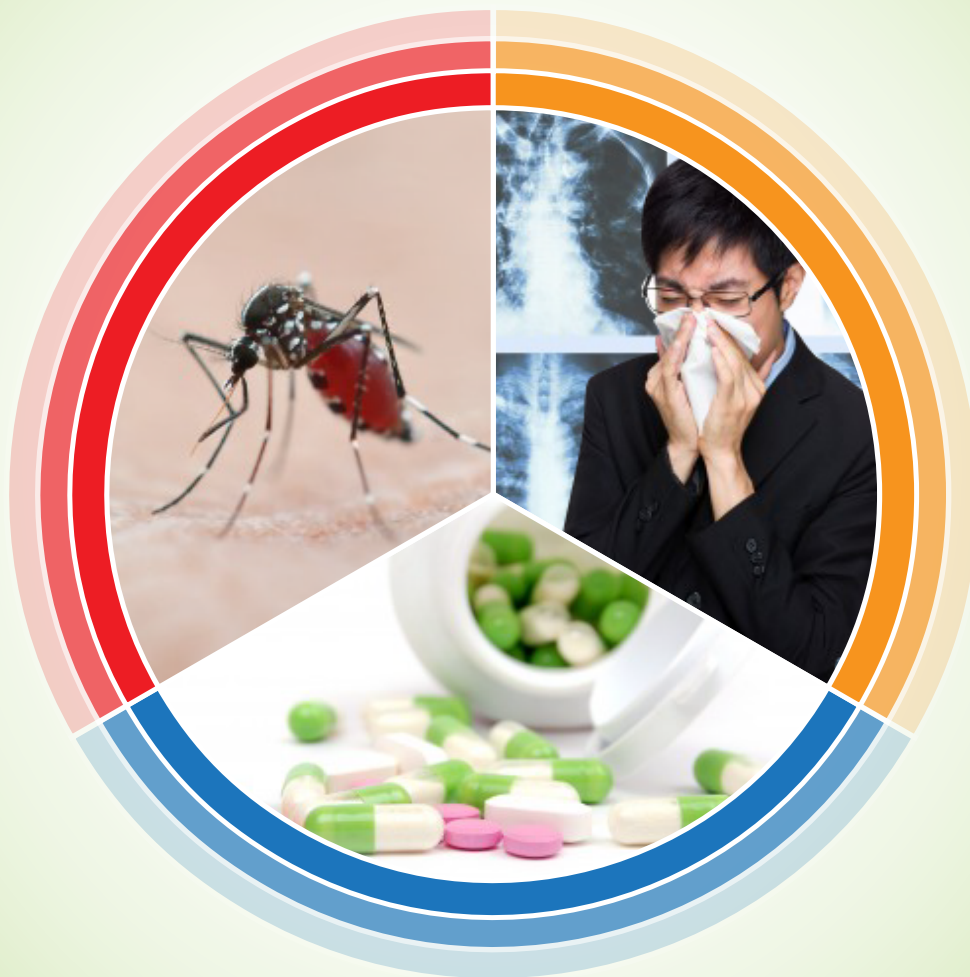


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2014 Volume 9 No. 2



Tackling Infectious Diseases in Primary Care

- ♦ *Onychomycosis nailed*
- ♦ *A Rejang River rash*
- ♦ *Malaysian CPG for the management of psoriasis vulgaris: An update*



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Tackling infectious diseases in primary care

Ng CJ

Editor in Chief

Dengue, tuberculosis (TB) and upper respiratory tract infections (URTIs) are three common infectious diseases encountered in the primary care setting in Malaysia. This issue of MFP features three review articles that highlight the diagnostic and treatment challenges faced by primary care doctors when managing these conditions.

Lum et al emphasise the importance of recognizing the three phases of dengue fever, i.e. febrile, critical and recovery phase, and monitoring the patient's clinical and blood changes according to these phases. In particular, warning symptoms (e.g. vomiting, abdominal pain, bleeding) and rising haematocrit are associated with plasma leakage, which often coincide with defervescence during the critical phase.⁽¹⁾ However, the disease progression of dengue is variable. Therefore, timely recognition of danger signs and rehydration is crucial in the management of dengue fever. For this, primary care doctors play a pivotal role in educating patients and ensuring timely referral for admission.

Pang addresses a less-discussed issue of latent tuberculosis infection (LTBI), which is increasingly being recognised as a measure to reduce TB transmission through close contact investigations.⁽²⁾ Screening for LTBI in close contacts of patients with TB has been advocated in countries with low disease burden and rich resources. However, in Malaysia, this practice remains controversial and the local guideline recommends that only close contacts of high-risk TB patients should be screened. Tuberculin skin test is the recommended screening tool but has its limitations; the cut-off level depends on patients' immune status and exposure risk. Newer test such as interferon gamma release assay is promising but is costly and needs more research evidence. Therefore, evidence to screen and treat LTBI is still weak and should, at best, limit to close contacts of high-risk populations.

Excessive antibiotic use in URTIs remains a problem in many parts of the Asia Pacific region. Teng revisits this issue by searching systematically for new evidence in the region and he confirms that there are still few studies on URTI and antibiotic use.⁽³⁾ Antibiotics have been used in URTI to treat Group A beta-haemolytic streptococcal (GAS) pharyngitis so as to prevent rheumatic fever. GAS infection is increasingly uncommon and the preferred antibiotic, penicillin V, is often not the drug prescribed in actual clinical practice. In addition, the lack of accurate clinical diagnostic prediction rule and test makes the diagnosis of GAS infection difficult. This contributes to over prescription of antibiotics and hence the growing problem of antibiotic resistance.

I hope that this issue of MFP will help you keep abreast of the current evidence on dengue, TB and URTI.

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Managing dengue fever in primary care: A practical approach

Lum LCS, Ng CJ, Khoo EM

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Abstract

Dengue is a common cause of illness seen in primary care in the tropical and subtropical countries. An understanding of the course of disease progression, risk factors, recognition of the warning signs and look out for clinical problems during the different phases of the disease will enable primary care physicians to manage dengue fever in an appropriate and timely manner to reduce morbidity and mortality.

Introduction

Dengue is a common cause of illness seen in primary care settings in tropical and subtropical countries. It is endemic in more than 100 countries of Africa, America, Eastern Mediterranean, South-East Asia and Western Pacific.¹ It is caused by dengue virus—a mosquito-borne flavivirus and transmitted by *Aedes aegypti* and *Aedes albopictus*.² There are four distinct dengue serotypes, DEN-1, 2, 3 and 4.

A report had shown that 30% of deaths due to dengue had sought medical attention within 24 hours of onset and 67% by 72 hours.³ Among the patients with dengue who were hospitalised, 83.9% had sought medical consultation at primary care level before admission and 68.7% had been seen on two or more occasions.⁴ The mean duration between first contact with primary care and hospitalisation was 1.4 days. Therefore, primary care physicians play a very important role in the early recognition and management of dengue fever when patients progress through the different phases of illness.

Diagnosis of dengue fever

Dengue viruses cause symptomatic infections or asymptomatic seroconversion. Patients with asymptomatic infection are viraemic and thus may be a source of infection. Symptomatic dengue infection is a systemic and dynamic disease. The incubation period lasts for 5 to 7 days and the onset of the illness is abrupt. It has a wide clinical spectrum, which includes both severe and non-severe clinical manifestations.⁵ Common presenting symptoms include high-grade fever, headache, retro-orbital pain, myalgia, arthralgia, nausea, vomiting and rash. The symptoms usually last for 2–7 days. As these symptoms are relatively undifferentiated in early stages, other differential diagnoses need to be considered in the first 72 hours. In patients with moderate-to-severe disease, the

course of the illness follows three phases: febrile, critical and recovery (Figure 1).

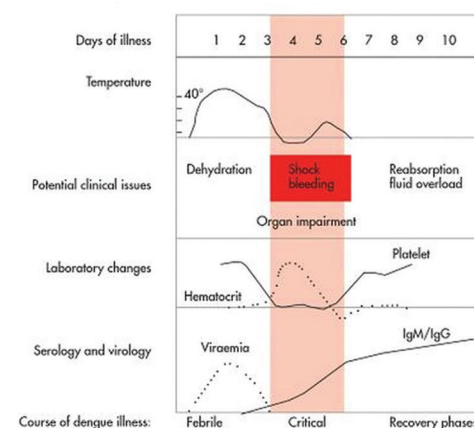


Figure 1. Course of dengue illness. (Yip WCL, 1980)⁶

The severity of the disease usually becomes apparent during defervescence, that is, during transition from the febrile to the afebrile phase. This often coincides with the onset of the critical phase, usually after 72 hours of fever. The critical phase is distinguished by the pathophysiological phenomenon of increased capillary permeability, which lasts approximately for 24 to 48 hours and is more frequently seen in secondary dengue infections. This phase is followed by the recovery phase. The key to achieve a good clinical outcome is to have an understanding of the different phases of the disease and be alert to the clinical problems that could arise during these phases.

Febrile phase of dengue

After the incubation period, the illness starts abruptly with high fever accompanied by non-specific symptoms such as facial

flushing, skin erythema, generalised body aches and headache. This febrile or viraemia phase usually lasts for 2 to 7 days. It can be clinically difficult to distinguish dengue from non-dengue febrile illnesses in the early febrile phase.

In a single-centre outpatient-based cohort study enrolling 214 patients aged 16 years and more with ≤ 72 hours of undifferentiated fever, 65% had a laboratory-confirmed diagnosis of dengue, whereas the rest were classified as other febrile illnesses (OFI).⁷ Of the 140 patients with dengue, 11.4% developed dengue haemorrhagic fever (DHF), no patients developed dengue shock syndrome (DSS) and 37.1% of patients required hospitalisation. In addition to a recent history of dengue within the family or neighborhood, the three early clinical predictors of dengue at ≤ 72 hours of fever were nausea and/or vomiting, postural dizziness and lower total white cell count compared to patients with OFI. Symptoms such as headache, myalgia, arthralgia and retro-orbital pain that were frequently reported by patients with dengue fever were also observed in patients with OFI with no significant differences between the two groups. Similarly, children with dengue were more likely to report anorexia, nausea and vomiting. They had a positive tourniquet test, lower total white cell counts, absolute neutrophil and monocyte counts and higher plasma ALT and AST than the children with OFI.⁸ Symptoms of upper respiratory tract infections such as injected pharynx and enlarged tonsils did not exclude dengue.⁹

After 2 to 3 days of high fever, anorexia and nausea, most patients may have varying degrees of dehydration and lethargy. The quality of life decreases to approximately 40% to 50% at the onset of fever with experiences of somatic pain and discomfort and difficulties in cognition, sleep, mobility, self-care and anxiety or depression.⁹ Mild haemorrhagic manifestations such as petechiae and mucosal membrane bleeding (e.g., nose and gums) may be seen.^{8,10} Easy bruising and bleeding at venepuncture sites are present in some cases. Massive vaginal bleeding (in women of childbearing age) and gastrointestinal bleeding may occur during this phase, although this is not common.⁷ The liver may be enlarged and tender after a few days of fever.⁴ The earliest change in the full blood count is a progressive decrease in white blood cell count, which should alert the physician to a high probability of dengue. This leucopenia is most likely due to a virus-induced down-regulation of haematopoiesis.

Critical phase

During the transition from febrile to afebrile phase, usually after day 3 or as late as day 7 of

fever, patients without an increase in capillary permeability improve without going through the critical phase. Their appetites improve and they feel better. Patients with increased capillary permeability, however, experience worsening of symptoms with the subsidence of high fever. Defervescence usually occurs on days 3 to 8 of illness when temperature drops to 38°C or less and remains below this level. Patients may have warning signs, mostly as a result of plasma leakage (Table 1). Warning signs usually precede the manifestations of shock and appear towards the end of the febrile phase, usually between days 3 and 7 of illness.

Table 1. Warning and danger signs and symptoms of dengue fever

Persistent vomiting >3 times a day
Severe abdominal pain
Lethargy and/or restlessness, sudden behavioural changes
Bleeding: epistaxis, black coloured stools, haematemesis, excessive menstrual bleeding, dark-coloured urine or haematuria
Postural hypotension—dizziness
Pale, cold clammy hands and feet
Not able to drink and less/no urine output for 4–6 h
Difficulty in breathing
Enlarged and/or tender liver
Clinical fluid accumulation
Rising HCT together with rapid fall in platelet count

In the full blood count picture, progressive leucopenia followed by a rapid decrease in platelet count usually precedes plasma leakage. An increasing haematocrit (HCT) above the baseline is another early sign.^{11,12} The period of clinically significant plasma leakage usually lasts 24–48 h. The degree of plasma leakage varies. A rising haematocrit precedes changes in blood pressure (BP) and pulse volume. The degree of haemoconcentration above the baseline haematocrit reflects the severity of plasma leakage; however, this can be masked by early intravenous fluid therapy. Usually pleural effusion and ascites are clinically detectable only after an intravenous fluid therapy unless the plasma leakage is significant, which is a case of patient in a state of shock. A right lateral decubitus chest radiograph, ultrasound detection of free fluid in the chest or abdomen or gall bladder wall oedema may precede clinical detection. In addition to the plasma leakage, haemorrhagic manifestations such as easy bruising and bleeding at venepuncture sites

occur frequently. Shock occurs when a critical volume of plasma is lost through leakage; it is often preceded by warning signs. Some patients progress to the critical phase of plasma leakage and shock before defervescence. In these patients, a rising haematocrit and rapid onset of thrombocytopenia or the warning signs indicate the onset of plasma leakage. Most patients with dengue having warning signs recover from intravenous rehydration, although some will deteriorate to severe dengue.

Recovery phase

As the patient survives the 24- to 48-hour critical phase, a gradual reabsorption of extravascular compartment fluid takes place in the following 48 to 72 hours. During this time, patient's general well-being improves, appetite returns, gastrointestinal symptoms

abate, haemodynamic status stabilises and diuresis ensues. Some patients may exhibit a confluent erythematous or petechial rash in small areas of normal skin described as "isles of white in the sea of red".¹³ Some may experience generalised pruritus. Bradycardia and electrocardiographic changes are common during this stage. The haematocrit stabilises or may become lower due to the dilutional effect of reabsorbed fluid. The white blood cell count usually starts to rise soon after defervescence but the recovery of the platelet count is typically later than that of the white blood cell count. Respiratory distress from massive pleural effusion and ascites, pulmonary oedema or congestive heart failure may occur during the critical and/or recovery phases if excessive intravenous fluids have been administered. Table 2 summarises the complications that can be encountered in the various phases of dengue.

Table 2. Medical complications seen in the febrile, critical and recovery phases of dengue

No.	Phase	Complication
1	Febrile phase	Dehydration: High fever may cause neurological disturbances and febrile seizures in young children
2	Critical phase	Shock from plasma leakage: Severe haemorrhage and organ impairment
3	Recovery phase	Hypervolaemia (only if intravenous fluid therapy has been excessive and/or has extended into this period) and acute pulmonary oedema

The various risk factors associated with severe disease of dengue are listed as below:

- Infants
- Young children
- Pregnant women
- Diabetes mellitus
- Hypertension
- Haemolytic conditions
- Older persons
- Obese patients

The revised dengue case classification

The development of the revised dengue case classification into dengue (with or without warning signs) and severe dengue (D/SD) was introduced in 2009 (Figure 2).¹⁴ The most recent systematic review compared the 1997 classification with the revised dengue case classification.¹⁵ Five years after its introduction, the D/SD classification is able to detect disease severity with high sensitivity and thus assisting the clinical management and potentially contributing to reduce mortality. It is recommended that a clinical diagnosis of dengue (e.g., probable dengue based on case definition or laboratory confirmed dengue) should be made first and then the warning signs should be applied to help in triage.

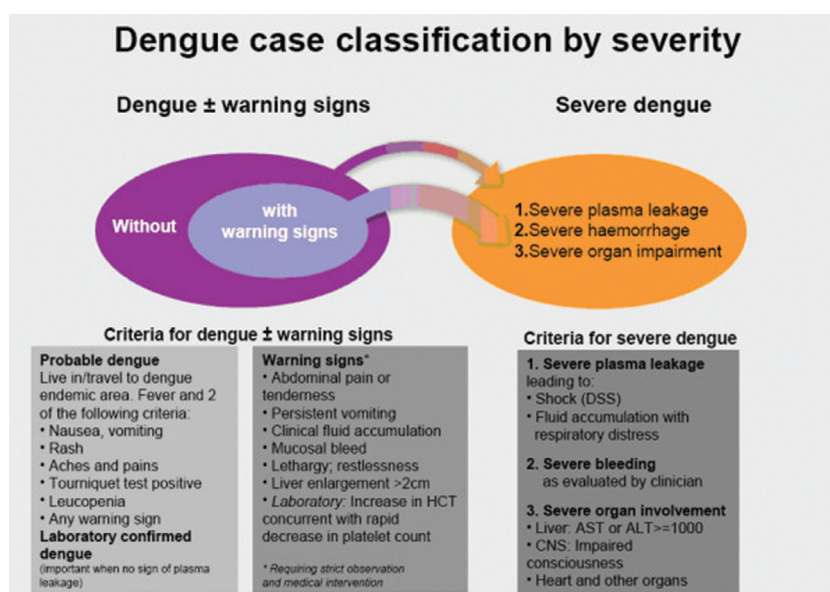


Figure 2. Dengue case classification by severity. (WHO, 2009)¹⁴

It is important to note that the warning signs should not be randomly applied without making a clinical diagnosis of dengue.

Clinical evaluation

Clinical evaluation of the patients involves four steps—history taking, clinical examination, investigations and diagnosis and assessment of disease phase and severity.

Step 1: A patient's history should include:

- Date of onset of fever onset (date is preferable to the number of days of fever)
- Other symptoms and severity
- Ask the 3 three golden questions:
 - Oral fluid intake—quantity and types of fluids
 - Urine output—quantify in terms of frequency and estimated volume and time of most recent voiding
 - Types of activities performed during this illness (e.g., can the patient go to school, work, market, etc?)

These questions, though not specific to dengue, give a good indication of patient's hydration status and how well the patient copes with his illness.

- Other fluid losses—such as vomiting or diarrhoea
- Presence of warning signs, particularly after the first 72 h of fever
- Family or neighbour with dengue or travel to dengue-endemic areas
- Medications (including non-prescription or traditional medicine) in use
 - List of medications and the time they were last taken
- Risk factors
- Jungle trekking or swimming in waterfall
 - Consider leptospirosis, typhus and malaria
- Recent unprotected sexual or drug use behaviour
 - Consider acute HIV seroconversion illness

Handout for homecare of dengue patients

(Important information to be given to family members at outpatient department)

A. What should patients do?

- Adequate bed rest
- Drink small volumes of fluids frequently. Types of fluids: include milk, fruit juice, isotonic electrolyte solution (ORS), rice water and, coconut water. Volume:
 - Young children at least 3 cups (~250 mL each) per day
 - Older children at least 4 cups per day
 - Adults at least 6 cups per day
- Keep body temperature below 39°C. If temperature rises >39°C, give patients paracetamol. Paracetamol is available in tablets (500 mg per tablet) or syrup (120 mg per 5 mL syrup). The recommended dose is 10 mg/kg/dose, not more than 4–6 times in 24 hours and not more than 4 days.
- Tepid sponging should be applied to the forehead, neck, armpits and inguinal regions. Lukewarm shower or bath is recommended for adults
- Daily follow-up*
- Watch out for warning/danger signs (Box 1)
- Source reduction—clear breeding sites in and around house

Handout for homecare of dengue patients

(Important information to be given to family members at outpatient department)

B. What should patients avoid?

- Aspirin or non-steroidal anti-inflammatory agents (NSAIDs)
- Too much paracetamol
- Intravenous fluid therapy at home is dangerous and will lead to complications

Figure 3. Handout for homecare of dengue patients

* There are 8 parameters to be assessed: 3 of them relate to peripheral perfusion (capillary refill time, colour and temperature of extremities, and peripheral pulse volume), 2 to the cardiac output (heart rate and blood pressure), 2 to organ perfusion (brain and kidney) and 1 to respiratory compensation for shock. By holding patient's hand, you can evaluate 4 of these parameters.

Step 2: Physical examination**Assess:**

- Mental state
- Hydration status
- Peripheral perfusion done by holding the patient's hand, assessing the colour, capillary refill time, temperature of the extremities, pulse volume and pulse rate (CCTVR)
- Haemodynamic status (Table 3)
- Tachypnoea/acidotic breathing/pleural effusion
- Abdominal tenderness/hepatomegaly/ascites
- Rash and bleeding manifestations
- Tourniquet test (repeat if previously negative or if there is no bleeding manifestation)

Table 4. Haemodynamic assessment—continuum of haemodynamic changes

*There are 8 parameters to be assessed: 3 of them relate to peripheral perfusion (capillary refill time, colour and temperature of extremities, and peripheral pulse volume), 2 to the cardiac output (heart rate and blood pressure), 2 to organ perfusion (brain and kidney) and 1 to respiratory compensation for shock. By holding patient's hand, you can evaluate 4 of these parameters.

Parameters	Stable circulation	Compensated shock	Hypotensive shock
Conscious level	Clear and lucid	Clear and lucid	Restless and combative
Capillary refill time	Brisk (<2 seconds)	Prolonged (>3 seconds)	Very prolonged and mottled skin
Extremities	Warm and pink	Cool peripheries	Cold and clammy
Peripheral pulse volume	Good volume	Weak and thready	Feeble or absent
Heart rate	Normal heart rate for age	Tachycardia	Severe tachycardia or bradycardia in late shock
Blood pressure	Normal blood pressure for age	Normal systolic pressure but rising diastolic pressure	Hypotension (see definition below)
	Normal pulse pressure for age	Narrowing pulse pressure (≤ 20 mm Hg) Postural hypotension	Unrecordable blood pressure
Respiratory rate	Normal respiratory rate for age	Tachypnoea	Hyperpnoea or Kussmaul's breathing (metabolic acidosis)
Urine output	Normal	Reducing trend	Oliguria or anuria

Step 3: Investigation

If facilities are available, a full blood count (FBC) should be done at the first visit to

establish the baseline haematocrit. However, a normal FBC during the first 72 hours of illness does not exclude dengue infection. FBC should be repeated daily from the 3rd

day onwards until the critical phase is over. The haematocrit in the early febrile phase can be used as the patient's own baseline. A decreasing white blood cell and platelet count makes the diagnosis of dengue very likely. Leucopenia usually precedes the onset of the critical phase and has been associated with severe disease. A rapid decrease in platelet count, concomitant with a rising haematocrit compared to the baseline, is suggestive of progress in the plasma leakage/critical phase of the disease. These changes are usually preceded by leucopenia (≤ 5000 cells/mm³). In the absence of the patient's baseline haematocrit, age-specific population haematocrit levels can be used as a surrogate during the critical phase. There is however, no local data on the normal range of HCT in children and adults. In the absence of a baseline HCT level, a HCT value of $>40\%$ in female adults and children aged <12 years and $>46\%$ in male adults should raise the suspicion of plasma leakage.

If facilities for a FBC are not available or if resources are limited, such as in an outbreak, a FBC should be done at the first visit to establish the baseline. This should be repeated after the 3rd day of illness and in those with warning signs and with risk factors for severe disease.

Dengue-specific laboratory tests should be performed to confirm the diagnosis. However, it is not necessary for acute management of patients except in cases with unusual manifestations. Additional tests such as liver function test, glucose, serum electrolytes, urea and creatinine, bicarbonate or lactate, cardiac enzymes, electrocardiogram (ECG) and urine-specific gravity should be considered in patients with co-morbidities or in patients with clinically severe disease as indicated.

Step 4: Diagnosis, assessment of disease phase and severity

Based on the evaluations of history, physical examination and/or FBC and haematocrit, one could clinically determine the diagnosis of dengue, the phase patient is in, the presence or absence of warning signs, the hydration and haemodynamic state of the patient and whether the patient requires admission.

Disease notification and management decision

Disease notification

In dengue-endemic countries such as Malaysia, cases of suspected, probable and confirmed dengue should be notified by telephone within 24 hours to local health office so that appropriate public-health measures can be

initiated. Laboratory confirmation is not necessary before notification, but it should be obtained. In non-endemic countries, usually only confirmed cases should be notified.

Management decisions

Depending on the clinical manifestations and other circumstances, patients may either be sent home (Group A), referred for in-hospital management (Group B), or required emergency treatment and urgent referral (Group C).¹⁶

Group A (patients who may be sent home)

These are patients who can tolerate adequate volumes of oral fluids (at least 6–8 glasses depending on age), pass urine at least once every 6 hours and do not have any warning signs (particularly when fever subsides).

The key to successful ambulatory management is to give clear and definitive advice on the care that the patient needs to receive at home. These are bed rest, frequent oral fluids and fever management (Box 1). Patients with ≥ 3 days of illness should be reviewed daily for ability to drink adequate fluids and disease progression (indicated by decreasing white blood cell and platelet counts, increasing haematocrit, defervescence and warning signs) until they are out of the critical period.

Patients should be advised to return to the nearest hospital immediately if they develop any of the warning signs. They should be advised on the following action plan:

- Bed rest may relieve some of the physical discomforts in the febrile phase.
- Adequate oral fluid intake may reduce the number of hospitalisations.¹⁷ Encourage oral intake to replace fluid loss from fever and vomiting. Small amount of oral fluids should be given frequently to the patients with nausea and anorexia. The choice of fluids should be based on the local culture like coconut water in some countries and rice water or barley water in others. Oral rehydration solution or soup and fruit juices may be given to prevent electrolyte imbalance. Commercial carbonated drinks that exceed the isotonic level (5% sugar) should be avoided. They may exacerbate hyperglycaemia related to physiological stress from dengue and diabetes mellitus. Sufficient oral fluid intake should result in a urinary frequency of at least 4–6 times per day. A record of oral fluid intake and urine output should be maintained and reviewed daily.

- Take paracetamol for high fever if the patient feels uncomfortable. Sponge with tepid water if the patient still has a high fever. Do not give acetylsalicylic acid (aspirin), ibuprofen or other non-steroidal anti-inflammatory agents (NSAIDs) or intramuscular injections; as these aggravate gastritis, gastrointestinal tract bleeding and intramuscular hematoma.
- Instruct caregivers to bring the patient to a hospital immediately if any of the following occurs: no clinical improvement, deterioration around the time of defervescence, severe abdominal pain, persistent vomiting, cold and clammy extremities, lethargy or irritability/restlessness, bleeding (e.g. black stools or coffee-ground vomiting), shortness of breath, not passing urine for more than 4–6 hours.

Admission during the febrile period should be reserved for those who are unable to manage adequate oral hydration at home, infants, and those with risk factors. This group of patients should be followed up for daily assessment until they are 24 to 48 hours without fever.

Group B (patients who should be admitted for in-hospital management)

These patients should be admitted for close observation as they approach the critical phase. These include patients with:

- Warning signs only, with no evidence of shock
- Risk factors that may make dengue or its management more complicated (such as pregnancy, infancy, old age, obesity, diabetes mellitus, hypertension, heart failure, renal failure and chronic haemolytic diseases) and certain social circumstances (such as living alone or living far from a health facility without reliable means of transport).

Rapid fluid replacement in patients with warning signs is the key to prevent progression to shock. If the patient has dengue with warning signs or signs of dehydration, judicious volume replacement by intravenous fluid therapy (5 mL/kg of 0.9% saline for 1 h, then reduce rate to 3–4 mL/kg/hour for 1–2 h) from this early stage may modify the course and the severity of disease. These patients should be admitted for further observation as plasma leakage may progress during the next 24 to 48 hours.

Table 5. Admission criteria

Warning signs	Any of the warning signs for admission (Table 6)
Signs and symptoms related to dehydration and hypovolemia (possible plasma leakage)	Dehydrated patient, unable to tolerate oral fluids Dizziness or postural hypotension Profuse perspiration, fainting, prostration during defervescence Hypotension or cold extremities Difficulty in breathing/shortness of breath (deep sighing breaths)
Bleeding	Spontaneous bleeding, independent of the platelet count
Organ impairment	Renal, hepatic, neurological or cardiac Enlarged, tender liver, although not yet in shock Chest pain or respiratory distress, cyanosis
Findings through further investigations	Rising haematocrit with rapid decrease in platelet count (note that there is no “magic” level of platelet count to admit or not to admit a patient) Pleural effusion, ascites or asymptomatic gall-bladder thickening
Co-existing conditions	Pregnancy Co-morbid conditions, such as diabetes mellitus, hypertension, peptic ulcer, haemolytic anemia and others Overweight or obese (rapid venous access difficult in emergency)
Social circumstances	Infancy or old age Living alone Living far from health facility Without reliable means of transport

Table 6 . Warning signs for admission

Clinical	Laboratory
Severe abdominal pain	Rising haematocrit
Persistent vomiting	Sudden decrease in platelet count
Lethargy, restlessness	
Mucosal bleed	
Liver enlargement	

Group C (patients with severe dengue who require emergency treatment and urgent referral)

These are the patients who are in the critical phase of the disease and have:

- Severe plasma leakage leading to dengue shock
- Severe haemorrhages
- Severe organ impairment (hepatic damage, renal impairment, cardiomyopathy, encephalopathy or encephalitis)

Patient who is in shock should be transferred to the emergency department of the nearest hospital by ambulance and should be accompanied by a doctor. All patients with severe dengue should be admitted to a hospital with access to blood transfusion facilities. Judicious intravenous fluid resuscitation is essential and usually the sole intervention required. During the period of plasma leakage, the crystalloid solution used should be isotonic and the volume is just sufficient to maintain an effective circulation. Plasma loss should be replaced immediately and rapidly with isotonic crystalloid solution. In the case of hypotensive shock, a colloid solution is preferred. If possible, obtain haematocrit levels before and after fluid resuscitation. Intravenous fluid therapy of 5 to 10 mL/kg of 0.9% saline over 1 hour may be life-saving. This should be started as soon as possible. The rate of fluid infusion should be slowed down to 7 mL/kg/h for the second hour if the patient improves.

Post-dengue fever monitoring

Most patients with dengue fever after the recovery phase do not need to be reviewed. However, some patients with deranged liver function tests need a repeated test done after discharge from hospital to ensure if they feel well and the liver functions are recovering.

Conclusions

Dengue fever is a common disease encountered in primary care especially in the tropical countries. An understanding of the course of the disease progression and clinical problems to look out the different phases of the disease will enable primary care physicians to manage dengue fever in an appropriate and timely manner to reduce morbidity and mortality. With appropriate and timely treatment, the morbidity and mortality can be reduced. It is important for primary care doctors to adopt a practical approach to assess, classify and manage dengue fever. It is crucial to identify red flags and high-risk individual and refer them accordingly.

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Conflict of interest

None.

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Close contact investigation of TB in high-burden, low- and middle-income countries

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Abstract

Tuberculosis (TB) remains a very common disease in most of the low- and middle-income countries. As a result of high disease burden, TB control measures in these countries are usually concentrated on intensifying active disease case-finding and early treatment of infectious TB. On the contrary, in countries with low disease burden, the focus is on contact investigation to identify latently infected individuals and prophylactically treating them to prevent disease reactivation and transmission. These two strategies are deemed important for the effective TB control. Nonetheless, WHO cautions that targeted contact investigation and latent TB infection (LTBI) treatment should only be undertaken by countries that have the operational capacity/resources and have achieved $\geq 85\%$ treatment success rate of active TB. The screening of LTBI is further challenged by the lack of a “gold standard” test to identify and validate individuals with this condition. Tuberculin skin test (TST) is still the preferred investigation as it is cheap, widely available and validated in many trials. The sensitivity and specificity of the newer test—interferon gamma release assay (IGRA) for LTBI screening has been encouraging in low prevalence countries. However, the evidence supporting such usage remains uncertain in high burden settings. Diagnosis of LTBI should adhere to the strict criteria outlined in the guidelines to avoid misdiagnosing active TB as LTBI. The treatment of the latter involved only one or two anti-TB drugs. It has been demonstrated that in the properly conducted contact screening and LTBI treatment, chances of the emergence of multi-drug-resistant TB is very low.

Introduction

Tuberculosis (TB) remains one of the commonest infections in the world. In 2012, it was estimated that 8.6 million people developed active TB and 1.3 million died of the disease¹. Despite the presence of effective anti-TB treatment over the past 60 years, this “white plague” is still ravaging many parts of the world—Malaysia is certainly not exempted from this menace. In 2011, there were a total of 19,251 TB cases notified.²

Historically, the perseverance of TB was linked to overcrowding, poor sanitation and poverty. However, improved socioeconomic status did not necessarily guarantee better disease control. This is in part due to difficulties faced in early detection of active TB. Contrary to the common belief, the early manifestation of TB is generally quite subtle and hence do not normally alert the affected individuals to seek medical advice—this gap often allows bacilli to spread and infect many contacts before they are contained. Besides, *Mycobacterium tuberculosis* possesses a unique ability to remain in a state of dormancy in human body for years and can be reactivated when the immune system of the host turns weak.

In countries with low burdens of TB, most active cases have occurred among persons who were once infected, contained and then later develop the active disease. The identification and treatment of these individuals have been shown to be effective for the prevention of TB reactivation and transmission.^{3,4} In United States, this strategy has been estimated to have prevented 44% of active TB cases from 1993 to 2004.⁵

In low- and middle-income countries, where the burdens of TB are often high, the strategy is mainly concentrated on intensifying active case finding. Nonetheless, WHO currently recommends contact investigation (especially for household and close contacts) to be performed for at least 3 high-risk populations in these settings: children aged < 5 years, people living with/or have high-risk of HIV infection and contacts of index cases with multidrug-resistant-TB (MDR-TB) or extensively drug-resistant-TB (XDR-TB).⁶⁻⁷

Contact investigation

Contact investigation involves the systematic evaluation of the contacts of known TB patients to identify active disease or LTBI. In a recent systematic review and meta-analysis of

contact investigation for TB, where 95 studies had come from the low- and middle-income settings, the prevalence of active TB among all contacts was 3.1% (95% CI 2.2–4.4%, $I^2 = 99.4\%$), and LTBI was 51.5% (95% CI 47.1–55.8%, $I^2 = 98.9\%$)⁸. Early identification of active TB among these contacts means a better chance of cure and a reduction in further transmission. Besides, contact investigation also allows identification of people who are latently infected and at high risk for active TB.

Criteria for LTBI Diagnosis

The following are the diagnostic criteria recommended for LTBI diagnosis. Items 1–3 are essential criteria, whereas the 4th criterion may be considered if the patient's CXR shows any abnormal findings.

No.	Criteria	Findings
1	Clinical manifestation	No symptom/sign to suggest active disease
2	Tuberculin skin test (TST)/ Interferon gamma release assays (IGRA)	Positive TST or IGRA
3	Chest imaging	Normal CXR (<i>If it is abnormal, another CXR performed ≥ 6 months before or after this should not show any interval change</i>) ⁹
4	Sputum/bronchoalveolar lavage	Negative AFB direct smear/Mycobacterium culture on induced sputum or bronchoalveolar lavage (<i>if indicated</i>)

It is noteworthy that this is not a subtle form of active TB. The patients must not have any symptoms which may otherwise suggest active disease. Their chest radiographs are typically normal—although occasionally some abnormalities may be found. In the latter case, these patients should be further assessed. Healed lesions are often characterised by nodules and fibrotic lesions that are well-demarcated. The calcified nodular lesions as well as apical/basal pleural thickening pose a low risk for future progression to active TB.¹⁰ In any case, if doubts still exist, a sputum induction or bronchoalveolar lavage may be considered.

Challenges in making a diagnosis of LTBI

The diagnosis of LTBI has always been limited by the lack of a “gold standard” test. The tuberculin skin test (TST) has been used for more than a century to diagnose this condition. The TST is based on the principle of delayed-type hypersensitivity reaction towards the intradermal inoculation of tuberculin (also known as purified protein derivative). In subjects who have been infected, their sensitised memory T-cells will

What is LTBI?

When the TB bacilli are in dormant state, individuals who harbour these organisms are said to be having latent infection. Hence, LTBI can be defined as infection with *Mycobacterium tuberculosis* complex, where the bacteria may be alive but in the state of dormancy and not currently causing any active disease/symptoms.

react towards the tuberculin to produce a local inflammatory response, manifesting as an indurated and erythematous skin lesion. Measurements of skin induration at the inoculation sites after 48–72 h are used to gauge the likelihood of LTBI/active TB in the suspected patients.¹¹ In general, a skin induration of ≥ 5 mm is considered as significant. However, various cut-off points (≥ 5 mm, ≥ 10 mm and ≥ 15 mm) have been recommended to predict the likelihood of latent infection in patients with different immune status and exposure risks using a mathematical calculation called “positive predictive value”. For immunocompromised patients, lower cut-off points are used to predict positive results. Similarly, for patients with recent close contact or individuals living in high prevalence areas, lower cut-off points are likely to indicate positive tests. On the other hand, a higher cut-off point needs to be used in low prevalence areas to reduce the likelihood of false-positive result. Despite this mathematical adjustment, the sensitivity of TST is still considerably lower in immunocompromised subjects.^{12,13}

The other limitation of TST is that the tuberculin contains more than 200 proteins

which are widely shared among mycobacteria other than *M. tuberculosis*, including *M. bovis* and many non-tuberculous mycobacteria (NTM). As a result of this cross-reactivity, it has a lower specificity in population extensively vaccinated with BCG and in tropics where NTM infection is more commonly occurred.

In order to circumvent some of these limitations, a novel technique called interferon-gamma release assay (IGRA) has been developed in recent years. Two IGRAs have so far been approved and commercially available—the T-SPOT.TB test and the QuantiFERON-GIT (Gold In-Tube) test. In the IGRAs, only two or three specific antigens are used. They include the ESAT-6 (early secretory antigenic target-6), CFP-10 (culture filtrate protein-10) and TB 7.7 peptides (the latter only included in QuantiFERON-GIT test). These antigens are expressed in *M. tuberculosis* complex (*M. tuberculosis*, *M. bovis* and *M. africanum*), but are absent in all strains of *M. bovis* BCG and the majority of NTM.^{14,18,15,16,17}

The IGRA is an ex vivo test in which blood from a suspected individual is collected and tested outside the body. When it is incubated with the specific antigens, the T-cells of the infected/sensitised individuals will be stimulated to secrete interferon- γ . In the QuantiFERON-GIT test, the quantity of this chemokine in the test tube supernatant is measured by means of the enzyme-linked immunosorbent assay (ELISA). For the T-SPOT.TB test, mononuclear cells that harbour interferon- γ are enumerated by the enzyme-linked immunospot test (ELISPOT).

Comparison between IGRA and TST

Sensitivity and Specificity

The sensitivity and specificity of the IGRAs and TST varied significantly across different studies. In two different recent meta-analysis and systematic review of IGRAs for the diagnosis of LTBI by Menzies et al. and Pai et al., it was found that the pooled sensitivity of QuantiFERON-TB tests were 70% (95% CI, 63–78%) for QuantiFERON-TB GIT test and 78% (CI, 73–82%) for QuantiFERON-TB Gold test. The pooled sensitivity of another IGRA, the T-SPOT.TB was at 90% (CI, 86–93%). When compared to TST with a pooled sensitivity of 0.77 (CI, 0.71–0.82), it was concluded that the IGRAs were as good as the TST in identifying active TB, although the sensitivities were not consistent across tests and populations. It was also indicated that the T-SPOT.TB might be more sensitive than the QuantiFERON tests and the TST.

In addition, both IGRAs were highly specific—the pooled specificities for both QuantiFERON tests were 99% among the non-BCG-vaccinated participants (CI, 98–100%) and 96% (CI, 94–98%) among the BCG-vaccinated participants. The pooled specificity of T-SPOT.TB (including its precommercial ELISpot version) was 93% (CI, 86–100%).

The specificity of TST in non-BCG-vaccinated participants was consistently high (97% [CI, 95–99%]). However, the pooled specificity of TST in the BCG-vaccinated populations was low at 59% (CI, 46–73%) and highly heterogeneous.^{18,19}

Advantages of IGRAs compared to TST

When compared with the conventional TST, the IGRAs have the following added advantages:

- Only a single visit is required for the IGRAs.
- Repeat TSTs often result in enhanced reaction towards the tuberculin (the “booster effect”). This may complicate the interpretation of subsequent test results. As IGRAs are performed ex vivo, repeat testing does not lead to booster effect.
- Due to the utilisation of more specific antigens, there are less false-positive cases diagnosed with IGRAs, particularly in countries where BCG vaccination is practiced. Lower false-positive cases translate into a reduction of unnecessary treatment and cost saving. It is also noteworthy that LTBI treatment is not entirely risk free.²⁰

Limitations of IGRAs

- Limited data are available for IGRAs in children younger than 5 years of age (particularly those <2 years of age), immunocompromised persons, and on serial testing.^{21–25}
- Recently, an expert group commissioned by WHO concluded that the evidence of IGRAs in LTBI screening for healthcare workers, contacts and outbreak investigations in the low- and middle-income countries was very low. This was due to the fact that the study designs in these settings were highly heterogeneous.²⁵ As a result, no firm recommendation could be made.
- The cost of IGRAs could be prohibitive.
- Like TST, the sensitivity of IGRAs is also affected by the immune status of the subjects.^{24,26}

Which diagnostic test should be used—TST or IGRA?

While TST may be imperfect, it remains the most practical, cheap and widely available test to identify individuals with LTBI in low- and middle-income countries. Besides, for children younger than 5 years of age, it should be the preferred tool for screening. The measurements recommended for positive TST in various risk groups are well-established and the treatment effects have been proven in various studies. IGRA may be reserved for situations where repeat testing is required, e.g. healthcare worker screening or conditions where the result of TST is less certain, e.g. TST in the range of 5–9 mm.

Algorithm of investigation in close contact screening

In the context of close contact investigation, the contacts should be interviewed to elicit any symptoms suggestive of active TB, e.g. cough, anorexia, weight loss, night sweats and/or fever which have lasted for more than 2 weeks. If these symptoms are present, they should be investigated as per usual active TB investigations, e.g. sputum acid-fast bacillus (AFB) direct smear, sputum mycobacterial culture and chest radiograph. On the other hand, if they have no symptom to suggest active TB, they could be assumed to have either LTBI or no infection:

- a. A TST/IGRA would be a reasonable preliminary test (instead of a CXR).
- b. For those who tested positive are considered to have LTBI.
- c. For those who tested negative are considered to have no LTBI. However, caution should be exercised for contacts who are immunocompromised as false-negative result may be produced. For the latter, empirical LTBI treatment may be considered despite a negative test.
- d. Before latent TB treatment being initiated, a chest radiograph should be performed to rule out active TB.
- e. If there is any suspicion of active pulmonary TB, an induced sputum or bronchoalveolar lavage should be sent for AFB direct smear and mycobacterial culture.

Who should be screened for latent TB?

Based on the Malaysian guidelines and other guidelines from low prevalence countries, the following categories of individuals should be considered for screening:

- Contacts who have been recently exposed to an index case of infectious TB.
- Residents and employees of high-risk congregate settings (such as correctional facilities, prisons, nursing homes, homeless shelters, hospitals and other healthcare facilities).
- Immigrants from high endemic countries, particularly the recent immigrants (<2 years).
- Individuals who are at high risk of developing TB reactivation or acquiring active TB, for example, HIV-infected individuals, chronic dialysis patients, transplant recipients, patients who are going to receive immunosuppressive therapy and people who inject drugs.

The advantage of targeted screening is that these individuals are at high risk of acquiring TB as well as developing reactivation. Besides, the rate of false-positive results in this target groups is considerably reduced.¹⁰ In the healthcare environment and other high-risk congregate settings, where continuous and repeated exposure are likely, one must carefully weigh the benefit of treatment against the risk of reinfection. Treatment should only be considered if the long-term infection control can be ensured. For close contacts younger than 5 years, the risk of progression to active disease is high after primary infection—10% to 20% went on to develop TB disease. Hence, this group of patients should be routinely screened and treated.^{27,28}

Should contact investigation be performed in high prevalence countries?

Treatment of LTBI has the potential benefit of breaking the chain of transmission before the infection becomes active. In addition, this strategy is particularly valuable in places with high prevalence of HIV/MDR-TB/XDR-TB, where treatment of active disease has a lower success rate.⁷ Nonetheless, WHO recommends that contact investigation should be determined on the basis of local epidemiology of TB, operational capacity and resources. In general, contact investigation should be assigned a lower priority in countries or areas where treatment success is <85%.

How should LTBI be treated?

LTBI could be treated with one of the following regimens.²

Table 1: Recommended regimens for LTBI treatment

Drugs	Duration (months)	Interval	Completion criteria
Isoniazid	6–9	Daily	180 doses in 9 months (6-month regimen) 270 doses in 12 months (9-month regimen)
Isoniazid + rifampicin	3–4	Daily	120 doses within 6 months
Rifampicin	4	Daily	120 doses within 6 months
Isoniazid and rifapentine*	3	Once weekly	12 doses in 3 months

*this regimen is unsuitable for certain subgroups (see remark below)

*Remark: This regimen is not recommended for:

- Children younger than 2 years
- People with HIV/AIDS who are taking antiretroviral treatment
- People presumed to be infected with isoniazid- or rifampicin-resistant *Mycobacterium tuberculosis*
- Pregnant women or women expecting to become pregnant within the 12-week regimen

Note: This recommendation is adapted from “Centers for Disease Control and Prevention. Treatment Options for Latent Tuberculosis Infection”. Available at http://www.cdc.gov/tb/publications/factsheets/treatment/LTBI_treatment_options.htm.

Isoniazid is the preferred choice as it has a long-established efficacy track record to prevent TB reactivation. This regimen is also the preferred option for HIV-infected people taking antiretroviral treatment and children aged 2–11 years. The recommended duration of LTBI treatment for HIV-seropositive patients is similar to those with HIV-seronegative patients. This decision is supported by a meta-analysis which showed no difference in the development of active TB between the 6- and 12-month therapy (RR = 0.6, 95% CI 0.3–1.1).²⁹

For immunocompromised patients, the skin induration size may be less important in determining LTBI treatment. Instead, the history of TB exposure (duration and proximity of contact with the index case) often dictates the need for treatment. For instance, in a Cochrane review in HIV infected persons, the isoniazid preventive therapy (IPT) reduces the risk of developing confirmed, probable or possible TB by 33% regardless of their TST status (RR = 0.7, 95% CI 0.5–0.9). However, for those who were TST positive,

this reduction improved to 64% (RR = 0.36, 95% CI 0.22–0.61)).⁴

Regimen with “rifampicin and pyrazinamide for 2 months” is no longer recommended due to concerns on severe liver injury and deaths.³⁰

Isoniazid and rifapentine³¹ are the latest addition to the LTBI treatment regimens. The 12-dose regimen does not replace other recommended LTBI treatment regimens; it is another effective regimen option for otherwise healthy patients aged ≥12 years who have increased risk of developing TB.

How effective is LTBI treatment in preventing TB reactivation?

Most randomised controlled clinical trials of isoniazid for the treatment of LTBI were conducted in the 1950s and 1960s.³² Many of them compared the 12-month isoniazid treatment to the placebo arm. In one trial, conducted by the International Union Against Tuberculosis (IUAT), various durations (3-, 6- and 12-month) of isoniazid therapy were

studied to evaluate their effectiveness in preventing TB reactivation among persons with fibrotic pulmonary lesions consistent with inactive TB. It was found that TB reactivations were prevented in 69% and 93% of treatment compliant participants who had taken 6 and 12 months of therapy.³³ An analysis performed by Comstock shows that protection conferred by a 9-month isoniazid therapy is greater than that of a 6-month therapy. However, it is unlikely that further protection is conferred by extending the duration of treatment from 9 to 12 months.³⁴

Why treatment of LTBI in high prevalence countries may not be as effective as that in the low prevalence countries?

BCG vaccinations are generally implemented in high prevalence countries. This may result in higher false-positive cases. Treatment of LTBI is most effective if it is given to individuals with recent contacts. In a study of British schoolchildren, 2550 unvaccinated participants had TST converted during the study. Of these, 121 (4.7%) developed clinical TB within 15 years of entry into the study but most of them (82%) developed active disease within 2 years of conversion.³⁵

In high prevalence countries, some of the positive cases identified in close contact screening may be due to remote infection rather than recent infection. As a result, the treatment effect (prevention of TB reactivation) will be diluted. Reinfection may occur in the same individuals who have completed LTBI treatment upon re-exposure to an infectious individual. This risk is obviously greater in high prevalence countries.

Is there any risk of inducing drug-resistant *Mycobacterium tuberculosis*?

Emergence of drug-resistant *Mycobacterium tuberculosis* during treatment is a function of

the TB bacillus population size. In patients with genuine LTBI, the number of actively multiplying bacteria is so small that this risk is virtually non-existent. However, concerns still exist if some active TB cases are being treated accidentally as LTBI. Thus, all patients with LTBI should be thoroughly investigated before treatment initiation. The minimal standard of screening, as outlined above, should be observed.

Future direction

It has been shown that improved socioeconomic status does not automatically translate into significant reduction in TB incidence. Hence, policy-makers and healthcare providers in the low- and middle-income countries will now have to find a more innovative way to improve TB control. No doubt, traditional strategies such as intensifying case detection, early treatment of infectious TB, improving treatment adherence and completion rate should still remain the core approaches to battle this menace. However, it is perhaps time for us to take stock from strategy adopted by the advanced countries in teasing out the hidden pool of TB.

Although it is desirable to have large-scale prospective randomised longitudinal studies to compare the efficacy of LTBI treatment versus standard care in high burdens, low- or middle-income countries, this is a feat that is difficult to come by due to the requirement of enormous funding and manpower. Perhaps, a smaller scale, proof-of-concept cluster randomised control study may be more attainable⁷. If this proved efficacious, a mathematical modelling to estimate the cost-effectiveness of such approach could be undertaken before the incorporation of LTBI screening and treatment in the national TB programme of these settings.

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Antibiotic prescribing for upper respiratory tract infections in the Asia-Pacific region: A brief review

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Abstract

This review highlights the high prevalence of antibiotic use for upper respiratory tract infections (URTIs) in a larger part of the Asia-Pacific region. Since URTIs are one of the common reasons for primary care consultations in this region, inappropriate use of antibiotic in both quantity and drug choice has greatly influenced the development of antibiotic resistance. Notwithstanding the paucity of Asia-Pacific data on the above issues, the available information suggests urgent actions needed to be taken to promote judicious antibiotic use at the point-of-care through a multi-pronged approach targeting the patients/consumers (or parents), healthcare providers and health care systems.

Introduction

Antibiotics loom large in the public imagination of the benefits of modern medical advances. Their introduction in the early twentieth century coincided with noticeable decline in mortality and improvement in quality of life of the general population. However, the improvement in social conditions and economic progress probably should receive more of that credit.¹ In the recent decades, the emergence of antibiotic resistance has been raising an alarm in the international stage and precipitating repeated calls for more judicious use of antibiotics.² Inappropriate antibiotic therapy in ambulatory care, especially for upper respiratory tract infections (URTIs), has been cited to have a major influence on the occurrence of antibiotic resistance.² This review therefore focuses on the problem of over-prescribing of antibiotics for URTIs and identifies the strategies that can be implemented to contain the problem. A comprehensive search for relevant original articles and systematic reviews has been done with a focus on the situation prevailing in the Asia-Pacific region. In this article, Asia-Pacific region has been taken in to the consideration including countries or political entities of East Asia (including South East Asia) and Oceania but excluding Russia and east coast of America).

In writing this review, answers of the following questions are sought:

1. What is the prevalence of group A beta-haemolytic *Streptococcus* isolation in children and adults presenting with URTIs?

2. What is the antibiotic prescribing rate for URTIs in primary care in the Asia-Pacific region?
3. What are the misconceptions regarding antibiotic use for URTIs?
4. What interventions have been done with the aim of reducing antibiotic prescribing rate in URTIs?

PubMed search was conducted using the combinations of relevant MESH terms (e.g., pharyngitis, respiratory tract infections, common colds, anti-bacterial agents, inappropriate prescribing, meta-analysis, etc.) supplemented by searching Google Scholar and checking reference section of the retrieved articles. Selected articles were primarily published between January 2000 and June 2014.

Definition

Anatomically speaking, upper respiratory tract refers to the part of the respiratory system that lies above the vocal cords. The phrase "upper respiratory tract infections (URTI)" has been defined inconsistently in the research literatures. The international classification of primary care (ICPC-2)³ provided the following rubrics for six clinical conditions that some researchers would consider as URTI (see Box 1), whereas others limit the "URTI" only to presumed viral infection of the upper airways (rubric R74 in ICPC-2). In clinical practice, infections commonly affect two or

more contiguous areas of the upper airways; hence, words such as pharyngo-tonsillitis and rhinosinusitis are often used. In this review, the phrase “upper respiratory tract infections (URTIs)” was used, including ICPC-2 rubrics R72 to R77 but excluding R75 and H71.

Box 1: ICPC-2 rubrics for “URTI”

R72 : Strept throat (includes streptococcal pharyngitis)

R74 : Upper respiratory infections, acute (includes common cold, coryza and acute pharyngitis)

R75 : Sinusitis, acute/chronic

R76 : Tonsillitis, acute

R77 : Laryngitis/tracheitis

H71 : Otitis media, acute

Aetiology of URTIs

The aetiology of URTI is primarily viral in origin. Most of the viral infections are

relatively benign, although, in recent years, serious epidemics have emerged where the initial presentations may be confused with the run-of-the-mill URTI, notably influenza A, severe acute respiratory syndrome (SARS), middle-east respiratory syndrome-corona virus (Mers-Cov).⁴ It is generally believed that it is only the bacterial infection that deserves an antibiotic therapy is *Streptococcus pyogenes* (group A beta-haemolytic *Streptococcus* [GAS]).⁵ In a meta-analysis of 29 prevalence studies, Shaikh et al. reported a *Streptococcus pyogenes* isolation rate of 37% among children with pharyngitis and 12% among healthy children.⁶ However, none of the included studies were from the Asia-Pacific region. The isolation rates from the patients with URTIs in the Asia-Pacific regions vary from 0 to 28%. This wide variation is due to the numerous methodology issues, including selection criteria of patients (pharyngitis vs. others), patient's age, season and lack of consistency in the laboratory methods.⁷⁻¹⁸

Table 1. Prevalence of *Streptococcus pyogenes* isolation in children and adults with pharyngitis in Asia-Pacific studies published since 2000

Country	Author, Year	GAS prevalence (%)	Patients or prescriptions (n)	Setting
Australia	Danchin, 2004 ⁷	21	242 (all ages)	Primary care clinics
Australia	Bakare, 2010 ⁸	28	106 (all ages)	Primary care clinic
Fiji	Steer, 2009 ⁹	9	678 (children)	Four schools
Hong Kong	Wong, 2002 ¹⁰	3	1449 (all ages)	Hospital emergency department
Indonesia	Malino, 2013 ¹¹	8	114 (children)	Hospital paediatric clinic and emergency room
Indonesia	Syahroel, 2008 ¹²	14	95 (children)	Hospital paediatric clinic
Japan	Hirakata, 2005 ¹³	7	930 (adults)	Primary care clinics and hospitals
Singapore	Hong, 2004 ¹⁴	0	594 (adults)	Public health centres
Thailand	Treebupachatsakul, 2006 ¹⁵	8	292 (adults)	Hospital outpatient clinic
Taiwan	Chi, 2003 ¹⁶	2	242 (children)	Hospital outpatient clinic
Taiwan	Lin, 2003 ¹⁷	21	1175 (children)	Hospital outpatient clinic
Taiwan	Shih, 2012 ¹⁸	4	342 (children)	Hospital outpatient clinic

Rationale for treating streptococcal pharyngo-tonsillitis

Untreated or inadequately treated streptococcal pharyngo-tonsillitis may result in suppurative and non-suppurative complications.⁵ Rheumatic fever (a non-suppurative complication) may result from an autoimmune response to acute infection with *Streptococcus pyogenes* in the throat.¹⁹ Rheumatic fever and its long-term cardiac sequelae (rheumatic heart disease) have been decreased markedly in the developed and developing countries.^{20–22} However, they remain an important cause of morbidity and mortality in the aboriginal communities in Australia,²³ Pacific Islanders and Maori in New Zealand.^{24,25} Underdiagnosis of this serious problem had been demonstrated in Fiji;²⁶ thus, the absence of data from many parts of the Asia-Pacific region may not mean that the problem has disappeared from the isolated deprived communities.

Clinical practice guidelines on streptococcal pharyngo-tonsillitis continue to recommend penicillin when the bacterial or streptococcal throat infection is strongly suspected on clinical grounds (see below). The antibiotic of choice is either a single dose of intramuscular procaine penicillin or a 10-day course of oral penicillin V.²⁷ This recommendation is based on the documented prevention of acute rheumatic fever with penicillin in military recruits way back in the 1950s.²⁸ Recent surveillance of *Streptococcus pyogenes* in the Asia-Pacific region revealed that the resistance of this bacterium to penicillin is non-existent but there is an increasing trend of resistance to erythromycin (China 95–98% and Hong Kong 28%).^{29–31}

Diagnosis of streptococcal pharyngo-tonsillitis in primary care

Many diagnostic studies have been done with the aim of identifying clinical predictors of streptococcal pharyngo-tonsillitis. The most frequently used clinical prediction rule is based on a combination of five features (age <14 years, absence of cough, fever, cervical adenopathy, tonsillar swelling or exudates).³² Patients without above features have very low chance of streptococcal infection and the diagnosis can be ruled out.³¹ However, this clinical prediction rule is not specific for streptococcal infection in view of the marked overlaps in the symptoms/signs of viral and bacterial causes and the low prevalence of streptococcal infection in primary care.^{33–34}

Thus, even in patients with all the above five clinical predictors, the positive predictive value of *Streptococcus pyogenes* is still below 60%.³²

The use of rapid strept screen has been advocated in high income countries, it has a relatively high specificity but a bit lower sensitivity (pooled specificity 96%, pooled sensitivity 85%, pooled likelihood ratio for positive test 22 and pooled likelihood ratio for negative test 0.15).³⁵ Thus, rapid strept screen demonstrated fairly good diagnostic performance but is somewhat better at ruling in streptococcal pharyngo-tonsillitis than ruling out this infection in the primary care. It is rarely used in the Asia-Pacific countries because of its cost.

Antibiotic prescribing rate and antibiotic choices

The antibiotic prescribing rates for URTI in the Asia-Pacific countries is highly variable (Table 2).^{36–45} The reported rates are not directly comparable between countries in view of differences in the definition of URTI, period of study, sample size and study setting. Given that the prevalence of streptococcal infection among URTI patients is not more than approximately 20% (see Table 1); the available prescribing data suggest antibiotic over-prescribing in many countries, particularly in China, Thailand and Korea. The data also show that antibiotic choices may be inappropriate in some countries. For example, a study in Japan showed frequent use of broad-spectrum antibiotics that are more likely to promote antibiotic resistance. Penicillin V, the first choice recommendation in many guidelines, is rarely prescribed.

URTIs, being a common reason for consultation in primary care in most countries, contributes a high proportion for antibiotic use in primary care. In Malaysia, it has been estimated that around 50% of all antibiotics used in primary care could be due to URTI (personal communication: Dr. Mohd Fozi Kamaruddin 1 August 2014).^{42,46} In a systematic review using 243 studies, Bell et al. found that antibiotic consumption is associated with the development of antibiotic resistance.⁴⁷ In another systematic review conducted by Costelloe et al. individuals prescribed with an antibiotic in primary care for a respiratory infection were twice as likely to develop bacterial resistance to that antibiotic.⁴⁸ The effect was greatest in the month immediately after treatment but may persist up to 12 months.

Table 2. Antibiotic prescribing rates for URTI in the Asia-Pacific countries^a

Country	Author, year	Setting	Patients or prescriptions (n)	Antibiotic prescribing rate (%)	Other remarks
Australia	Pan, 2006 ³⁶	General practice clinics	2088	40% (adult) 24% (children)	Bettering evaluation and care of health (BEACH) data for the years 2002–2003
China	Jiang, 2012 ³⁷	30 township health centres	3,059	85	25% of prescriptions contained two or more types of antibiotics
Hong Kong	Kung, 2014 ³⁸	74 public clinics	895978	5	Computerised record for the year 2010
Japan	Higashi, 2009 ³⁹	Outpatient clinics	2577	60	Outpatient visit claims in a health insurance plan. Types of antibiotics: Third-generation cephalosporin (46%), macrolide (27%) and quinolone (16%), penicillin (4%)
Korea	Park, 2005 ⁴⁰	Outpatient clinics	16736	81	Viral illness (including URTI). Ambulatory visit claims in a national health insurance programme in 2000
Indonesia	Marjadi, 2009 ⁴¹	Outpatient clinics	6804	70 (public), 47 (private)	Extracted from PhD thesis
Malaysia	Fozi, 2013 ⁴²	Outpatient clinics	22,328	34	Pre-intervention data in 2010. Antibiotic choices: macrolide 61%, penicillin 36% (penicillin V 0.4%)
New Zealand	Kljakovic, 2005 ⁴³	246 GP clinics	335	61	10506 records from 246 GPs. Sore throat as a presentation
Taiwan	Hou, 2014 ⁴⁴	Outpatient clinics	6915140	6	Ambulatory visit claims in a national health insurance programme
Thailand	Issarachaikul, 2013 ⁴⁵	Outpatient clinics	339	81	Antibiotic choices: Penicillin, 71%, macrolide 21%

^aThe largest and latest study for each country has been preferentially cited.

Determinants of over-prescription of antibiotics

Systematic reviews of multiple studies revealed that there are multiple factors at the level of

patients, healthcare providers and healthcare system that work in concert to influence and maintain high antibiotic use. The factors have been described in detail in Table 3.

Table 3. Determinants of over-prescription of antibiotics with details

Categories	Factors
Patient factors ⁴⁹⁻⁵¹	Excessive patient expectation Lack of knowledge Misconception about antibiotics' effectiveness
Healthcare provider factors ^{52,53}	Diagnostic uncertainty Fear of complications or medico-legal problems Financial incentives of over-prescribing Lack of communication skills Physicians' complacency Undue weight given to non-predictors
Health system factors ⁵⁴	Cost constraints Lack of rapid laboratory tests Patient overload Pharmaceutical promotion

Interventions to reduce antibiotic prescribing

Various interventional studies have been done with the aim of reducing antibiotic prescriptions in URTI. Narrow scope interventions focusing the key steps of the point-of-care using diagnostic aids (e.g. C-reactive protein⁵⁵) and fairly straightforward management strategy (delayed antibiotic prescribing⁵⁶) do work but they are not practiced routinely in the Asia-Pacific region. Four systematic reviews⁵⁷⁻⁶⁰ examining the effectiveness of patients/consumer education and provider education (see Table 4) have been published. They generally employed the combinations of various active and passive strategies demonstrated to be effective by the Cochrane review group on Effective Practice and Organisation of Care, including medical audit, opinion leaders, academic detailing, and reminders. Only a few Asia-Pacific countries have tested some of these interventions; clearly, more studies need to be done in this region to determine their exact role.

In recent years, several Asia-Pacific countries have introduced national health financing schemes (e.g. Japan, Korea, Taiwan, Australia and New Zealand), and others are in various stages of planning the same (e.g. China, Indonesia and Malaysia). The systematic review by Faden et al.⁶¹ identified more than 60 studies from low and medium income countries assessing the impact of health insurance system on inappropriate medicine utilisation. While health insurance system may improve the access to medicines, there is still a paucity of evidence showing its positive impact on appropriate medicine utilisation.

Radyowijati et al, in an extensive review of publications from the developing world, identified multiple stakeholders in the maintenance of the culture of prescribing inappropriate antibiotic.⁵⁴ They felt that professional education has limited effect and the sustained use of appropriate antibiotics in the community is achievable if there are multi-prong approaches by governments, health training institutions, professional societies, pharmaceutical companies, consumer organisations and international organisations.

Table 4. Systematic reviews of interventional studies aiming to reduce antibiotic use in primary care

Studies	Number of studies (N); study period	Countries studied	Intervention	Outcome
Huang, 2013 ⁵⁴	N = 13; 1946–2013	Six countries from Europe and North America. None from Asia-Pacific region	Point-of-care C-reactive protein testing	Significantly reduced antibiotic prescribing at the index consultation for patients with RTIs
Spurling, 2013 ⁵⁵	N = 10; 1966–2013	Four countries contributed all studies. New Zealand is represented	Delayed antibiotics	Reduced antibiotic use but is perceived as less satisfactory than immediate prescription by patients
Huttner, 2010 ⁵⁶	N = 22; 1990–2007	16 countries, mostly from Europe and North America. Australia and New Zealand represented	Multi-faceted intervention (targeting both consumers and healthcare providers, using a variety of mass media and other interventions (guidelines, seminars, and academic detailing)	Costs of campaigns are high but probably contributed to more careful use of antibiotics in the outpatient settings
Vodicka, 2013 ⁵⁷	N = 17; 1966–2012	Six high-income countries, mostly from Europe and North America. Australia represented	Multi-faceted intervention (combinations of patient education materials, group education, academic detailing, opinion leaders, prescribing feedback, computerised decision support system, reminders, websites	Interventions that combined parent education with clinician behaviour change decreased antibiotic prescribing rates by between 6–21%
Ivanovska, 2013 ⁵⁸	N = 8; 1990–2009	Six high middle income countries. China and Malaysia are represented	Combinations of consumer and provider education	Greater impact on antibiotic prescribing was achieved by multifaceted interventions focusing on specific diseases
Andrews, 2012 ⁵⁹	N = 23; 1966–2011	Three countries contributed all studies (Israel, UK and USA)	Verbal or written information given to parents or their children	In order to be most effective, interventions to influence parental consulting and antibiotic use should: Engage children, occur before an illness episode, employ delayed prescribing, and provide guidance on specific symptoms

Conclusion

The above review has documented the antibiotic overuse in URTI, which is a major problem in much of the Asia-Pacific region. Since URTI forms a large proportion of the reason for primary care consultations in this region, inappropriate use of antibiotic in both quantity and drug choice exert major selective pressure on the occurrence of antibiotic resistance. Although, there is a paucity of national level data on the above issues, the available information suggests an urgent need

to take actions to promote judicious antibiotic use at the point-of-care through a multi-prong approach targeting the patient/consumer, healthcare providers and health care system.

Conflict of interest

None.

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"Personal mission statement": An analysis of medical students' and general practitioners' reflections on personal beliefs, values and goals in life

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Abstract

Background: Personal mission in life can determine the motivation, happiness, career advancement and fulfilment in life of the medical students (MSs) along with improvement in professional/clinical performance of the family physicians. This study explored the personal beliefs, values and goals in the lives of MSs and general practitioners (GPs).

Methods: Fourth-year MSs at the Universiti Putra Malaysia and GPs who participated in a 2-hour session on 'Ethics in Family Medicine' in 2012 were invited. All the participants submitted the post-session written reflections about their personal missions in life. The written reflections were analysed using thematic analysis.

Results: A total of 87 MSs and 31 GPs submitted their written reflections. The authors identified 17 categories from the reflections contained by four themes—good vs. smart doctor, professional improvement vs. self-improvement, self-fulfilment and expressed motivation. The most common categories were "to be a good doctor" (97/330) and "professional improvement" (65/330). Many MSs had expressed motivation and wanted to be a smart doctor as compared to the GPs, whereas a larger number of GPs wished to have a fulfilled life and be a good doctor through professional improvement.

Conclusion: The difference between the two student groups might indicate different levels of maturity and life experiences. Medical teachers should engage students more effectively in orientating them towards the essential values needed in medical practice.

Background

Personal mission in life can determine motivation, happiness, future career advancement and fulfilment in life of the medical students (MSs) along with improvement in professional/clinical performance of the family physicians.¹⁻⁵ These personal internal qualities are largely represented by the professional functional knowledge base, which can be influenced by personal awareness (pre-propositional impressions that trigger experiential learning) and moral principles.⁶ Physicians often deal with patients with complex medical and social problems.⁷ Therefore, a physician's self-understanding, insight into the nature, limitations of the knowledge and capacity of applying it are crucial in professional practice.⁸

Reflection is a mental process of cyclic thoughts that allows self-examination and internal exploration of issues and concerns triggered by experience. It functions in self-regulation of personal values and behaviour resulting in changed conceptual

perspectives,^{9,10} which appear as one of the six components of the cited learning methods in clinical practice.^{11,12} These six teaching methods comprise Modelling, Coaching, Scaffolding, Articulation, Reflection and Exploration. It encourages situated (the clinical and bedside) learning by helping students to acquire both cognitive and meta-cognitive skills through observing expert performance in practice that further facilitate development of their own problem-solving skills.¹² Critical and deliberate reflection of a physician's medical practices when encountered with difficulties and weaknesses would give rise to the development of professional expertise.⁹ Particularly in medicine and healthcare, the term often refers to critical thinking in problem solving.^{3,13}

Through these reflections, many physicians evaluate their past experiences and self-organise their personal values in doctor-patient relationship in order to make necessary adjustments to have an effective

communication and relationship-centred care.^{4,14} Observing the association of reflection with critical thinking and clinical practice^{8,15} medical educators have expressed enthusiasm about its use and many medical schools have incorporated reflection into their curriculum and student assessments.¹⁶ The skill of reflection would also enable physicians to incorporate different personal values expressed by patients into evidence-based medical care while negotiating a patient-centred care plan.¹⁷ Thus, medical profession values the ability to reflect and sees it as an essential part of clinical practice.¹⁸

However, there are very little informational data on the medical students' or family physicians' personal beliefs, values and goals in life. Also, the published reports have very limited access on the use of reflection. It was assumed that the personal beliefs, values and goals in a professional's life begin from the earlier trainings; also, the experiences along the way may change these personal values. Knowing these personal values during medical training would provide the students an opportunity to readjust their core personal values and medical teachers to influence their students. It was aimed to answer a research question, "what are the personal beliefs, values and goals in lives of the fourth-year medical students (MSs) in Universiti Putra Malaysia and general practitioners (GPs) enrolling for the Diploma of Family Medicine course organised by the Academy of Family Physicians Malaysia (AFPM)?"

Methods

Setting, participants and curriculum

This study was conducted at the Faculty of Medicine and Health Sciences of the Universiti Putra Malaysia and included all the fourth-year MSs (n = 91) entering their family medicine posting (FMP) in 2012. In addition, a group of GPs were also invited (n = 64) to participate in this study during the workshop on professionalism, ethics and practice management in the course of their diploma in family medicine (DFM) in 2012. GPs group consisted of a mixture of medical officers from private practices and public primary care clinics with different work experiences and aspirations.

FMP spans over 4 weeks in the fourth year undergraduate programme at Universiti Putra Malaysia (UPM). The fourth-year MS is divided into four smaller groups in every academic year and each group is posted for a period of 4 weeks according to rotation. DFM is organised by the Academy of Family Physicians of Malaysia (AFPM) for the training of GPs. It serves as a mean for the

GPs to update their professional skills and upgrade their competency to a level that is recognised by the national healthcare delivery standard.

A 2-hour lecture on the ethics and professionalism in family medicine was delivered during both the FMP and DFM as part of the curriculum. The lecture included a large-group, informative presentation on the definition, importance and principles of biomedical ethics in family medicine with emphasis on ethical problems/dilemmas in clinical practice. The last 30 min of the lecture was a small group discussion based on patient scenarios. At the beginning of the lecture, students (the MSs and GPs) were informed about the study and explained with an example of a personal mission statement. The personal mission statement was defined as the core/personal belief of a person to become a doctor as a life mission.

The example of a personal mission statement shown to the students was: "*I will live so as to embody (i) an open-minded receptivity toward creation and creativity; (ii) a celebration of life and all that is good in humankind; and (iii) a caring hand extended toward the least of my brethren.*"

After the above introduction, students were given 3–5 min to reflect and write down their thoughts at the beginning of the lecture. Students were given another 3–5 min to complete their written reflections before submitting them at post-lecture. Written reflections included only the student's age, gender and ethnicity.

Outcome measures and data analysis

The outcome measures of the study were analysed. These were the themes, which emerged from narrative analysis of students' written reflections. First, the student reflections were numbered according to their group and duplicated. Each remark was uniquely identified by a letter indicating the student group, A–C for MS participants and G for GP participants, followed by the numbers. Three investigators qualitatively analysed the FMP and DFM students' written reflections. The main investigator analysed both student-groups' written reflection while another two investigators analysed FMP and DFM students' reflection separately. Each of them then independently reviewed, read and coded each reflection. Each category was coded only once in each reflection. At the end of the individual coding process, they met in a group in a round-robin arrangement to derive consensus for each reflections. They agreed on the classification of categories into themes, using an iterative process of discussion,

refining and revision of the coding scheme, and consensus. The number of categories per student and the total number and frequency of categories were documented. Finally, the distribution of categories within each theme was determined.

While looking for relationships between the themes, diversity in the level of abstraction and aggregation of categories was noticed within themes. At the same time, an underlying construct was identified that allowed to connect categories from different themes.

This study was approved by Universiti Putra Malaysia Ethics Committee and conformed to the provisions of the Declaration of Helsinki in 1995 (as revised in Edinburgh 2000). All investigations on human subjects had obtained their informed consent and participant's anonymity was preserved throughout the study.

Results

Among 118 students (76.1% response rate), 87 MSs (87/91, 95.6% response rate) as compared to 31 GPs (31/64, 48.4% response

rate) submitted their written reflections. Out of the 87 MSs in the FMP posting, half (50%) were female, 31 (35.2%) were male and 13 (14.8%) did not report their gender. The mean age was 22.0 years (range 21–23 years) and more than 50% were Malay (45 Malay, 29 Chinese, 4 Indian and 10 no response). Out of 31 GPs in the DFM course, 15 (48.4%) were male, and the mean age was 38.2 years (range 29–51 years). There was approximately equal distribution of the three main ethnic groups (7 Malay, 8 Chinese, 7 Indian, 2 Punjabi, 1 Myanmar and 6 no response).

Reflections varied in length from 7 to 150 words. Generally, the MSs had longer written reflections (9–150 words) compared to the GPs (7–50 words). A total of 17 categories for the 118 reflections were identified through our coding process. The number of categories that were identified for each reflection ranged from one to eight. The four emerging themes were (1) good vs. smart doctor, (2) professional vs. self-improvement, (3) self-fulfilment and (4) expressed motivation. Table 1 shows the definitions for the themes and the categories for each theme.

Table 1. Definition of themes and their representing categories regarding the students' personal beliefs, values and goals in life

Themes definition	Categories
<i>Good doctor vs. smart doctor</i>	
Good doctor is defined as doctor with high regard for ethical values, good religiosity/spirituality and professionalism	1. Professional aspiration for patient 2. Professional aspiration for community/country 3. Professional aspiration for the world 4. Virtues, ethical values to develop 5. Religion/religious, spiritual
Smart doctor is defined as doctor with strong motivation to acquire knowledge and skill	1. Specialty/sub-specialty intend to pursue 2. Specific skill/duty as a doctor 3. Current study in undergraduate 4. About exams in undergraduate 5. Knowledge
<i>Professional improvement vs. self improvement</i>	
Professional improvement is the general goal of becoming a good doctor who is capable of providing quality medical care to others and himself	1. General professional duty as a doctor 2. Professional aspiration for self
Self-improvement is the general non-professional improvement and responsibility as a person, family, child, parent, sibling and society	1. Self-improvement in general 2. General self-responsibility to the society or family
<i>Self-fulfillment</i>	
Self-fulfillment is defined as the self-enjoyment of life in terms of materialistic, career achievement and success in life including being rich and happy	1. Self-enjoyment/fulfillment in life
<i>Expressed motivation</i>	
Expressed motivation is source of motivation as the driving force in life	1. Motivation derivation 2. Un-related to personal mission statement

In the overall reflections, the most common themes were “to be a good doctor” (97/330), “professional improvement” (65/330), “general self-improvement” (54/330) and “to become a smart doctor” (53/330).

Some of the reflections on becoming good doctors:

A11: “... *To become a caring and compassionate doctor and serve the community especially in Sabah and Sarawak.*”

A26: “...*I also want to use the money to build charity house and if I can. I want to join MERCY (the Malaysian Medical Relief Society) or at least go to rural areas to serve poor people.*”

B10: “*I believe ...in whatever thing we do, we must be high spirited, sincere, genuine and... strong to face any obstacles... this applies in all field and all future doctors should have these qualities.*”

C03: “*I will become a responsible, relevant (and) trustworthy doctor. I will put my patients first rather than myself. I try to understand the patients and comfort them and do no harm.*”

C23: “... *I can help people especially those who are unfortunate (i.e. in undeveloped countries).*”

G25: “*Honest, trust, attain good karma. Not to cheat, hold promise.*”

Some of the reflections on professional improvement:

A05: “... *become a better person as I have to be (an) example to my patient.*”

B24: “*I want to equip myself with good knowledge and give good medical service to the society and aim to be a surgeon in future.*”

G02: “... *Be creative & innovative in extending my medical help to the society e.g. free breast examination.*”

Some of the reflections on general self-improvement:

A06: “*I want to be a good housewife and mother to my husband and children... contribute something to my religion and nation.*”

A10: “... *To have a family that support, love and care for me. And, I'm learning to do likewise for them.*”

C02: “*I will study hard, keep learning and growing in order to become a person who can contribute to the society and live a life of dedication.*”

C24: “*I will live so as to embody ... (ii) strong mind to overcome challenges in life (iii) to care for self (and) others.*”

C25: “*I believe in fate but I also believe that we can achieve what we want if we try our best.*”

G10: “*To train myself every day to be the best husband, father, son and a doctor to all those who place their trust in me.*”

Some of the reflections on becoming smart doctors:

A08: “*I would like to find a lot of experience in medical fields. (These) fields (are) very challenging especially emotion part and my defense mechanism... I would like to become a teacher or lecturer and share my experience and knowledge with... medical students.*”

A11: “*In 10 years time, I would like to specialize either in psychiatry or palliative care.*”

B22: “*Get a master degree in family medicine...*”

C14: “*Beside trying to prolong the life of patients... I must make sure my management and care-plan won't compromise the well-beings of patients without bringing any improvement.*”

C17: “*My mission is to be one of the greatest doctor...*”

C18: “*I want to explore more on human's health and hoping to discover more facts that is more all rounded in terms of health in the future.*”

C23: “*I ... want to be a doctor that can treat and understand the patient in all aspects.*”

More MSs had expressed motivation, self-improvement and wanted to be smart doctors as compared to the GPs who wished to have a fulfilled life and to be good doctors through professional improvement (Figure 1). Below are some of the expressed motivations:

B05: “*What motivate me to continue in this field despite of (all its) hardships is that I like to help people.*”

B07: “*My motivation to be a doctor is to make my parents proud, make my parents happy ...*”

B17: “*Give all of myself, physically (and) mentally. Never stop fighting like a warrior in this stage of life... a hero with his own story, like Batman who sacrificed his life for others... Life is like a muscle cell, the more pressure, the more it gains.*”

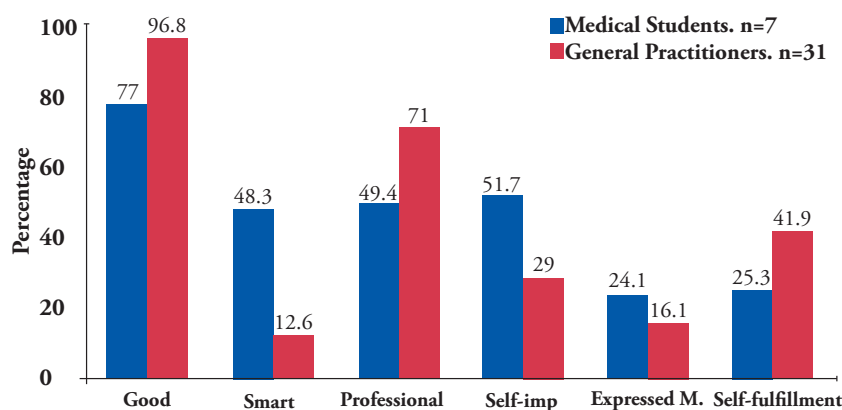


Figure 1. Proportion of categories appeared in the written reflections according to the student groups (*Good* good doctor, *Smart* smart doctor, *Professional* professional improvement, *Self-imp* self-improvement, *Expressed M.* expressed motivation)

Self-fulfilment reflections as stated below were most intriguing and at the same time these should encourage medical teacher to engage in more deeper and personal interactions. The reflections were very influential in the broader aspects of life.

A04: "I will live as a happy and successful person... live a happy, healthy and enjoyable life..."

B22: "...Have own clinic and earn money, getting married in 5 years, (and) travel around the whole world whenever there's holiday."

C01: "I want to gain a lot of money and share it with my family..."

C17: "... my mission to have a great family even busy with my work."

C19: "Most important, stay happy & smile always."

C28: "... Having a stable profession that can help me be a better person."

G03: "... Live happily for the rest of my life."

G31: "Want to be a happy person, caring to the surrounding people and family. With some financial freedom. And preparation also for after-life."

The GPs group expressed rather balanced goals in life. Besides stating the utmost importance of being a good doctor, they strived for an improvement in professional practice and aimed further for a better personal health, to prosper in life and able to enjoy life with family members.

G29: "I live to make sure my personal & professional life is balance for the benefit of my family & patients."

G12: "Learn as much as I can and to use this knowledge to serve the people who need my service and at the same time earning a living."

Some reflections showed strong religious affiliations and spirituality.

B03: "I strongly believe that whatever good I do, is counted as a 'hassanah' (good deeds) during the hereafter. Spiritually believing that what God has arranged for him is the best for me."

C23: "I believe in what God has determined for me, as in example being in this field."

B06: "I want my life as a doctor to be an 'ibadah' (obedience with submission) as every work that I do sincerely will be rewarded by God."

C17: "I believe that God will give me the success based on my effort."

G25: "Honest, trust, attain good karma."

It was noticed that some reflections of negative experiences were turned into motivations or a mission in life.

B21: "I just want to be (someone) of doctor such as (a) neurosurgeon or cardiac surgeon because I want myself to be respected and ... convince others and make them to (give) in the way I have. .. Next, I would like to make my friend (sorry) and regret because he keeps insulting me."

B16: "I'll ... liberate our profession from being under any political system. I mean the head of healthcare system should not be a minister from any political party... The head of healthcare system should be a statesman as he/she would take quality of life as the main or the only agenda."

Discussion

The study approaches captured students' written reflections on their core/personal beliefs in becoming a doctor and/or as missions in their life. The data obtained also provided a snapshot of comparison of these personal mission statements between undergraduate medical students and the practising family physicians. It was observed that the GPs provided shorter written reflections and this was probably because they were in a condition of more "settled in life" as compared to the MSs.

Participants' reflections suggested the universality of positive intentions and purposes in life. The differences of these life goals between the MSs and GPs were expected. MSs who generally perceived themselves as students were striving to improve in their study, to gain more knowledge and become smarter. The GPs who participated in the DFM were all working doctors with most of them self-employed, married and had many other social responsibilities, wanted practical returns in their life for all the investments they had put in. However, there was one similarity between these two groups of students that was from the perspective of religiosity in the reflections. Religiosity prevails in this country and society.^{19,20} Thus, it came as no surprise that some reflections showed strong religious affiliations and spirituality and were not irrational. The findings suggested that the students were insightful of their motivations for the short-term goals and life destiny for the long-term goals. For the MSs, it was the former being more lucid and expressed compared to the latter. Motivation had been shown to relate to self-regulation of learning and academic success in the demanding medical programme.²¹ Some reflections indicated past hurts from friends, dissatisfaction with the current healthcare and political systems in the country. These negatives feelings were not unusual in the teaching and working experiences and they could have been strong motivators for these particular students in their academic endeavour and self-improvements.

Literatures pointed out that through the reflection process learning occurs leading to change in behaviour. Encouraging reflective learning using personal journal recordings and tutorials had been shown to help medical students in focusing on what they need to be taught and integrate learning from different sources into knowledge.²² However, in context of immediate learning, the reflective learning process for the medical students needs to be facilitated and stimulated as they are the future health professionals.²³ GPs were more

focused on acquiring professional skills to improvise their clinical practice, fulfilling their life multiple responsibilities and enjoying life. Their (mostly urban) life aspiration was similar to the United States primary care physicians who practiced in non-underserved areas. Better lifestyle, among others, was the main reason for choosing their practice location when compared to those in underserved areas (defined as working in a clinic that is situated at a place designated as a health profession shortage area).²⁴ The findings from a recent study on the learning processes of residents in the clinical workplace had indicated the importance of reflection in professional knowledge and skills improvement.²⁵

On the basis of these findings, an integrating discussion was proposed on personal life goals into an existing professionalism or doctoring courses using a learner-centred approach which emphasizes more supportive learning environments.²⁶ Undergraduate medical teachers in universities should adopt broader approaches that provide life lessons toward self-improvement in family life, social life with organisations and charity works with international bodies. Medical teachers of the GPs would need to deliver the proven useful professional skills and practical knowledge in primary medical care. Non-judgmental discourse and feedback can generate thoughtful reflection on the influence of personal belief/life goals of professional roles, career advancement and sense of life fulfilment.¹⁴ In other words, permitting students to discuss private and personal aspect of their lives by creating a safe space for conversation with explicit recognition and acceptance of the personal values and goals in their professional lives can lead to positive learning experience. It can also lead to enhanced diagnostic ability and a greater capacity for lifelong learning.^{27,28} Furthermore, the exercise of writing the reflection may itself reinforce (or increase the likelihood of) future positive life goals. It was speculated that such integrated, student-centred curriculum may improve early alignment of personal values and desired professional values of a medical practitioner. As a result, it may reduce drop-out rate in the medical school, disappointment in the early professional career, improve higher self-assessment ability and clinical performance.²⁹⁻³¹ Teaching and learning activities in ethics and professionalism could be more effectively organised in relation with the students' personal values, goals and needs in life. A more meaningful and acceptable influence on these personal life missions could lead to positive adjustment in the students that would improve fulfilment in both of their social and professional life.

It remains to be determined whether students were receptive to this educational model. Critical reviews of literature also showed that the cognitive and affective skills were necessary in reflection.^{10,22} In order to use reflection as a learning tool, it was necessary to develop these skills in professional courses of the students. It was also acknowledged that the question of when, where and who should teach and lead these discussions about appropriate and honourable personal missions in life remains unanswered. Faculty members or external medical professionals who were widely regarded as successful may be perceived as more credible teachers capable of convincing the value change. The importance of faculty development and training to effectively teach and facilitate thoughtful conversation about this topic cannot be overstated.^{11,23}

Strength and limitation

The strength of study was the use of a systematic process for narrative coding and reached theme saturation but it had its own limitations. It was conducted at a single institution, so the results from the undergraduate medical students may not be generalisable to the other institutions. However, generalising the study results is possible when the domains of the populations are similar. The students' personal values in life were inferred through self-report but the verification was not possible. However, as the responses had been collected anonymously it was believed that students' responses were not skewed toward socially desirable responses. Assessment of the fourth-year MSs' personal goals in life might be considered too late (in the course of the undergraduate medical program) for adjustment or influence from teachers or faculty members. However, too early reflection of this, such as in the preclinical years (first and second year), the MSs might not relate well and thus would not provide meaningful aspirations for life as a doctor in

the future. Knowing that there is plenty of teaching and learning activities in the fifth-year, it was believed that it was not too late for opportunities of values sharing between the students and medical/clinical teachers provided the later are aware and prepared to engage the students in the discussion of the "higher" values in becoming a doctor.

Conclusions

Amongst the MSs and GPs, a few core values in personal mission were discovered. MSs had more aspirations in their life as compared to the GPs who were more focused on professional development, practice enhancement, fulfilling life multiple roles and enjoyment. The differences in personal mission statements between the two groups were within expectation that reflect different levels of maturity and life experiences. Medical teachers should engage students more effectively in orientating them to the essential values needed in medical practice.

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Funding and conflicts of interest

This study was self-funded and we declare no conflicts of interest. The authors alone are responsible for the content and writing of the article.

How does this paper make a difference in general practice?

- Medical students had more varied aspirations in their lives compared to general practitioners (GPs) who were more focused on practice enhancement, fulfilling multiple roles in lives and enjoyment.
- GPs perceived highly of professional skills and practical knowledge that are of proven usefulness in primary medical care.
- Undergraduate medical teachers of family medicine should adopt a broader approach that includes providing lessons of self-improvement in family life, social life with organisations and charity works with international bodies.
- A student-centred curriculum that attempts to discover students' personal values may reduce drop-out rate in medical schools and disappointment in the early professional career and may improve early alignment of desired professional values of medical practitioners and higher self-assessment ability and clinical performance.

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Malaysian private general practitioners' views and experiences on continuous professional development: A qualitative study

Abdul Samad N, Md Zain A, Osman R, Lee PY, Ng CJ

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Abstract

Introduction: Continuous professional development (CPD) is an important aspect of a medical practitioner's career. Aiming to be at par with other developed countries for high quality of professional practice, Malaysia is planning to implement compulsory CPD for the doctors.

Aim: The aim of the study was to explore the private general practitioners' (GPs) views, experiences and needs regarding CPD programme in the primary care service.

Methods: This study used a qualitative methodology. Seven semi-structured interviews and three focus group discussions were conducted with private general practitioners from an urban area of Malaysia between January and December 2012. An interview topic guide was developed based on literature review and researchers' discussions and it was used to guide the interviews. All the interviews were audio-recorded, transcribed verbatim and the transcripts formed the data for analysis using the thematic approach.

Results: GPs undertook a wide range of CPD programmes to keep up with medical advances, meet patients' expectations and improve financial rewards. Conferences, lectures and online recourses were the most mentioned methods of keeping updated. Some of the GPs felt that peer motivation and networking seem to motivate and facilitate participation in CPD programmes. However, they were wary of the validity and relevance of some CPD programmes, particularly those related to pharmaceutical industry. Although the participants agreed to the new mandatory CPD regulation, they voiced concerns on how it would be implemented and wished for a more effective method of monitoring.

Conclusions: Organised peer support and relevant CPD content may improve GP participation in CPD but adequate regulatory measure should be in place to monitor the CPD activities.

Introduction

Continuous professional development (CPD) involves an ongoing process of learning and upgrading of knowledge and skills. It also entails personal development of a medical practitioner throughout his professional life.¹ CPD has been advocated and practiced worldwide.² In many countries, such as the United States, Canada and the United Kingdom, CPD is mandatory for the revalidation of a doctor's practicing license. Studies have shown that CPD is effective in improving general practitioners' (GPs) quality of professional practice.^{3,4} Within the region, Singapore has implemented compulsory CPD since 2003.⁵ Hong Kong's non-specialist doctors are encouraged to join the mandatory CPD imposed for specialist.⁶ Regulations and bylaws regarding CPD among medical professionals are already in place in the Philippines and Thailand⁷ but participation is still voluntary.

Despite the importance and effectiveness of CPD, its uptake and implementation remain challenging and varies across different settings and specialties. There are several reasons for this such as: time constraint, heavy workload, difficulty in finding replacements and inconvenient location.

Malaysia has a dual-sector (public and private) healthcare system. The primary care doctors in the public sector work in the health clinics where there are ample opportunities for training and updates on the latest medical evidence. On the other hand, doctors in the private primary care setting often run solo practices and do not have time and opportunity to attend CPD programmes, of which less than 2% of them have been accredited for vocational or postgraduate training. Most GPs receive

latest medical updates through pharmaceutical representatives and journals.

Currently in Malaysia, the practice of CPD is voluntary for medical doctors. However, with the impending amendments to the Medical Act 1971, the health authority is making CPD a pre-requisite for renewal of doctors' annual practicing certificate (APC).¹⁴ This will serve as an impetus for primary care doctors to continuously improve their medical knowledge and skills to improve patient care. However, there is a dearth of information on CPD activities undertaken by private GPs in Malaysia. It is therefore timely to explore the GPs' views, experiences and needs for CPD activities. This will help the health authorities and CPD providers to develop programmes and trainings that are relevant to and sustainable in the Malaysian primary care setting.

Methods

In view of the exploratory nature of the study, we used a qualitative methodology to answer the research question.¹⁵ We conducted seven semi-structured interviews ($n = 7$) and three focus group discussions ($n = 10$) from January to December 2012. The GPs were recruited from Klang Valley, which is an urban area in Malaysia. Purposive sampling was used and GPs were recruited based on their gender, practice experience and postgraduate qualification. We identified several practitioners based on the practice type (solo and group) and location (residential and industrial). After checking their registration in Malaysian Medical Register, we contacted them directly or by phone. Colleagues of the researchers introduce some more practitioners. To those who agreed, an e-mail was sent with further details on the study. This was to ensure the homogeneity and capitalise on the shared experiences among the GPs. Permission was obtained from the Medical Ethics Committee, University of Malaya Medical Centre (MEC ref no: 920.20). We sought written consent from all the participants for audio recording and interviews. The participants were assured of anonymity and confidentiality.

An interview topic guide was developed based on literature review and pilot tested for suitability. After the pilot study, few questions were rephrased for clarity. The researchers interviewed the participants and asked open-ended questions as far as possible. GPs who couldn't attend focus group discussions (FGDs) were interviewed individually. Few of the respondents who were personally known to the researchers were included in the FGD conducted by senior researcher not acquainted to them. GP researchers, who were trained in qualitative studies, conducted the individual

interviews of GPs. This enabled the respondents to relate their experience easier as they shared some common grounds in primary care. The interviews lasted between 35 minutes to 2 hours. Prompts were used only if important issues did not emerge spontaneously during the interview. The key topics included GPs' views and experiences of CPD, the hurdles they faced and needs for CPD and their views on compulsory CPD for annual practicing certificate renewal.

An independent researcher took the field notes on the non-verbal cues and group dynamics for FGDs. The in-depth interviews, focus group discussions and field notes were used to triangulate the data. We interviewed the participants and analysed the data in an iterative manner until no new themes emerged. The recruitment was stopped when the researchers reached a consensus that the analysis had reached thematic saturation.

All the interviews were audio-recorded, transcribed verbatim and checked, and the transcripts were used as the data for analysis. The data were managed using NVivo 9, a computer-assisted qualitative data analysis software. Two teams of researchers working in pairs analysed two transcripts and agreed on the coding framework. Two researchers then coded the rest of the transcripts separately. The researchers get familiarised with the data by reading the transcripts repeatedly. We analysed the transcript by labelling a significant section of the transcripts to form the free codes. The free codes were grouped to form themes, which were later condensed to form categories. The coding framework was then applied to all the transcripts and any new codes or themes that emerged were communicated to all the researchers. All the researchers reached a consensus on the final list of codes and themes.

We presented the major themes derived from the analysis.

Results

GPs' profile

Out of 46 GPs who we approached, 17 agreed to participate. Those who refused, gave reasons that they were not interested in research or they felt that the interviews would disrupt their clinical practice. There were eight men and nine women participants with age ranging from 38 to 65 years old. The duration of the practice as a GP ranged from 2 to 35 years. All GPs were private primary care doctors. There were eight solo practitioners and nine were either in partnership or group practice. Out of these, three had a postgraduate degree in family medicine.

CPD activities and resources

Table 1 summarises the types of CPD activities undertaken by the participants with a wide variation. The GPs in this study sought information from many sources depending on their perceived needs and interest. The most mentioned CPD activities by the GPs were conferences and lectures; however, the younger GPs preferred online resources although they have to pay for certain access. Some GPs reported that they can even learn from free web video site such as 'youtube'.

Many GPs subscribed to read local and international medical journals. Other GPs attended conferences where they can interact directly with various speakers and other colleagues. International events were deemed more prestigious and preferred. GPs employed in group practice had their own periodic discussions or consultations with the group specialists. Formal courses (as listed) were attended and recommended by the doctors but others considered them too time consuming. Even the least participating GPs read journals, attended lectures and actively sought direct information.

Table 1. Continuous professional development activities undertaken by the general practitioners

Type of CPD	Activities/Resources
Reading materials	Journals: Medical Progress, British Medical Journal, Medical Journal Malaysia, Australian Family Physician Newsletter: (Medical Tribune) Materials from sales representatives Newspaper, magazines Clinical practice guidelines
Conferences	Scientific conferences
Workshops	Workshops Formal training courses: Diploma family medicine, membership of the Academy of Family Physician, occupation safety health
Pharmaceutical industry activities	Short lectures sponsored by pharmaceutical companies Information update, brochures on medical products by sales representatives
Online sources	Search engines: Google, Yahoo Medical websites: Medscape, AcMed, Hippocrates Youtube Online journals E-learning programmes
Peer groups	Social network: Malaysian primary care network Small group discussions Clinical teaching with specialists

Although GPs perceived CPD as beneficial but there were also negative ideas about CPD.

GPs' positive perception of CPD

The GPs valued the CPD activities in several ways. They considered CPD essential to help them keep up-to-date with the latest medical development and to meet the needs of patients. In addition, CPD enabled the GPs to provide better services, which in turn helped them to generate more income. Some GPs formed network to support CPD activities.

Meeting patients' needs

The GPs considered it a necessity to keep abreast of the latest medical advances to meet their patients' need. As one senior GP put it succinctly:

"So unless you go for your CPD, how are you going to give optimum care for your patients?" (65-year-old man)

"Besides, you want to give your best for your patients. Of course, it's for your own personal development. Well, you don't want to be doing dumb kind of things. You want to upgrade yourself from time to time and know new information." (53-year-old woman)

Better financial return

Increasing GPs' clinical knowledge and skills on specific clinical areas, such as occupational health, enabled them to expand their range of services. This in turn would mean better financial return.

"Occupational health will open more doors basically. So knowledge is one thing but we also have to feed our children. So it has to translate into better compensation." (49-year-old man)

Provides peer motivation and networking

Some GPs established informal peer support groups, which motivated them to attend CPD activities. This network of doctors kept each other informed about available CPD programmes and shared resources.

"Since this year, I pushed myself to attend (CPD), to learn and I have got a group of GPs that I start meeting during this CME programmes and they are actually very supportive. So anytime they get the information, they will email, they will text." (38-year-old woman)

GPs who were part of a group practice benefited from in-house CPD programmes.

"Because the being part of XY (a big group practice), we do get internal updating of information." (49-year-old man)

GPs' negative perceptions of CPD

Although GPs considered CPD beneficial, a few negative views were expressed by the GPs in this study. The GPs voiced suspicions of the motives and credibility of some CPD providers. Some CPD content was perceived to lack validity and relevance to the general practice setting.

Hidden agenda by CPD providers

The GPs were aware of the hidden agenda of some CPD providers, including those delivered by private hospitals, pharmaceutical industry and academic institutions.

"Another thing is the private hospital. They are actually very keen to advertise their hospital so they actually will give you free invitation to attend talks given by their own doctors, promote their doctors and give us free lunch or dinner." (39-year-old woman)

"it's more on commercialization, it's more on advertising for drug companies.." (53-year-old woman)

It was common for GPs to attend industry-sponsored CPD activities and they were

aware of the potential bias. In addition, pharmaceutical representatives played an important role in keeping GPs updated on new drugs in the market.

"You know, like O&G conference or hypertension conference. Those things you know. I might go. I look for a sponsor and go, because sometimes it is expensive." (53-year-old woman)

Even teaching institutions were suspected to have their own agenda of marketing the organisation.

"Nowadays we find certain teaching institution also very...how to say...belong to same line as the pharma you know. Because they have got certain agenda like they try. Because you see they are already vying for each other for (market share)...you know" (43-year-old man)

CPD activities irrelevant to local general practice

The GPs commented that some of the CPD activities were delivered by foreign speakers, which might not be relevant to general practice locally. In addition, the content of some CPD activities focused on hospitals rather than primary care.

"I have to be more selective because sometimes the organizer brings in speakers from overseas and they are talking about topics that are more for the specialist, not for GPs, not practical in my setting." (43-year-old woman)

"I think sometimes the journals may not be very useful because they are not suitable for our context—our local (general practice) context. And as a GP, most of the literatures are focused on hospital practice rather than general practice." (53-year-old woman)

Validity of information

Several concerned GPs were uncertain about the validity of the information they received, especially online resources.

"But there're different versions. The American version is different. The British version is different. Sometimes you don't know which direction, which?" (56-year-old man)

Certain content of local journals was also doubted.

"Even some of the local experts, supposed to be experts, when they write, you can pick up some issues which should not be there. Sometimes, they're biased also." (65-year-old man)

GPs' views on the impending change in CPD regulations

All respondents were agreeable to the proposed compulsory CPD for the GPs. This reflects their desire to see an improvement in the standard of primary care.

"So by having compulsory CPD points before we get our APC, it will make our medical professional sit up and update ourselves. This is just to get our doctors to keep up to date...what is going on...so in the end they will become better health care professionals." (43-year-old man)

However, they expressed concern regarding its implementation and regulation. The GPs were skeptical about how the CPD attendance would be monitored. They observed some loopholes that should be improved before mandatory certification can be imposed.

"There are a lot of loop holes that the other doctors can do. Just sign in your registration, and come back the end of the day, collect your certificate, that doesn't mean you sign out for it. You will learn, so, let's make it something that the doctor voluntary wants to do." (49-year-old man)

Discussion

This study revealed several pertinent issues regarding CPD undertakings of GPs. As all our GPs were engaged in some form of CPD activities, previous notions that only a small percentage of private GPs participate in CPD may be reviewed. However, this will warrant a different study.

The GPs were actively engaged in different forms of CPD to meet their learning needs despite the absence of legal enforcement. The CPD activities appeared similar to that elsewhere in the world. These actions had also been previously proposed by the local researchers. Other forms of CPD such as audits, teaching or mentoring, research works and journal contributions have been described by GPs in other studies but not captured in our study. Similar to our findings, the popularity of lectures and conferences is universal as similar preferences were documented among primary care doctors in New Zealand, UK and South Africa. These modalities, though popular, were often less effective in improving doctor's clinical competency, as reported by Forsetlund and Thompson O'Brien. Some of the existing GPs initiated CPD programmes themselves, including small group discussion, which could be given due recognition and be awarded CPD points. This would encourage more GPs to be involved in CPD activities. Systematic planning, record keeping and content validation may qualify such events to be accredited. Practice

based small group learning (PBSGL) is an innovative and effective mode of CPD, which has been practiced by primary care practitioners in Canada and Scotland. Some of our GPs arranged in-house or peer group CPD activities. They readily shared information among themselves, despite business competition in private health service.

CPD was viewed favorably by our GPs but they were more concerned about the effectiveness of CPD and whether it resulted in improvement of health services. The relevance and validity of available CPD content were concerns raised by GPs in the study. Previous study of GPs by Loh et al. recorded similar findings. They were critical about the relevance of CPD delivered by hospital-based foreign specialist. Therefore, locally initiated CPD might appeal to these GPs as it had more relevance to their practice. On the other hand, the concerns about the validity of CPD content might actually reflect an essential but neglected GP needs, which was a critical appraisal skill. GPs should be guided to correctly identify their learning needs, which may reflect the health pattern of the community that they serve. A learning needs assessment tool for GPs could serve as a guide to plan the CPD development and evaluation. As such, appropriately trained GPs can fulfill the unmet healthcare needs of the population and contribute to the nation health provision more significantly. GPs must be prepared to change their paradigm from a simple end user of CPD to a critical contributor. They must also identify and communicate their learning needs clearly. More collaborative work between stakeholders and medical practitioners of different levels are needed.

Most of our GPs regarded CPD as an investment that should result in better financial returns. This was not surprising as most private GPs were business owners or partners. The entrepreneurial insights of GPs enabled them to grasp the business dimension of CPD. These could be used as a facilitator to encourage CPD among private GPs. The mechanism of reward for GP embarking on CPD is unclear at present.

Our respondents questioned the potential commercialisation of CPD and its regulation. For instance, in USA, CPD is a multi-billion-dollar business. The pharmaceutical industry contribution to the CPD has been the subject of debate for some time. All GPs in this study were aware of the role of the pharmaceutical industry when delivering CPD and their potential bias. They were very critical of industry-sponsored clinical materials. However, they still considered the financial support of the pharmaceutical industry to the CPD activities helpful and desirable. According to Othman et al., the concern of industry influence on the prescribing

pattern are mostly apply to junior and less experienced GPs. Educational integrity and independence must be maintained even as the grants provide value to the supporting organisation. Clear guidelines or regulations should be put in place to monitor the CPD providers, funders and target audience for best outcome. Present CPD monitoring system should be improved before mandatory revalidation of annual practicing certification can be implemented. Even in a teaching institution the role of various parties is debated and the demand for suitable reward is voiced.³⁸ As each doctor must respond to the need to fulfill his highest potential, proper support measures should be provided for the GP's attainment of CPD.

As far as we are aware, this was the first study to explore issues pertaining to private GP's CPD activities in Malaysia. However, there were limitations in this study. Our respondents were GPs from Klang Valley where CPD was most available. GPs from different parts of the country, particularly those from remote areas, might face different challenges in pursuing and benefiting from the CPD. The bigger portion of non-responders GP might have participated

in different CPD activities and had different perceptions and problems.

Conclusions

An organised network with peer support is helpful to encourage involvement of GPs in CPD. To improve CPD, topics and issues covered for private GPs should be relevant to their local setting. GPs are receptive to positive changes in CPD regulations to improve healthcare. However, proper regulations need to be out in place to monitor various stakeholders, users and contributors in CPD activities.

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Conflict of interest

The authors declare that they have no competing interest.

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Outcome of phacoemulsification and extracapsular cataract extraction: A study in a district hospital in Malaysia

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Phacoemulsification, extracapsular cataract extraction, complications, visual outcome

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Abstract

Aim: The aim of the study was to compare the outcomes of phacoemulsification (Phaco) and extracapsular cataract extraction (ECCE) in a district hospital setting.

Methods: A retrospective analysis was done from the medical records of the patients who underwent Phaco and ECCE in Temerloh District Hospital, Pahang state between October 2009 and September 2010. The age, gender and ethnicity of the patients, intraoperative and postoperative complications, and the best corrected visual acuity at the last follow-up visit were noted. Statistical analysis was done using Stata Software Version 11.0. The results of the two procedures were compared.

Results: Out of the 179 cataract surgeries performed, 146 cases were Phaco and 33 were ECCE. In our study, 82 were men and 97 were women. The age of patients ranged from 39 to 82 years; majority of the patients (71.3%) were more than 60 years of age. There was a significant association between type of surgery and outcome of visual acuity ($p = 0.001$). There was no significant association between intraoperative complication and type of surgery ($p = 0.166$). Postoperative complications of the surgeries were not significantly different. Good visual outcome was noted in 80.1% of eyes operated by Phaco compared to 48.5% of eyes operated by ECCE procedure.

Conclusion: Since the visual outcome was significantly better in Phaco compared to ECCE procedure ($p = 0.001$), we recommend that Phaco equipments should be supplied in the district hospitals with adequate facilities for performing intraocular surgery.

Introduction

Cataract is the leading cause of blindness in Malaysia¹ and cataract extraction is the most common type of intraocular surgery performed all over the world.² Cataract surgery has evolved from intracapsular cataract extraction (ICCE) to extracapsular cataract extraction (ECCE) and today to phacoemulsification (Phaco) that uses modern technology.

Standard ECCE involves the removal of a part of anterior capsule, manual expression of the nucleus through a large corneoscleral incision (9–10 mm) and aspiration of cortex, leaving behind the intact posterior capsule. The intraocular lens (usually rigid made up of polymethyl methacrylate) is inserted between the anterior and posterior capsule. This surgery requires local anaesthesia (facial block, retrobulbar/peribulbar/sub-Tenon injection). Since the wound is large and sutures are put to close it, there is some amount of astigmatism

after healing and thus, visual improvement takes longer time following operation.³

Phaco is the most common technique of cataract operation performed under local anaesthesia (infiltration or topical with lignocaine). It involves the use of a machine with an ultrasonic hand piece equipped with a titanium or steel tip. The tip vibrates at ultrasonic frequency (40,000 Hz) and the lens material is emulsified. A second fine instrument (sometimes called as a “cracker” or “chopper”) may be used from a side port to facilitate cracking or chopping of the nucleus into smaller pieces. Fragmentation into smaller pieces makes emulsification easier as well as the aspiration of cortical material (soft part of the lens around the nucleus). After the phacoemulsification of the lens nucleus, a dual irrigation-aspiration probe is used to aspirate out the remaining peripheral cortical materials.³ The surgery is performed

through a small corneoscleral/clear corneal wound (2.2–3.2 mm). The intraocular lens (acrylic or silicon) is folded and inserted using a lens injector through the small wound. Due to the small size of the wound and two level openings in the wound, no suture is required. The healing process of wound is fast and the rehabilitation time is less. There is no/very little astigmatism and thus, visual improvement is faster allowing the patient to return to work within few days. However, this procedure requires sophisticated and more expensive equipment; and the learning curve to convert from the standard ECCE to phaco procedure is long.

The National Eye Survey 1996 in which population from urban and rural areas of different states were included, revealed that cataract was responsible for 39% of the bilateral blindness and 35.9% of low vision.¹

The patients suffering from cataract have diminution of vision in early stages but they remain independent in their daily activities. However, when the cataract progresses and becomes mature (opacification of whole nucleus and cortex of the lens), the vision further diminishes incapacitating them for driving and going out to get anything from the shops. Cataract is the most common cause of diminution of vision in elderly patients. Family physicians or general practitioners encounter few patients with diminution of vision in their daily practice. They are the doctors who advise the patients during their visit with visual problem. Surgery being the only treatment to improve the vision in patients with cataract; the knowledge about phaco and ECCE procedure, their complications and visual outcome will help doctors to convince their patients in a better way for acceptance of surgical treatment.

This study was done to compare the complications and visual outcome of phaco and ECCE performed in a district hospital in Malaysia.

Methods

A retrospective study was done to compare phaco and ECCE in the Hospital Sultan Haji Ahmad Shah, Temerloh. It is one of the two (one in state headquarters, Kuantan) government funded specialist hospitals located in Temerloh district of Pahang state, providing service to a population of 1,443,365 in 2010, with an average annual population growth rate of 0.5% and an ethnic distribution of 74.9% Malays, 16.8% Chinese, 4.0% Indians and 4.3% others.⁴

The hospital provides health care services to the people of Temerloh district as a referral centre for Kuala Lipis, Raub, Maran, Bentong, Jerantut and Bera of Pahang state. It provides general comprehensive ophthalmology services as well as glaucoma and retinal services run by the visiting ophthalmologists from the state headquarters, Kuantan.

The data like age, gender and ethnicity of the patients, intraoperative and postoperative complications were obtained from the case folders of the patients and the National Eye Database (NED). All patients who underwent Phaco and ECCE procedures from October 2009 to September 2010 were included in this retrospective study. The best corrected visual acuity obtained after Phaco and ECCE (after refraction and subjective correction with glasses) were compared. Considering the WHO categorisation of vision figures, the best corrected visual acuity is divided into good vision (6/6 to 6/12), moderate vision (6/18 to 3/60) and poor vision (worse than 3/60).⁵

Refractions were performed by hospital optometrists at 6 weeks or later within 3 months if there was a need. Cases which were followed-up till 3 months were those with complications or patients who required suture removal. Combined cataract and glaucoma surgery were not done in any of the patients in our study. The outcomes were compared to see whether the type of surgery affected the complications and the final visual outcome.

The National Eye Database (NED) is a database of six registries on eye health information system which is supported by Ministry of Health Malaysia. The Cataract Registry was initiated in 2002 and has the data pertaining to patients' characteristics, intraoperative and postoperative events; and the preoperative as well as postoperative visual acuities. It is used to determine the practice pattern of cataract surgery, outcomes and factors influencing it, the occurrence of complications such as posterior capsule rupture, endophthalmitis and visual outcome. More importantly, the data are used to stimulate research on cataract.⁶ The data were extracted from the NED by the author Thevi Thanigasalam and cleaned.

Statistical analysis: The numerical data values were expressed as mean and standard deviation. Categorical variables were stated as frequency (n) and percentage (%). Chi-square tests were used to determine the associations between types of surgery and outcome of visual acuity and types of surgery and intraoperative/postoperative complication. The

p value of <0.05 was taken as significant. All the analyses in the study were performed using Stata Software (Version 11.0, Stata Corp LP).

Results

Out of the 179 cataract surgeries performed during the study period, 146 surgeries were phacoemulsification (Phaco) and 33 cases were extracapsular cataract extraction (ECCE). In our study, majority of the patient were in the age group of 61–70 years (38%, 68/179) (Table 1). The mean age of patients who

underwent Phaco and ECCE were 65.6 and 64.4 years respectively. There were more women (55.5%, 81/146) in the Phaco group while men (51.5%, 17/33) were more in ECCE group. Majority of the patients in our study were Malays (55.9%, 100/179).

There was a significant association between type of surgery and outcome of visual acuity ($p = 0.001$). Majority of the patients who underwent phaco had good visual outcome (80.1%, 117/146) compared to ECCE (48.5%, 16/33) (Table 2).

Table 1. Characteristic of patients who underwent phacoemulsification (Phaco) and extracapsular cataract extraction (ECCE) operations (n = 179)

Characteristics	Phaco n (%)	ECCE n (%)	Total n (%)
Age group (years)			
≤40	1 (0.7%)	1 (3.0%)	2 (1.1%)
41–50	11 (7.5%)	0 (0.0%)	11 (6.1%)
51–60	26 (17.8%)	12 (36.4%)	38 (21.2%)
61–70	55 (37.7%)	13 (39.4%)	68 (38.0%)
71–80	50 (34.2%)	6 (18.2%)	56 (31.3%)
>80	3 (2.1%)	1 (3.0%)	4 (2.2%)
Gender			
Male	65 (44.5%)	17 (51.5%)	82 (45.8%)
Female	81 (55.5%)	16 (48.5%)	79 (54.2%)
Ethnicity			
Malay	80 (54.8%)	20 (60.6%)	100 (55.9%)
Chinese	47 (32.2%)	8 (24.2%)	55 (30.7%)
Indian	19 (13.0%)	5 (15.2%)	24 (13.4%)

Table 2. Association between the type of surgery and the outcome of visual acuity (n = 179)

Visual acuity	Phaco (n = 146) n (%)	ECCE (n = 33) n (%)	Total n (%)	P value
Good vision	117 (80.01%)	16 (48.5%)	133 (74.3%)	
Moderate vision	25 (17.1%)	16 (48.5%)	41 (22.9%)	
Poor vision	4 (2.07%)	1 (3.0%)	5 (2.8%)	

Posterior capsule rent (PCR) was seen in 9.1% of patients undergoing ECCE compared to only 1.4% of patients undergoing Phaco. Vitreous loss was seen in 6.1% in ECCE, but not seen in Phaco (Table 3). There was a significant association between type of surgery and the occurrence of PCR ($p = 0.044$) and vitreous loss ($p = 0.033$). However, there was no significant difference between the types of surgery and zonular dehiscence ($p = 0.561$), or central corneal oedema, ($p = 1.000$). There were more intraoperative complications

in ECCE cases (15.2%, 5/33) compared to Phaco cases (7.5%, 11/146) (Table 4). However, there was no significant association between the occurrence of an intraoperative complication with the type of surgery ($p = 0.166$). Postoperative complications were not significantly different in the two types of cataract surgeries (Table 5).

High astigmatism was seen in 1.4% (2/146) of Phaco and 3.0% (1/33) of ECCE ($p = 0.459$).

in ECCE cases (15.2%, 5/33) compared to Phaco cases (7.5%, 11/146) (Table 4). However, there was no significant association between the occurrence of an intraoperative complication with the type of surgery ($p = 0.166$). Postoperative complications were not significantly different in the two types of cataract surgeries (Table 5).

High astigmatism was seen in 1.4% (2/146) of Phaco and 3.0% (1/33) of ECCE ($p = 0.459$).

Posterior capsule opacification (PCO) was seen in 0.7% (1/146) of Phacos but not in ECCE ($p = 1.000$). Corneal decompensation was seen only in Phaco (1.4%, 2/146) but not in ECCE (3.0%, 1/33). Other complications

such as cystoid macula oedema, infective endophthalmitis, intraocular lens decentration and retinal detachment were not seen in both types of surgeries.

The best corrected visual acuity of 6/12 or better was not influenced by the postoperative complications when the two groups were compared. High astigmatism was seen in 6.9% (2/29) of phacos and 5.9% (1/17) of ECCEs ($p = 1.000$). Corneal decompensation was seen in 6.9% (2/29) of Phacos but not in ECCE ($p = 0.524$). There were no cases of retinal detachment, cornea decompensation, endophthalmitis or cystoid macula oedema accounting for impaired or poor visual outcome.

Table 3. Association between type of surgery and type of complication ($n = 179$)

Complication	Phaco (n = 146)	ECCE (n = 33)	p Value
Posterior capsule rupture	2 (1.4%)	3 (9.1%)	0.044
Vitreous Loss	0 (0.0%)	2 (6.1%)	0.033
Zonular dehiscence	3 (2.1%)	1 (3%)	0.561
Central corneal oedema	3 (2.1%)	0 (0.0%)	1.000

Table 4. Comparison between intraoperative complications and type of cataract surgery ($n = 179$)

Intraoperative complication	Phaco (n = 146) n (%)	ECCE (n = 33) n (%)	p Value
At least one complication	11 (7.5%)	5 (15.2%)	0.166
No complication	135 (92.5%)	28 (84.8%)	

Table 5. Comparison between postoperative complications and type of cataract surgery ($n = 179$)

Postoperative complication	Phaco (n = 146) n (%)	ECCE (n = 33) n (%)	p Value
High astigmatism	2 (1.4%)	1 (3%)	0.459
Posterior capsule Opacity	1 (0.7%)	0 (0%)	1.000
Corneal decompensation	2 (1.4%)	0 (0%)	1.000

Discussion

There was a significant association between the type of surgery done and the final best corrected visual acuity. Patients who underwent phaco had a good visual outcome (80.1%) as compared to patients who underwent ECCE (48.5%) and was statistically significant ($p = 0.001$). This was comparable to the NED data from 2002 to 2011, where 91.5% of patients who underwent phaco had good vision of 6/12 or better as compared to 83% of patients who underwent ECCE.⁶ This was similar to the

findings in Ampang Hospital where 91.7% of their patients had a good visual outcome in Phaco compared to ECCE.⁷ In the two randomised trials conducted at Moorfields and Oxford Eye Hospitals, it has been found that the proportions of patients achieving 6/9 or better with spectacle correction was significantly higher in the Phaco group (69%) compared to ECCE group (57%).⁸ Better visual outcome with Phaco (80%) compared to ECCE (54%) has been reported by Khan et al.⁹ whereas Arriaga and Lozano¹⁰ reported the same as 76% and 66%, respectively. In a multicentre observational study by Loo et

al.¹¹ where three ophthalmology departments of Ministry of Health Malaysia hospitals participated, it was also found that at 3 months postoperatively, the best corrected visual acuity was better in the Phaco group (94%) compared to ECCE group (81%). Conventional extracapsular cataract surgery with intraocular lens implant costs RM 3442 (USD 905.79) and phacoemulsification with intraocular lens implant costs RM 4288 (USD 1128.42). There was no significant difference in cost effectiveness between ECCE and phaco. The cost of cataract surgery in the Moorfields and Oxford Eye Hospitals (MOH) Ministry of Health Malaysia hospital was found high due to the high overhead costs.

Posterior capsule rupture (PCR) is the commonest intraoperative complication that occurs during cataract surgery. There was a significant association between the type of surgery performed and the PCR complication ($p = 0.044$). In our study, PCR occurred more often in ECCE (9.1%) compared to Phaco (1.4%). This could probably due to the different levels and seniority of surgeons involved in the present study. Majority of phaco surgeries were done by the specialists when compared to ECCE; but junior surgeons (medical officers) perform more number of ECCE procedures than phaco surgeries. Moreover, patients with mature/hypermature cataracts were subjected to ECCE when compared to immature cataracts with lesser grades of nuclear sclerosis for phaco surgery. The higher frequency of complication rate has been supported by a study done in Aravind Eye Hospital in which the complication rate has been correlated with skill and experience of the surgeon. The intraoperative complication rate was significantly high for trainee surgeons when compared with staff surgeons experienced with both phaco and manual small incision cataract surgery.¹²

In a study of pseudoexfoliation, small pupil and phacodonesis, Katsimpris et al.¹³ found a similar higher incidence of PCR in ECCE (17.0%) compared to Phaco (4.2%). On the other hand, Neekhra et al.¹⁴ found a higher incidence of PCR in Phaco (9.54%) compared to ECCE (6.5%). Similarly, in a study in Hong Kong by Tso et al.¹⁵ there was a higher rate of PCR in Phaco (7.7%) compared to ECCE (3.0%). Interestingly, the NED data from the year 2002 to 2011 showed that the occurrence of PCR in phaco (3.9%) was similar to the occurrence of PCR in ECCE (4.1%).⁶

Vitreous loss was also statistically significant ($p = 0.033$) depending on the type of surgery

done. We found that 6.1% of patients had vitreous loss in ECCE but there were none in the Phaco group. According to the study done by Kothari et al.¹⁶ Vitreous loss was higher in the ECCE group (8.1%) when compared to the Phaco group (5%). Similarly in the study by Katsimpris et al.¹² a higher rate of vitreous loss was observed in ECCE (17.0%) compared to Phaco (4.2%). On the contrary, in a study of 1400 cataract surgeries by Blomquist and Rugwani,¹⁷ 53 patients who underwent phaco had vitreous loss but in ECCE only 7 patients had vitreous loss.

There was no significant difference in the complication rate between Phaco and ECCE procedures ($p = 0.166$). Not much of difference was found in the complication rate between phaco (6.3%) and ECCE (9.1%) in the data of NED from 2002 to 2011.⁶ This was similar to the other Malaysian study done by Loo et al.¹¹ He found that there was also no difference in the occurrence of intraoperative complications between ECCE (17%) and phacoemulsification (14%). Meeks et al.¹⁸ found no difference in the occurrence of complications between phaco (2.5%) and ECCE (4.1%) ($p = 0.40$). However, in the study of complications over 22 years in Australia by Clark et al.¹⁹ it was found that complications were most common in ICCE and ECCE (2%), whereas complications were half in Phaco (0.98%) ($p < 0.001$).

Postoperative complications of ECCE and Phaco were not significantly different. High astigmatism was seen in ECCE (1.4%) compared to Phaco (3.0%), but this was not statistically significant ($p = 0.459$). We did not study the surgically induced astigmatism but the study conducted by Loo et al.¹¹ in Ministry of Health Hospitals showed that there were significant differences in the surgically induced astigmatism between ECCE and Phaco ($p < 0.05$). Minassian et al.⁸ also found that all of the significantly poorer results in the ECCE were due to higher level of astigmatism after surgery. Posterior capsule opacification (PCO) was seen in 0.7% of Phacos but not in ECCE ($p = 0.634$). Other studies have found that the occurrence of PCO is higher in ECCE compared to Phaco. Minassian et al.⁸ also found that the occurrence of PCO was significantly higher in the ECCE group than in Phaco group ($p = 0.014$). Castells et al.²⁰ also found a higher incidence of posterior capsule opacity in ECCE compared to Phaco ($p = 0.035$). A lower incidence of postoperative corneal oedema in Phaco (3.6%) compared to ECCE (7.4%; $p = 0.016$) was reported by Castells et al.²⁰

Other complications such as cystoid macula oedema, infective endophthalmitis, intraocular lens decentration, retinal detachment were seen in 17.2% of phaco and 5.9% of ECCE ($p = 0.270$). Minassian et al.⁸ also did not find any significant difference between the complications in both groups. Cystoid macula oedema (CMO) was seen in three ECCE patients and two Phaco patients ($p = 0.68$) and retinal detachments were seen only in two Phaco patients. Endophthalmitis was seen in four patients out of whom three patients underwent Phaco ($p = 0.62$). In our study, the postoperative complications such as high astigmatism, PCO, corneal decompensation and CMO did not significantly affect the final visual outcome. Minassian et al.⁸ found that poorer results in the visual outcome of ECCE were due to higher levels of astigmatism.

Limitations

There were unequal number of ECCE and Phaco (33 vs 146) surgeries in this retrospective study. In addition, surgeons of different levels and seniority were involved in this study. Intraoperative complication rate was higher in the hands of trainee surgeons.

Conclusion

Phaco has been shown to have a better final visual outcome compared to ECCE in the District Hospital setting. However, ECCE also yields good results. All district hospitals

should have ophthalmology services for cataract surgery, so that patients do not need to travel far to be operated. The training for ECCE does not take long time and almost all ophthalmologists can do it. It can be done in a functioning operation theatre with the necessary instruments that do not cost much. However, due to better outcome with phaco, we therefore recommend that district hospitals should be provided with the Phaco machine, instruments and adequate facilities for performing intraocular surgery and the doctors and paramedics should be trained so that better eye care services can be delivered to the public.

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Lens-induced glaucoma in a tertiary centre in northeast of Malaysia

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Abstract

Objective: To determine the clinical presentations, management and outcome of lens-induced glaucoma (LIG) in Hospital Universiti Sains Malaysia.

Methods: A retrospective review was done among the existing patients of Hospital Universiti Sains Malaysia from January 2003 to December 2008. Patients with LIG were included and exclusion criteria were applicable for those who had glaucoma or other underlying causes of glaucoma. Demographic data, clinical presentations, management and outcome were recorded and analysed.

Results: Thirty-eight patients (38 eyes) with LIG were included. The mean age was 70.2 years and predominantly women (22, 57.9%) were affected. Phacomorphic glaucoma (28, 73.7%) was the main cause of LIG, followed by phacolytic glaucoma (8, 21.1%). The main clinical symptoms were reduced vision (94.7%), eye pain (84.2%) and eye redness (81.6%). Most patients (32 eyes) were presented with visual acuity of hand movements (84.2%, or worse) and intraocular pressure more than 40 mm Hg (21, 55.3%). Nineteen patients (50.0%) underwent extra capsular cataract extraction with primary posterior chamber lens implantation. In 28 cases (73.7%), patients were able to stay free from pressure-lowering drugs after the operation. Intraocular pressure (IOP) reduced tremendously upon discharge with a mean of 15.2 mm Hg and vision had improved exceptionally (more than 6/36) as noted in 17 cases (44.7%).

Conclusion: Triad of acute reduced vision, eye pain and redness are the main clinical presentations of LIG. The main cause of LIG is phacomorphic glaucoma stemming from untreated senile cataract. Public awareness and early detection by primary physician is important for an early intervention of cataract. Early intervention aids in visual recovery and IOP control of LIG.

Introduction

Lens-induced glaucoma (LIG) is common in developing countries owing to the delay in cataract removal.^{1,2} In Malaysia, cataract is one of the leading causes of blindness and low vision.³ Although LIG is prevalent in developing countries, it also occurs in developed countries.⁴

Lens-related elevation in intraocular pressure (IOP) results from a variety of mechanisms such as lens dislocation, lens swelling (intumescent cataract), inflammation due to phacoanaphylaxis and lens particle blocking the trabecular meshwork. Untreated increase in IOP damages the optic nerve mechanically, which inevitably leads to blindness. Elevation in IOP causes compression and backward bowing of lamina cribrosa, leading to obstruction of axoplasmic transport of retinal nerve fibre and ganglion cell death.

Cataract occurs when the crystalline lens loses its transparency normally as a part of the ageing

process. Neglected cataractous lens may swell because of the osmotic effect of the degenerated lens proteins. In phacomorphic glaucoma, the swollen lens may block the anterior flow of the aqueous humor from the posterior chamber pushing the iris forward. Eventually, the trabecular meshwork gets blocked by the iris and leads to a sudden and extreme rise in IOP. Prolonged swelling of the lens and hypermature cataract may cause disruption or dysfunction of the zonular fibres of the lens leading to subluxation of the lens. The change in the lens position blocks the anterior flow of the aqueous humour and subsequently causes elevated intraocular pressure (IOP) through the same mechanism mentioned above.⁵ Other causes of subluxated lens include trauma, pseudoexfoliation syndrome, high myopia, buphthalmos and hereditary causes such as aniridia, Marfan syndrome and homocystinuria. Trauma remains the most common cause of subluxated lens.

Phacolytic glaucoma is a principal complication of hypermature cataract. Hypermature cataract may cause leakage of lens protein from an intact capsule. The lens protein causes intense inflammation and blockage of trabecular meshwork, subsequently responsible for elevation of IOP.⁶ The lens proteins and particles were thought to be derived from materials formed during the early embryological stage of eye development. The release of this material from a ruptured lens at the later life is perceived as foreign body and initiates an intense autoimmune granulomatous reaction.⁷

Understanding the presentation, causes and management of LIG are important for blindness prevention strategy. The purpose of this review is to study and determine the clinical presentations, management and outcome of lens induced glaucoma at Hospital Universiti Sains Malaysia.

Methods

A retrospective review was conducted on the records of patients who were diagnosed with LIG and admitted to Hospital Universiti Sains Malaysia between January 2003 and December 2008. LIG was diagnosed based on the presence of elevated IOP and lens-related problem.¹ The diagnosis of phacomorphic glaucoma was based on the presence of the classical signs and symptoms such as pain and redness, shallow anterior chamber (AC), cornea oedema and increased IOP with intumescent lens. Phacolytic glaucoma was diagnosed clinically based on the presence of the hypermature cataract with intact capsule, presence of lens protein and flare in AC. Phacoanaphylactic glaucoma was diagnosed by the manifestation of the ruptured capsule, flare AC and increased IOP. The malposition of the lens (subluxation of the lens) was based on the slit lamp examination. Goldmann applanation tonometry was used to measure IOP.

Exclusion criteria were applicable for those who had primary glaucoma or other underlying causes of secondary glaucoma, inadequate or inconclusive diagnostic data and less than 6 months of follow-up. Demographic data, clinical presentations, management and outcomes were documented and statistical analysis was conducted using IBM SPSS 20.0.

Results

A total of 38 patients with LIG (16 men and 22 women) were included in the review. Majority were Malay (34 or 89.5%) and the remaining were Chinese (Table 1). Of the

total patients, 28 (73.7 %) had phacomorphic glaucoma, 8 (21.1%) had phacolytic glaucoma, 1 (2.6%) had phacoanaphylactic glaucoma and 1 (2.6%) had subluxated lens (Table 1). The results showed an increasing trend in the number of patients admitted for LIG from the year 2004 to 2008 (Table 1). The age of patients at the time of presentation was 47 to 88 years with the majority (71%) between 61 and 80 years. Six (15.8%) patients were between 81 and 90 years (Table 1).

Table 1. Demographic data

	N (%)
Age in years (n = 38)	
81–90	6 (15.8)
71–80	13 (34.2)
61–70	14 (36.8)
51–60	4 (10.5)
41–50	1 (10.5)
Gender (n = 38)	
Male	16 (42.1)
Female	22 (57.9)
Ethnicity (n = 38)	
Malay	34 (89.5)
Chinese	4 (10.5)
Types of LIG (n = 38)	
Phacomorphic	28 (73.7)
Phacolytic	8 (21.1)
Phacoanaphylactic	1 (2.6)
Subluxated lens	1 (2.6)
Status of fellow eye (n = 38)	
Pseudophakic	8 (21.1)
Mature cataract	4 (10.5)
Immature cataract	26 (68.4)
Number of LIG cases according to year	
2004:	6
2005:	5
2006:	8
2007:	8
2008:	13

Clinical presentation

Most patients with LIG presented with reduced vision (94.7%), eye pain (84.2%), eye redness (81.6%), headache (68.4%) and vomiting (36.8%) (Table 2). Despite the

presence of reduction in vision, majority of patients presented late to the hospital. Almost half (44.2%) of them looked for the treatment only after 6 months and 1 year of reduction in vision. Eye pain and redness (36.8%) were the main symptoms that brought the patients to the hospital. Presence of eye redness for more than 1 month was noted in 25.8% of patients (Table 3).

Table 2. Summary of clinical presentations of LIG

	N (%)
Symptoms (n = 38)^a	
Reduced vision	36 (94.7)
Eye pain	32 (84.2)
Eye redness	31 (81.6)
Headache	26 (68.4)
Vomiting	14 (36.8)
Intraocular pressure in mm Hg (n = 38)	
≥20–29	4 (10.5)
≥30–39	4 (10.5)
≥40–49	12 (31.6)
≥50–59	7 (18.4)
≥60–69	8 (21.1)
≥70–79	3 (7.9)
Visual acuity affected eye (n = 38)	
6/12–6/18	2 (5.3)
6/24–6/36	1 (2.6)
6/60–1/60	2 (5.3)
CF (counting fingers)	1 (2.6)
HM (hand movement)	13 (34.2)
PL (perception of light)	12 (31.6)
Non-perceptive to light (NPL)	7 (18.4)
Visual acuity fellow eye (n = 38)	
6/6–6/18	23 (63.9)
6/24–6/36	6 (15.7)
6/60–1/60	3 (7.8)
CF	1 (2.8)
HM	1 (2.8)
PL	2 (5.6)
NPL	2 (5.6)

^aPatients may have more than one symptom.

Table 3. Summary of duration each of symptoms

	N (%)
Blurring of vision (n = 36)	
Less than a week	8 (22.2)
1 to <2 weeks	5 (13.9)
2 to <4 weeks	2 (5.6)
1–3 months	2 (5.6)
3–6 months	2 (5.6)
>6 months	17 (44.2)
Eye pain (n = 32)	
Less than a week	14 (43.8)
1 to <2 weeks	4 (12.5)
2 to <4 weeks	7 (21.9)
1–3 months	5 (15.6)
3–6 months	1 (3.1)
>6 months	1 (3.1)
Eye redness (n = 31)	
Less than a week	14 (45.2)
1 to <2 weeks	5 (16.1)
2 to <4 weeks	4 (12.9)
1–3 months	5 (16.1)
3–6 months	1 (3.2)
>6 months	2 (6.4)
Headache (n = 26)	
Less than a week	11 (42.3)
1 to <2 weeks	6 (23.1)
2 to <4 weeks	5 (19.2)
1–3 months	4 (15.3)
3–6 months	–
>6 months	–
Vomiting (n = 14)	
Less than a week	7 (28.6)
1 to <2 weeks	2 (14.3)
2 to <4 weeks	3 (21.4)
1–3 months	2 (14.3)
3–6 months	–
>6 months	–

Visual acuity in affected eye and fellow eyes

At first presentation, 7 (18.4%) patients with affected eye were already non-perceptive to light (NPL) and 2 (5.6%) were NPL with the fellow eye. Majority of patients (29, 76.3%) had acceptable vision with the fellow eye ranging from 6/6 to 6/36 and 8 (21.1%) patients had the history of previous cataract

extraction of the fellow eye (Table 1). IOP at the time of presentation ranged from 22 to 78 mm Hg (Table 2). A large number of them (79.0%) presented with IOP of 40 mm Hg and above. All patients were treated medically prior to cataract operation. Fourteen (36.8%) patients had IOP above 30 mm Hg prior to the operation (Table 4).

Table 4. IOP prior operation, day 1 post-operation and on discharge

	N (%)
IOP (mm Hg) prior to operation (n = 38)	
<10	2 (5.3)
≥10–19	12 (31.6)
≥20–29	10 (26.3)
≥30–39	8 (21.1)
≥40–49	4 (10.5)
≥50–59	2 (5.3)
IOP (mm Hg) post-operation, Day 1 (n = 38)	
<10	7 (18.4)
≥10–19	22 (57.9)
≥20–29	6 (15.8)
≥30–39	2 (5.3)
≥40–49	1 (2.6)
≥50–59	–
IOP (mm Hg) on discharge (n=38)	
<10	6 (15.8)
≥10–19	28 (73.7)
≥20–29	2 (5.3)
≥30–39	2 (5.3)
≥40–49	–
≥50–59	–

Intraocular pressure, surgery and outcome

Majority of patients underwent extracapsular cataract extraction (ECCE) with and without IOL implantation. Other operations performed were intracapsular cataract extraction (ICCE). Majority of patients were implanted with IOL either posterior chamber intraocular lens (PCIOL) or anterior chamber type (ACIOL) (Table 6). Uneventful operations were noted in majority (71.0%) of cases. The main complication was posterior capsule rupture (21.0%) (Table 6).

Table 5. Visual acuity on admission, discharge and 6 months follow-up

	N (%)
Visual acuity on admission (n = 38)	
6/6–6/9	–
6/12–6/18	2 (5.3)
6/24–6/36	1 (2.6)
6/60–1/60	2 (5.3)
CF	1 (2.6)
HM	13 (34.2)
PL	12 (31.6)
NPL	7 (18.4)
Visual acuity on discharge (n = 38)	
6/6–6/9	1 (2.6)
6/12–6/18	5 (13.2)
6/24–6/36	12 (31.6)
6/60–1/60	3 (7.9)
CF	6 (15.8)
HM	–
PL	2 (5.3)
NPL	7 (18.4)
Missing data	2 (5.3)
Visual acuity 6 months post-operation (n = 38)	
6/6–6/9	13 (34.2)
6/12–6/18	9 (23.7)
6/24–6/36	2 (5.3)
6/60–1/60	2 (5.3)
CF	–
HM	2 (5.3)
PL	–
NPL	8 (21.1)
Missing data	2 (5.3)

Table 6. Type of surgeries, intraoperative complications and vertical cup–disc ratio on discharge

	N (%)
Type of surgeries (n = 38)	
Plain ECCE	12 (31.6)
ECCE/PCIOL	19 (50.0)
ECCE/ACIOL	4 (10.5)
ICCE	3 (7.9)
Intraoperative complications (n = 38)	
Uneventful	27 (71.0)
Posterior capsule rupture	8 (21.0)
Zonular dialysis	1 (3.0)

	N (%)
Vertical cup disc ratio (VCDR) on discharge (n = 38)	
0.3	13 (34.2)
0.4	2 (5.3)
0.5	2 (5.3)
1.0	5 (13.2)
No data	16 (42.1)

On day 1 post-operation, IOP reduction below 20 mm Hg was achieved in 29 (76.3%) patients (Table 4). Upon discharge, most patients (34, 89.5%) recorded IOP below 20 mm Hg with or without using topical pressure-lowering drugs (Table 4). There was an inadequate documentation of vertical cup-to-disc ratio of 16 patients upon discharge. Corneal haziness was the main reason for the failure of optic disc evaluation.

Follow-up

Five patients developed absolute glaucoma and 15 patients had cup-to-disc ratio (CDR) of less than 0.5 (Table 6). In this study, after 6 months of follow-up, 34.2% of patients had good visual outcome of 6/9 or better and 23.7% had 6/18 or better on the Snellen chart (Table 5). Unfortunately, eight patients (21.2%) lost their vision (non-perceptive to light) (Table 5).

Discussion

The National Eye Database (2007) Annual Reports indicated that out of 18,426 patients who had undergone cataract operation in

various centres in Malaysia, 0.7% were the cases of phacomorphic and phacolytic glaucoma.⁸ In the present study, the phacomorphic lens is the most common cause of LIG followed by the phacolytic lens. In India, phacomorphic glaucoma was found in 3.9% of all cataract surgeries.⁹ Based on the retrospective review, it was concluded that there was an alarming increase in the incidence of LIG in Hospital Universiti Sains Malaysia (HUSM). This increasing incidence of LIG may be attributed to the exponential increase in the elderly population because of the improvement in health care.

The findings were similar to those of the previous studies, which indicated that women are more predisposed to LIG^{10,11} due to higher prevalence of cataract in them.^{12,13} Inaccessibility to eye care and lack of awareness may contribute to late presentation of LIG even with the presence of pain. Early detection of lens-related problem may prevent elevation of IOP, which may lead to optic neuropathy. Public awareness on the benefits of early detection and treatment of cataract is important in the prevention of LIG. The saying 'poor vision is associated with old age' needs to be eradicated.¹⁴

Conclusion

LIG is an important vision-threatening disease presenting as a painful red eye. A phacomorphic lens disease secondary to a neglected senile cataract is the major cause of LIG. Removal of the cataractous lens results in prompt reduction in IOP and a favourable visual outcome.

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Does honey improve cough symptoms in children with upper respiratory tract infections?

Chan CW

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Case scenario

Madam Tan brings in her 3-year-old son, John, with 2-day history of cough and runny nose. She describes the dry cough as moderately severe and estimates approximately 10–15 episodes per hour. The cough occasionally disturbs John's sleep. He has no significant past medical history for respiratory system medical history and has been healthy. Also, he has no fever. On examination, he looks alert and afebrile. His physical examination findings are normal except the slight runny nose.

John had the similar cough 1 year ago, which was treated with diphenhydramine. Madam Tan had noted that John was somnolent after taking the medicine. She heard from her friend that honey is effective in reducing cough symptoms. Madam Tan asks your opinion regarding treating John with honey.

Clinical inquiry

Does honey improve cough symptoms in children with upper respiratory tract infection (URTI)?

In Population, Intervention, Control and Outcome (PICO) Format:

Population	Children with URTI
Intervention	Honey
Control	Diphenhydramine; no treatment
Outcome	Reduce cough severity and frequency

Acquire

In order to answer the clinical inquiry, Cochrane reviews and PubMed databases were searched using terms “honey”, “cough” and “children”. Cochrane database of systematic reviews identified an abstract on the following review:¹

Oduwale O, Meremikwu MM, Oyo-Ita A, et al. Honey for acute cough in children.

(Cochrane Database of Systematic Reviews 2012, Issue 3. Art. No.: CD007094. DOI:10.1002/14651858.CD007094.pub3).

While searching the PubMed database, five reviews were identified, which fit the requirement. Among the five reviews, two of the Cochrane systematic reviews were by Oduwale O (2010 and 2012) and the other three were literature reviews. Since systematic reviews are considered highly informative in evidence based practices, the most updated Oduwale O's systematic review was selected to answer the clinical inquiry.

Appraise

The stated objective of the review,¹ “To evaluate the effectiveness of honey for acute cough in children in ambulatory settings”, fits our PICO. In this review, the terms “honey” and “cough” were used to conduct search in seven databases.¹ Selection criteria, selection process, data extraction and appraisal of individual trials were adequately described. Furthermore, analysis was carried out appropriately on patient-level data as well as on trial-level data. Although this review was conducted using rigorous methodology, the included trials had high risk of bias as blinding of intervention was not done. Blinding is a study process in which the critical information on allocation of treatment is hidden either from the patients, observer or the evaluator. The method of blinding in randomised controlled trial (RCT) is used to ensure that there are no differences in the way in which each group is assessed or managed and thus minimises the bias. Since blinding of intervention was not done for the included RCTs; the quality of evidence based on this review is not ensured.

Results

This review included two RCTs. Measures of treatment effect in the RCTs were the mean differences (MDs) derived from parents' subjective assessment of cough symptoms through validated questions using a 7-point Likert scale. The mean difference (MD)

is a standard statistic that measures the absolute difference between the mean values in two groups in a clinical trial. It estimates the amount by which the experimental intervention changes the outcome on an average compared with the control. Honey was better than 'no treatment' in reducing frequency of cough (MD -1.07; 95% CI -1.53 to -0.60; two studies; 154 participants). Low quality evidence suggests that honey maybe slightly better than diphenhydramine in reducing cough frequency (MD -0.57; 95% CI -0.90 to -0.24; one study; 80 participants). Three children (7.5%) experienced somnolence in the diphenhydramine group but it was not significantly different from the honey (RR 0.14; 95% CI 0.01 to 2.68; 80 participants).¹

Apply

One of the two trials included the patients from 24–60 months and the median age of another RCT was 5.22 years. Therefore, the findings of this review are applicable to John. Based on the results, as compared to diphenhydramine and "no treatment", honey seems to have somewhat higher effectiveness in reducing the severity and frequency of acute cough due to URTIs. Despite having small risk of causing insomnia, hyperactivity and

nervousness¹, honey can still be recommended to John because of its potential benefits in improving quality of sleep and reducing the severity of cough.

Discussion

The limitation of this review update is that only two small studies with high risk of bias were included. URTIs are self-limiting illness and they are best managed without taking any medications to avoid adverse effects. However, if the cough affects the quality of life or sleep, antihistamine or honey can be considered. Theoretically, diphenhydramine can relieve both rhinorrhoea and cough; however, the evidence has shown it can relieve rhinorrhoea, but not cough.² Since antihistamine or other over-the-counter cold medicines have not shown to be effective in improving acute cough² and in fact they could be deadly if taken in large doses,³ honey serves as a safer alternative for children with distressing acute cough. Having said that, honey could be contaminated with *Clostridium botulinum*; infant less than 1 year of age should be restricted from consuming honey.⁴ The potential adverse effects like insomnia, hyperactivity and nervousness should be disclosed to the parents if honey is prescribed.

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Acute haemorrhagic oedema of infancy with bullae and koebnerisation

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Abstract

A 5-month-old Malay boy presented with purpuric papules and plaques on the face and extremities accompanied by fever, coryzal symptoms and bilateral lower limb oedema. There were also bullous linear purpuric lesions on the right upper limb. Blood and culture tests were normal. Histopathological tests showed leukocytoclastic vasculitis, confirming the diagnosis of acute haemorrhagic oedema of infancy. The patient achieved complete recovery after 2 weeks with no recurrence.

Introduction

Acute haemorrhagic oedema of infancy (AHEI) is a benign form of cutaneous leukocytoclastic vasculitis, which affects children younger than 2 years old. It presents with fever, peripheral oedema and purpuric targetoid plaques on the face and extremities. Despite the dramatic cutaneous presentation, gastrointestinal or renal involvement is uncommon.¹ The disease follows a benign, self-limiting course usually without any recurrence or long term complication. It may be difficult to diagnose, therefore, referral to a specialist for further improvement, observation and management is advisable.

Case report

A 5-month-old Malay boy presented with fever for 4 days duration accompanied by cough, loose stool, purpuric skin lesions and bilateral lower limb swelling. Three days prior to the onset of illness, the child received his third dose of diphtheria, tetanus and polio (DTP) vaccination. Before coming to the hospital, his mother had brought him to a general practitioner who prescribed him antipyretics and antimicrobials. The skin lesions appeared prior to the commencement of antimicrobials. Starting with purpura on the right ear pinna, the lesions rapidly extended to the upper and lower limbs and finally the face. Papules on the cheeks and lower legs quickly evolved into large and tender plaques. The child had no symptoms of irritability and there was neither haematuria nor haematochezia. He had no known medical illness and had a normal birth history. No other siblings were similarly affected.



Figure 1. Erythematous, non-blanching and indurated papules and plaques on the cheeks, left hand dorsum and bilateral lower limbs



Figure 2. Clear and haemorrhagic blisters on linear erythematous plaques encircling the right upper limb

Laboratory investigations were non-specific with normal complete blood count, renal profile, liver function test, anti-streptolysin O titre, complements, immunoglobulin levels, anti-nuclear antibody, anti-mycoplasma IgM and urinalysis. Erythrocyte sedimentation rate (ESR) and C-reactive protein (CRP) were 96 and 28 mg/L respectively. Blood and blister fluid cultures were negative for bacterial growth. A punch biopsy taken from a purpura on the left forearm demonstrated a perivascular neutrophilic infiltration with some eosinophils, extravasated red blood cells and nuclear dusts surrounding the blood vessels, as well as thrombosed vessels. All of these were the features of leukocytoclastic vasculitis (Figure 3). No organisms were seen with PAS (periodic acid—Schiff) and Giemsa histochemical stains. Immunofluorescence study was not done. The clinical features with the skin histopathological findings strongly support the diagnosis of acute haemorrhagic oedema of infancy.

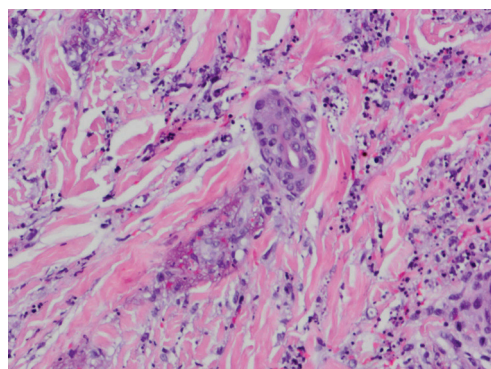


Figure 3. High power examination shows small-vessel leukocytoclastic vasculitis in which there is fibrinoid necrosis of the vessel walls, neutrophils infiltrating the vessel walls with nuclear dusting and red cell extravasation (Hematoxylin and eosin (HE) stain, magnification 40*)

Normal saline wet dressing was commenced on the right upper limb blisters along with 0.025% betamethasone cream for the purpuric plaques. He was discharged after 5 days of admission and at that point the purpuric plaques had already become dusky. On a follow-up visit to the dermatology clinic 2 weeks later, almost all skin lesions had completely cleared without hyperpigmentation or scar. Bullous lesions on the right upper limb; however, had resolved with hyperpigmentation.

Discussion

AHEI is a form of cutaneous leukocytoclastic vasculitis, occurring in infants younger than 2 years of age.^{1–3} Over 250 cases have been reported worldwide but the exact

incidence is unknown. A systematic review reported that 80% of cases occurred in children aged 6–24 months.⁴ Its aetiology is unknown, although a history of recent upper respiratory infection, otitis media, pharyngitis, pneumonia, conjunctivitis, urinary tract infection or immunisation has been found in patients.^{2,4,5} AHEI has been reported to be associated with viral infections (coxsackievirus,² cytomegalovirus,¹ rotavirus² and hepatitis A(6)), bacterial infections (*Escherichia coli*, *campylobacter*,² streptococcal⁴ and staphylococcal⁵), vaccination (measles,⁷ diphtheria–pertussis, tetanus or combined)⁴ or drug intake (penicillin, cephalosporins, trimethoprim sulphamethoxazole, paracetamol, cough syrup or a combination of these).^{2,4,5} Patients typically present with purpuric, targetoid, or rosette-shaped lesions, often found on the head, ears, and limbs together with tender, non-pitting oedema and fever.⁸ The trunk and mucous membranes are usually spared.⁵

In terms of laboratory investigations, elevated total white cell count, ESR or CRP can be seen; although no consistent laboratory findings have been reported.⁵ Histopathological examination typically shows a leukocytoclastic vasculitis of the dermal vessels with fibrinoid necrosis, extravasation of red blood cells and leucocytoclasia with perivascular IgA deposits in one-third of AHEI cases. Immunofluorescence study also detected IgM and C1q.^{1,2,5} According to the clinical presentations alone, it is essential to exclude conditions such as Henoch-Schönlein purpura (HSP), meningococcaemia and erythema multiforme. Other differential diagnoses of AHEI include Sweet syndrome, Kawasaki disease, skin lesions in septicemia or a drug eruption.^{1–3,5}

It is possible that the DTP vaccination had induced the disease in the patient—an association previously reported in the literature.⁹ Notification of this adverse drug reaction to the Malaysian Adverse Drug Reactions Advisory Committee is also advised if any drug or vaccine is suspected to be the cause. It is unclear how vaccination can cause leukocytoclastic vasculitis but it may be related to hypersensitivity to circulating immune complexes containing viral antigens or any of the preservatives.¹⁰

The patient also presented with unusual features of AHEI by developing new lesions on areas affected by trauma, essentially a Koebner phenomenon. These lesions then progressed to bullous formation. According to our knowledge, koebnerisation of skin

lesions in AHEI has not been described in the medical literature previously. On the other hand, bullous forms of AHEI has been reported.¹¹ Koebner phenomenon is common in many other dermatological diseases such as vitiligo, verruca vulgaris and lichen planus.¹² A probable theory is that local inflammation predisposes vessels to immune complex and complement aggregation, resulting in the occurrence of new lesions at traumatic sites.¹²

In this patient, a skin biopsy and histological examination of the bullous linear purpuric lesions on the right upper limb was essential for confirmation. It was important to exclude other skin conditions that may coexist and present with linear bullous lesions over site of trivial trauma such as bullous mastocytosis and milder form of epidermolysis bullosa¹³. These were not performed as the parents declined to repeat the surgical procedure.

In cases with extensive bullous lesions, secondary infection of ruptured bullae and infant dehydration could occur necessitating referral to a specialist for hospitalisation and further management.

As with any self-limiting disease, treatment is symptomatic and oral corticosteroids or antihistamines are not absolutely necessary.

Spontaneous recovery occurs within 6–21 days.⁴ Our patient did not have any systemic complication and had an uneventful recovery.

Conclusion

AHEI is an uncommon, benign cutaneous vasculitis in young children. It is important to identify AHEI as the cutaneous lesions do not appear benign. Hence, caution is needed from the primary care perspective.

Conflict of interest

The authors declare that there are no conflicts of interest.

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Contribution of authors

Norashikin Shamsudin diagnosed and treated the patient and Sazlyna Mohd Sazlly Lim conceived the study. Both participated in the interpretation and drafted the manuscript.

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Unilateral epiphora in an adolescent

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Case history

A 15-year-old girl from a village near Pekan town was presented to the clinic accompanied by her parents. The girl had a 5-day history of tearing from her right eye associated with itching. She had visited another general practice (GP) clinic 2 days earlier where she was given some eye drops. None of her family members or contacts had conjunctivitis. There was no history of swelling, trauma, insect bite or dust in her eye. She had no cough, fever or other coryzal symptoms and there was no history of asthma or allergic rhinitis in the patient or her family members.

On general examination, the patient was found afebrile with clear lungs and had no lymphadenopathy, murmurs on auscultation of the heart and hepatosplenomegaly. On inspection, mild conjunctival injection of her right eye with a small dark pigmented and elevated lesion seen at the margin of her right upper eyelid (Figure 1). This lesion was thought to be a mole during her first clinic visit.

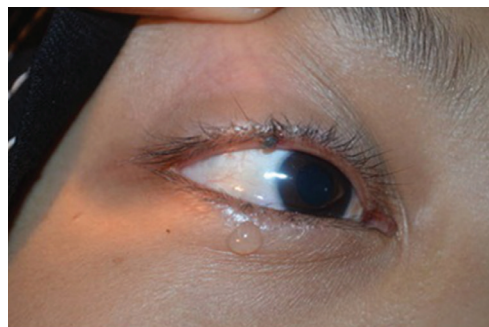


Figure 1. A dark pigmented lesion

Careful inspection with the help of a magnifying lens revealed that the lesion had multiple small extensions. These extensions were removed using crocodile forceps and were sent to the laboratory for academic purpose. The specimen is shown in Figure 2.



Figure 2. Specimen removed intact with crocodile forceps

Questions

1. What is your most probable diagnosis?
2. What are common clinical presentations of this condition?
3. What is the principle of managing this condition?
4. Are there any precautions to be taken during the management? Why?
5. Do you need to notify the health authorities about this condition?
6. Is this condition common? How common is it in Malaysia?

Answers

1. The provisional diagnosis is the presence of a tick bite in the eyelid. The small tick on the eyelid is mistaken for a mole because of its small size, colour, flat appearance and adherence to the lid margin. By the time patient arrives to the clinic, the tick may have started to feed and become engorged with blood making it more visible. Upon careful inspection with the aid of a magnifying glass, small extensions from the body representing the tick's legs are revealed. The upper eyelid of the right eye is slightly 1. swollen and epiphora is noted. There is neither ptosis, lymphadenopathy nor any discharge from the nostrils. The differential diagnoses for epiphora include nasolacrimal duct obstruction, keratitis, abrasion or presence of foreign body on cornea or under lid.¹
2. Tick bites on eyes and ears are very common in children. The general clinical presentations of tick bites (to the eyelid margin) are tearing of the eyes, swelling, itchiness and conjunctival injection.^{2,3} In cases of intra-aural ticks, there can be pain in the ear and the neck. In some cases of intra-aural tick bite, facial palsy has been reported.⁴⁻⁶

Common causes of unilateral epiphora are punctual obstruction, canalicular obstruction, nasolacrimal duct obstruction, lid malposition conjunctivitis, sinusitis, Bell's palsy and ocular surface disorders. Rare causes of unilateral epiphora include canaliculitis and papilloma of the lacrimal sac. Six cases of unilateral epiphora caused

by canaliculitis secondary to a herpes simplex infection and a case of recurrent Schneiderian papilloma of lacrimal sac were reported.^{7,8}

A case of tick bite on upper eyelid with epiphora due to trichotillois has been reported.⁹ Also, five cases of tick bite on eyelid with a complication of orbital myositis and swelling of eyelids along with a case of left abducens nerve palsy have been reported.^{3,10} Association of Orbital myositis with *Borrelia burgdorferi* infection (Lyme disease) has also been found.¹¹

3. The principle of managing tick bites on the eyelid includes the prompt and gentle manual removal of the tick. However, ticks are usually difficult to remove because of its hour-glass shaped hypostome of the mouthparts. Also, the secretion of cement-like substance helps it to anchor to the skin. In this case, topical anaesthetic eye drops like Alcaine 0.5% (proparacaine hydrochloride) had been applied before the removal of the tick using a crocodile forceps. There was slight discomfort during the process of removal; however, there was no bleeding.

The management of tick bite has been described widely and in some practices the methods used are questionable and potentially unsafe. Application of lighter fuel to the tick on the eyelid using cotton swab to asphyxiate the tick followed by its removal with a forceps has been described. The lighter fuel may irritate the eye as well as the tick, which may cause the tick to inject toxic material into the tissue.¹² In another setting, the eye was anaesthetised with proparacaine ophthalmic (Ophthaine) and a chalazion clamp was used over the tick, which was slowly tightened to extrude the tick gradually.¹³

In young children, it is preferable to remove eyelid tick under general anaesthesia by an ophthalmologist. Ticks must be removed promptly to prevent them from secreting toxins. The ticks should be removed using blunt forceps by holding it as close to the mouthparts of the tick as possible so as not to leave any remnant mouth parts of the tick. Several studies found mechanical removal of ticks using a blunt, medium-tipped and angled forceps as the most effective process.^{14,15}

Antibiotics were not prescribed to this patient. Only oral analgesic and antihistaminic were given for symptomatic relief. In tick bites on eyelid, broad spectrum antibiotics can be given to children as prophylaxis to prevent complications.^{3,10,16}

4. Ticks may have either a soft or a hard shell. The body of the tick must not be crushed to prevent the release of toxins into the tissues.^{15,16} During the removal of a tick, the following measures must be avoided:
 - Handling the tick with unprotected hands.
 - Using sharp forceps.
 - Crushing, puncturing or squeezing of the tick's body.
 - Applying substances such as alcohol, petroleum jelly, gasoline, etc.
 - Applying heat with a match box or candle.
5. There is no need of mandatory notification of tick bite cases to the health authorities.¹⁷ However, when cases of tick bite are seen frequently in a specific area, it is beneficial to notify the health authorities so that preventive measures such as fumigation can be carried out. Little information is available on the relationships of tick bites with diseases in Malaysia, although, in other areas of the world, several species of ticks are important vectors of human diseases.^{18,19}
6. Tick bites are common and have been reported in many parts of the world.^{3,12,13,20-23} There are few study reports on tick bites in Malaysia. Tick bites were commonly reported in the east coast states of Malaysia, in which 40 cases in Kelantan and 91 in Kuantan, Pahang.^{5,6} Three cases of intra-aural tick bites with varied clinical presentations were reported in the state of Penang.²² In another case, a Japanese entomologist who visited Ulu Gombak forest located in the state of Selangor had reported tick bites.²³

Conflict of interest

None.

How does this paper make a difference in general practice?

- This paper aims to create awareness of the common tick bite presentations in general practice.
- Prompt detection and management is essential to prevent complications associated with tick bites.
- Careful removal of ticks using a blunt, medium-tipped and angled forceps is the most effective process.
- Patient education is important to prevent tick bites. Recommended actions to prevent tick-borne diseases include avoiding tick-infested areas, wearing long pants and tucking it into the socks, applying N,N-diethyl-m-toluamide (DEET) insect repellents, using bed nets when camping and being careful in exposed areas.¹⁶ Household pets may bring ticks into the home; therefore, they must be treated regularly.

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A thyroid mass that moves with tongue protrusion: An ectopic thyroid gland

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Abstract

Thyroglossal duct cyst (TDC) is a developmental anomaly that usually appears in early childhood. The common presentation is midline swelling of the neck, which moves with both tongue protrusion and deglutition. Diagnosis is usually clinical and radiological. Fine needle aspiration cytology (FNAC) can be used as a tool for the exclusion of malignancy in adult patients. In some cases thyroid scan is done to rule out the presence or absence of the normal thyroid gland. A complete work-up is mandatory before cyst removal given that it contains only thyroid tissue. We report the case of a 32-year-old woman with only thyroid tissue in thyroglossal duct cyst.

Introduction

Thyroglossal duct cyst (TDC) is a congenital lesion. It is one of the most common causes of anterior neck swelling in children.¹ Its presentation is mostly a midline anterior neck lesion located below the hyoid bone, which is characterised by the painless mass and moves with tongue protrusion and deglutition. On the contrary, the thyroid gland does not move with tongue protrusion. During embryogenesis, the thyroid gland descends from its initial position (the tongue base) to its final pre-tracheal position creating a thyroglossal duct. The duct normally disappears completely before the 10th week of foetal life.² Failure in obliteration of the thyroglossal duct after the descent of the thyroid gland results in TDC.³ Diagnosis is always straightforward from clinical examination. The presence of all functioning thyroid tissue in an aberrant location along with the embryological line of thyroid gland descent is defined as ectopic thyroid. Only 1% to 2% of ectopic thyroid tissue is found in TDC.⁴

Case summary

A 32-year-old Malay woman presented with 5-year history of anterior neck mass. The swelling was increasing in size but there was no history of hyperthyroid or hypothyroid symptoms. She denied any history of dysphagia, change in voice or loss of weight. There was no known medical illness.

Examination of the patient revealed a 2 cm × 3 cm oval-shaped mass at the level of the hyoid bone, which was moving with both deglutition and tongue protrusion. There was no bruit, hyperthyroid and hypothyroid features. No lymph node was palpable and laryngoscopy was normal. This confirmed the clinical impression of a TDC.

Fine needle aspiration cytology (FNAC) of anterior neck swelling was compatible with colloid goitre. Ultrasonography revealed a structure which was hyperechoic than the anterior strap muscle. It measures 1.6 cm (AP) × 2.7 cm (W) × 3.7 cm (CC) (Figure 1). Further scanning on both sides of the neck did not show the presence of normal thyroid tissue. These features suggest TDC with ectopic thyroid tissue. The thyroid function test was normal. Thyroid scan confirmed the presence of thyroid tissue in the TDC as the only functioning thyroid. No uptake was demonstrated at the normal thyroid bed. She was then prescribed a suppression therapy (to halt the size increment) with 200 µg of L-thyroxine and was regularly followed up to monitor the progress and see if there are any changes in the malignancy. However, the swelling had been of the same size despite the hormonal suppression therapy with L-thyroxine. The patient has so far been followed up for 14 years without any suspicious sign.

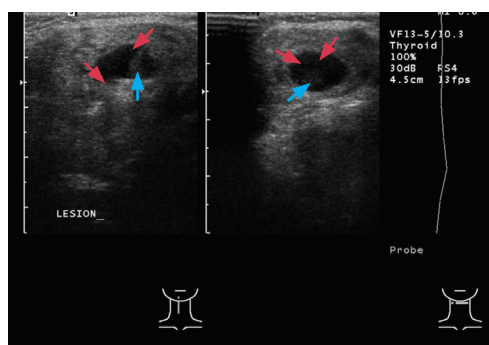


Figure 1. There is an oval structure of homogenous echotexture with medium echogenicity in the midline of the anterior neck. A rounded anechoic lesion (red arrow) with hypoechoic area (blue arrow) is noted. The hypoechoic area may be due to proteinaceous material.

Discussion

TDC is one of the most common causes of anterior midline neck swellings in childhood. It can be found anywhere from the base of the tongue to the suprasternal notch.¹ Although it is uncommon in adults, it may appear at any age.^{5,6} The presentations include a painless anterior neck mass, discharging sinus, abscess formation and on rare occasions compressive symptoms. It is usually complicated by the infection and abscess formation due to communication between the cyst and floor of the mouth, resulting into contamination with oral flora. This complication is commonly seen in adults.⁵

The clinical presentation of TDC is very classical as demonstrated in this case report where the mass is located on the anterior midline of the neck at the level of the hyoid bone, which moves with tongue protrusion and deglutition.⁵ However, lateral neck swelling was reported in a 50-year-old woman with a pre-operative diagnosis of solitary thyroid nodule, which revealed an intrathyroid thyroglossal cyst when a right hemithyroidectomy was performed.⁷ Similarly, a lateral neck mass was reported, which did not move with tongue protrusion and dysphagia with pre-operative diagnosis of thyroid goitre that turned out to be a TDC on operation.⁸ Thus, TDC should be included in the differential diagnosis of a lateral neck mass in an adult patient in addition to branchial cleft cyst, lymphoepithelial cyst, thyroid gland lesions, cystic degeneration of metastatic cancer in a delphian lymph node and lymphadenopathy.⁹

Ectopic thyroid has been described in numerous sites between the base of the tongue and its final pre-tracheal position, as well as in the mediastinum and distant

sub-diaphragmatic areas. The majority of thyroid ectopias are located in the midline along the tract of the thyroglossal duct due to arrest of migration along the line of descent.¹⁰ However, the presence of ectopic thyroid tissues in distant locations could be due to aberrant migration or heterotopic differentiation of uncommitted endodermal cells.¹¹ In most of the cases of ectopic thyroid, orthotopic thyroid gland usually coexists; hence, the patients are euthyroid. This is because the thyroid hormones produced by ectopic thyroid are usually subnormal.¹² Nevertheless, in our case report the patient presents only functional thyroid tissue, yet she remains euthyroid. The other main concern about ectopic thyroid is malignant transformation. Even though it is uncommon, but it has been reported in TDC¹³ as well as in lateral aberrant thyroid tissue, mediastinal and struma ovarii. To date, papillary carcinoma that was reported in ectopic thyroid outnumbered the other type of thyroid carcinomas.¹⁴

In addition to clinical assessment, the diagnosis of TDC and ectopic thyroid needs a critical radiological and histopathological evaluation. Usually, in most cases ultrasonography (US) has been frequently utilised in the diagnosis of TDC.¹⁵ Adequate information about the cyst can be provided by the US alone though scintigraphy is considered valuable in cases of hypothyroidism and where normal thyroid gland is not visualised on US.¹⁶ Other radiological imaging modalities that may help in designating the extension and location of ectopic tissue for pre-surgical evaluation include computed tomography (CT) and magnetic resonance imaging (MRI).^{17,18} Occasionally, in some cases of intrathoracic goitre chest radiography may also be a useful evaluating tool.¹⁴ In selected cases of patients, FNAC is considered for the exclusion of malignancy, especially in adults.⁵ About 5% of thyroid tissues is revealed histologically in TDC evaluation (but with thyroid gland in the normal location).¹⁹ Other findings in FNAC include cholesterol crystals, phagocytes and columnar ciliated epithelium. Moreover, FNAC also provides considerable assistance in confirming the diagnosis of ectopic thyroid in TDC.

In this case, scintigraphy using Tc-99m, I-131 or I-123 still remains the most important diagnostic tool in detecting ectopic thyroid tissue and showing the absence or presence of thyroid in its normal location. Thyroid scan is very sensitive and specific in differentiating an ectopic thyroid from other causes of midline neck masses^{17,18} and thus very useful

in detecting additional sites of thyroid tissue. As a result of normal or abnormal iodine uptake in the head and neck, the possibility of false positive diagnostic iodine scans must be taken into consideration. Pathological causes of increased uptake of Iodine may include sinusitis, dacryocystitis, prosthetic eye, dental disease and meningiomas; while uptake due to physiological causes include nasal mucosa, salivary glands, intestine, liver and urinary bladder.²⁰ Thyroid scan indications include cases such as lingual TDC where the gland cannot be located radiologically in its normal anatomic location. This observation was reported by Radowski et al.²¹ and Batsakis.²² They stated that since the gland is the leading element in the descent of the tract, a TDC implies a thyroid gland in a more distal location. This is contrary to our case report in which the ectopic thyroid tissue is within the TDC located just below the hyoid bone. In further evaluation with thyroid scan, it was revealed that only the thyroid tissue was present within the TDC. Other indications of thyroid scan

include patients with elevated level of TSH, abnormal thyroid function tests or symptoms of hypothyroidism.¹⁶

Sistrunk's operation,²³ which was described in 1920 and modified in 1928, is the best surgical option for TDC. However, an appropriate follow-up with the avoidance of surgery is the only choice for TDC with the functioning thyroid tissue. Our current patient has been followed up regularly. She has been on suppressive thyroxine therapy, 6-monthly thyroid function tests and the annual thyroid scan.

Conclusion

There should be a high index of suspicion of ectopic thyroid in every TDC. If US cannot detect any normal orthotopic thyroid tissue in the neck or is inconclusive than thyroid scan is essential for the investigation. FNAC may help to confirm ectopic thyroid but more importantly in excluding malignancy.

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Swelling on the inner aspect of the lower lip

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Case summary

A 14-year-old man presented with 1-month history of swelling on the inner aspect of his lower lip. The swelling was painless; however, it disturbed his speech. There was no contact bleeding but had a positive history of habitual lip biting. Examination showed a single $0.5 \times 1 \text{ cm}^2$ soft oval-shaped swelling with well-circumscribed margin (Figures 1 and 2). On palpation, the mass was non-tender and had a cystic or fluctuant sensation.



Figure 1. Anterior view of the mass



Figure 2. Lateral view of the mass

Questions

1. What is the diagnosis?
2. What is the pathogenesis of this condition?
3. Outline the treatment.

Answers

1. It is a lip mucocoele (minor salivary gland retention cyst). Other than the lower lip, common sites of occurrence include the tongue, floor of the mouth and buccal mucosa.¹
2. It is an accumulation of saliva. In the oral mucosa, there are plenty of minor salivary glands including the inner aspect of the lips. Each gland has its own duct draining into the oral cavity. For one reason or another, if the path of salivary flow is obstructed,¹ the saliva gets accumulated with time and forms a small painless cystic swelling. The duct of the minor glands can be damaged by an episode of infection, presence of stone, stricture or post-trauma. Lip biting is one of the common causes of trauma.
3. Sometimes the lesion may rupture and disappear or appear to change its size with time. A relatively larger cyst may warrant its removal. The patient chose to have his lesion removed under local anesthesia because he had difficulty in speaking with the lesion. Surgical excision is the best choice to provide adequate biopsy material and preferably the entire lesion is removed for histological examination.² Rare tumour mimicking lip mucocoele has been reported.³ In this case, the patient was seen in the clinic 2 weeks post-procedure. The site healed well. There was no sign of residual mass. The histopathological report confirmed the diagnosis of mucocoele.

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Corrigendum :

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There is a change in the authorship as follows:

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