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Prevalence and Determinants of Left Ventricular Hypertrophy in Hypertensive Patients at a Primary Care Clinic

An Audit of Sputum Smear Negative Pulmonary Tuberculosis Cases in Kinta District, Perak, in 2011

Cat's Curse: A Case of Misdiagnosed Kerion

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Editor's Note

Time of Change

There are a few significant changes to this issue of the MFP.

Firstly, Professor Teng Cheong Lieng, our long-serving Editor in Chief (2006-2012) has stepped down. He has pushed this journal to where it is today and his achievement is remarkable: The MFP journal is now indexed with many databases including Scopus; the number and quality of submissions have risen over the years; he is also recognised as a leading editor in Malaysia and the region. Teng will continue to sit on the Editorial Board and contribute to the growth of this journal.

Secondly, the MFP is ready to soar to the next era. Despite competition from other higher impact journals, the MFP journal has seen a significant rise in the quantity and quality of the submissions. The journal has become the recognised platform for family physicians and specialists, both local and regional, to share their research findings and clinical expertise. The next leap for MFP journal is to join the world of PubMed and ISI. The editorial team will work hard over the next few years to achieve this.

Thirdly, you may have noticed a facelift to the MFP. We have engaged a new management team who has helped to improve the image and efficiency of the journal. I hope you find the new look more reader-friendly. Early next year, we are introducing the electronic journal management system and this promises a more expeditious submission, reviewing and decision-making process.

Finally, as the new Editor of the MFP journal, I would like to reiterate that MFP is YOUR journal and the articles published in this issue reflect just that. We have original articles covering both communicable and non-communicable diseases which are commonly encountered in general practice. The case reports include common and uncommon dermatological, haematological, obstetrics and ENT conditions. I hope these articles will help you in patient care and stimulate you to think and reflect. We welcome all of you to write in to the Journal and tell us what you would like to read in the MFP: journal.mfp@gmail.com

Wishing all of you a happy and fruitful 2013!

Best wishes,

CJ Ng
Editor

Prevalence and Determinants of Left Ventricular Hypertrophy in Hypertensive Patients at a Primary Care Clinic

Ching SM, Chia YC, Wan Azman WA.

Keywords:

Prevalence, Left ventricular, hypertrophy, Hypertension, Primary care, Malaysia

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Abstract:

Left ventricular hypertrophy (LVH) has prognostic significance on cardiovascular mortality and morbidity. However, echocardiography screening for LVH is not routinely done for hypertensive patients in a primary care setting. Thus, this quantitative study aims to determine the prevalence and factors associated with LVH in hypertensive patients at a primary care setting. This was a cross-sectional study of 359 consecutive patients with uncomplicated essential hypertension attending a hospital-based clinic in Malaysia. All subjects underwent an echocardiography test. LVH occur when the left ventricular posterior wall thickness together with inter-ventricular septal thickness is ≥ 11 mm. It was found that 24% patients fulfilled the criteria for LVH. The mean age of the study population was 59.2 ± 7.7 years; mean duration of hypertension was 9.7 ± 7.5 years; and mean blood pressure was $136.5/81.5 (\pm 13.7/7.7)$ mmHg. Using multiple logistic regression analysis, patients who were obese [odds ratio (OR) 8.34, 95% confidence interval (CI) 3.14, 22.22] and male gender (OR 1.96, 95% CI 1.08, 3.16) had significant positive association with LVH. LVH was found in approximately one fourth of the hypertensive patients at a hospital-based primary care setting. There was a significant positive association between LVH and obesity and being male. Guidelines for enhancing use of echocardiography in detecting LVH may be needed.

Introduction

Hypertension with its concomitant risks of cardiovascular and kidney diseases, is a serious public health problem worldwide.^{1,2} It is also ranked third as a cause of disability-adjusted life years and contributes significantly to global mortality.²⁻⁴ By 2025, globally a 60% increase in hypertensive adult patients is predicted from 972 million in 2000 to 1.56 billion in 2025.³ In Malaysia, the prevalence of hypertension has increased dramatically from 33% to 43% over the last decade despite intensive health care campaigns and efforts.⁵

Left ventricular hypertrophy (LVH) is one of the earliest manifestations of organ damage among hypertensive patients, and is a strong independent predictor of cardiovascular mortality and morbidity.⁶⁻¹¹ The prevalence of LVH varies because different method, and cut-off points were used to diagnose LVH in previous studies.¹² Studies show that the incidence of LVH increases with age, obesity, being male and blood pressure (BP).¹³⁻¹⁷ Angiotensin-receptor blockers (ARB) and angiotension-converting enzyme inhibitors (ACEI) are shown to reduce the incidence of LVH and stroke.¹⁸⁻²¹ Early diagnosis of LVH

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followed by risk stratification and aggressive treatment are essential to prevent cardiovascular morbidity and mortality.

Primary care physicians are the front-liners who treat hypertension.²² However, a study in Malaysia reported that cardiovascular risks are inadequately assessed among hypertensive patients²³ and little is known about the prevalence of LVH in the primary care setting. Echocardiography is not done routinely in primary care even though it is more accurate than electrocardiograph (ECG) or chest X-ray in determining LVH.²⁴⁻²⁶ It will be useful to identify associate factors and to determine the difference between genders. It is hoped that the results will provide insights into developing a strategy for identifying LVH in patients with hypertension.

Methods

This is a cross-sectional study conducted from June to September 2009 at a university primary care centre in Kuala Lumpur, Malaysia. It was aimed at patients with hypertension, defined as when their case record fulfilled the following criteria:

- documented diagnosis of hypertension according to World Health Organisation (WHO) International Society of Hypertension (ISH) criteria, or
- based on current treatments consisting of lifestyle modification or antihypertensive agents

All eligible patients went through an echocardiogram examination. A standard two-dimensional M-mode transthoracic echocardiography was used to detect LVH in the study population. Echocardiography was performed by trained technicians in a tertiary centre who followed a standard protocol. LVH was diagnosed when the left ventricular posterior wall thickness together with inter-ventricular septal thickness is ≥ 11 mm.²⁷ The echocardiography results were interpreted by

a cardiologist. Patients with echocardiograph evidence of myocardial infarction (MI), rhythm disorder (atrial fibrillation, bundle branch blocks, Wolf Parkinson-white syndrome or other conduction abnormalities) and structural heart disease [ventricular septal defect, aortic stenosis or mitral regurgitation] were excluded as they are confounders for LVH.

Patients' heights and weights were recorded using a digital weighing machine with stadiometer. BP was taken using a mercury sphygmomanometer. Body mass index (BMI) was calculated as weight in kilogrammes divided by the square of height in meters. Using the Asian Pacific obesity guideline, obesity is defined as having a BMI more than 27.5 kg/m².²⁸ Average of three BP readings was used to determine the measurement of BP. Target BP was defined as <140/90 mmHg among hypertensive patients and <130/80 mmHg among hypertensive patients with diabetes.^{23,29}

The sample size of 323 was calculated by using Epi Info 6.0 following a pilot study. It was based on the estimated prevalence of LVH of 25%-30% with 80% power, 95% confidence interval (CI) and statistical significance level (α) at 5%.

Statistical analysis

SPSS version 18 (SPSS IBM New York) was used to perform the statistical analysis. Continuous data were described as mean and SD or median and interquartile range (25-75th percentiles). Chi square test was used to analyse the categorical data. Multiple logistic regressions were used to elucidate the various risk factors influencing LVH. A level of significance was set at p-value <0.05.

Results

Of the 428 patients, 376 agreed to participate in the study (response rate of 89.8%). Out of the 376 respondents, 17 (4.5%) were excluded from analysis due to underlying structural heart diseases.

The mean age of the study population was 59.2 ± 7.7 years and mean duration of hypertension was 9.7 ± 7.5 years. Two-fifth of the respondents were men (42.1%) and the mean BMI was 26.8 ± 4.7 kg/m². The study population consisted of Chinese (50.1%), Malays (27.6%), Indians (21.2%) and others (1.1%). Majority were married, and two-third had secondary education and above (Table 1).

Table 1: Sociodemography of study population by echocardiographic LVH status

Variables		LVH (n=86) N (%)	No LVH (n=273) N (%)	p value N (%)
Age	<65	65 (25.8)	185 (74.2)	0.210
	>65	21 (19.6)	86 (80.4)	
Gender	Males	45 (29.8)	106 (70.2)	0.027
	Females	41 (19.7)	167 (80.3)	
Education	<Primary	16 (32.0)	34 (68.0)	0.311
	Secondary	43 (20.9)	163 (79.1)	
	Tertiary	27 (26.2)	76 (73.8)	
Ethnicity	Malay	26 (26.3)	73 (73.7)	0.079
	Chinese	42 (23.3)	138 (76.7)	
	Indian	15 (19.7)	61 (80.3)	
Job status	Still working	29 (29.6)	69 (70.4)	0.083
	Not working	57 (21.8)	204 (78.2)	
Mean age, years		58.9 (7.5)	59.5 (7.5)	0.989
BP duration, years		9.5 (6.4)	9.7 (7.8)	0.807
SBP, mmHg		137.9 (15.4)	135.8 (13.3)	0.216
DBP, mmHg		81.1 (7.4)	83.0 (8.7)	0.040
BMI, kg/m ²		28.8 (4.7)	26.2 (4.6)	0.001

Table 2: Clinical profiles of study population by echocardiographic LVH status (continuous variables)

	Total sample (n=359) mean $\pm$ SD	LVH* (n=86) mean $\pm$ SD	No LVH (n=273) mean $\pm$ SD	p value
Mean age, years	59.2 (7.7)	58.9 (7.5)	59.5 (7.5)	0.989
Duration of hypertension (years)	9.7 (7.5)	9.5 (6.4)	9.7 (7.8)	0.807
SBP (mmHg)	136.5 (13.7)	137.9 (15.4)	135.8 (13.3)	0.216
DBP (mmHg)	81.5 (7.7)	81.1 (7.4)	83.0 (8.7)	0.040
BMI (kg/m ²)	26.8 (4.7)	28.8 (4.7)	26.2 (4.6)	0.001

Table 3: Clinical profile of study population by echocardiographic LVH status (categorical variables)

Variables	LVH (n=86), %	No LVH (n=273), %	p value
BP controlled#, %	35(23.5)	114(76.5)	0.862
BMI **classification, %	<23.5	5(6.3)	0.001
	23.5-27.4	33(23.7)	
	≥27.5	48(34.0)	
Number of medication, %	≤1	38(21.2)	0.060
	2	31(23.7)	
	≥3	17(34.7)	
Types of antihypertensive, %	CCB	40(23.5)	0.858
	ACE inhibitors	38(27.7)	0.187
	β-blocker	31(27.4)	0.295
	Diuretics	31(30.1)	0.084
	ARB	12(17.9)	0.199
Smokers, %	19(36.5)	33(63.5)	0.051
Alcohol consumption %	29(29.6)	69(70.4)	0.125
Diabetes mellitus, %	42(28.6)	105(71.4)	0.088

*LVH: left ventricular hypertrophy; **BMI: body mass index; BP: blood pressure; SBP: systolic blood pressure; DBP: diastolic blood pressure; #BP controlled indicate BP reading <140/90 mmHg among hypertensive and <130/80 mmHg in hypertensive with underlying diabetic; CCB: calcium channel blocker; ACE Inhibitor: Angiotensin converting enzyme inhibitor; ARB: Angiotensin II receptor blocker

The percentage of patients achieving target BP was 41.5% and the prevalence of echocardiography-diagnosed LVH was 24%. The Malays had the highest incidence of LVH (26.3%), followed by Chinese (23.3%) and Indians (19.7%). The mean systolic blood pressure (SBP) and mean diastolic blood pressure (DBP) were 136.5 ± 13.7 mmHg and 81.5 ± 7.7 mmHg respectively (Table 2). Generally, men had higher DBP ($p=0.002$) and longer duration of hypertension ($p=0.003$); more men smoked (33.1% versus 1%, $p<0.001$) and consumed alcohol (46.5% versus 13.5%, $p<0.001$). Table 2 a & b compares the clinical parameters between patients with and without LVH.

Generally, more than half of the study population were elderly (aged 60 years and above). Those who had echocardiographic evidence of LVH were found in the 50-60 age

group. Elderly patients appeared to have better BP control compared with the younger group (43.4% versus 38.8%).

Table 4 shows the odds of having LVH by using multiple logistic regressions after adjusting for established LVH risk factors. Hypertensive patients who were obese [odds ratio (OR) 8.34, 95% confidence interval (CI) 3.14 to 22.22] and male gender (OR 1.96, 95% CI 1.08 to 3.16) had significant positive association with LVH.

Discussion

The study revealed that one in four hypertensive patients have LVH despite 41.5% of them having achieved a target BP. This figure was comparable to the prevalence of 23-26% in New York and Rome primary care settings.^{12,30}

Table 4: Predictors of LVH in multivariate analysis at UMMC

Variables		OR*	95.0% CI**	p value
Age		1.02	(0.98, 1.06)	0.302
Male gender		1.96	(1.08, 3.16)	0.010
BMI	Normal	1		
	Overweight	4.62	(1.72, 12.45)	0.002
	Obese	8.34	(3.14, 22.22)	0.001
BP duration		0.996	(0.96, 1.03)	0.810
Achieve BP control		0.71	(0.31, 1.62)	0.420
Diastolic BP		1.02	(0.99, 1.06)	0.209
Smoking		1.84	(0.88, 3.87)	0.106
Diabetes		1.39	(0.83, 2.32)	0.209

It was higher compared with Japan and United States primary care studies, which reported prevalence of 15%³¹ and 19% respectively.¹² Our study was aimed at raising concerns about rising hypertension cases in Malaysia, especially when the incidence of hypertension is increasing throughout the Asia-Pacific region due to ageing and lifestyle changes.

There is an increasing body of evidence as well as controversies regarding the role of gender in developing LVH.^{13-14,16,32} A study has shown that females have a positive association with LVH. However, other studies have shown that male gender was an independent predictor for LVH.¹³⁻¹⁴ At the same time, another study has reported that there is no difference between gender and LVH.³² Our study found that the male gender is a predictor for the development of LVH. This is probably because men in this study had more cardiovascular risk factors as they had higher DBP ($p=0.002$), suffered from hypertension for a longer time ($p=0.003$) and smoked ($p<0.001$) as well as consumed alcohol ($p<0.001$) more than women. This is consistent with the findings in a local study where the coronary heart disease risks classified by Framingham risk score was higher in men compared to women.³³ These risk factors make them prone to developing LVH compared to female patients. A study conducted in 2006

in Spain reported that men had a higher prevalence of LVH and were at higher risks for cardiovascular disease.¹⁴ In this particular study, 15,798 hypertensive patients who were more than 55 years were enrolled, and the prevalence of ECG-diagnosed LVH was 20.3%. These two observations reaffirm that male patients often have higher cardiovascular risk factors and are more prone to getting ischaemic heart disease.^{14,34}

Previous studies found that patients with obesity have a higher risk of developing LVH.^{16, 17, 34-38} In this study obesity was one of the predictors for developing LVH among hypertensive patients. The odds of developing LVH were 4.62 times higher for an overweight patient compared with a patient who has normal weight. Furthermore, the odds of developing LVH doubled for an obese patient compared with an overweight patient. Study from India found similar trend in associating obesity with the risk of developing LVH.³⁹ This is probably related to obesity cardiomyopathy, which is characterised by the presence of LVH.⁴⁰ As such, weight reduction may play an important role in retarding the LVH progression as shown in other studies.^{41, 42} There is a negative relationship between age and LVH. It could be because LVH had regressed among the elderly group because this group

had a better BP control (43.4% versus 38.8%). The mean age of the study population was 59.2 years, which was relatively younger compared with the other studies which reported that age is associated with the development of LVH.¹³

In this study, Chinese made up 50.1% of the population, Malays 27.6%, Indians 21.2% and others 1.1%, which represent the ethnic distribution in the urban areas in Malaysia. However, there was no relationship observed in terms of prevalence of LVH among hypertensive patients. This could be attributed to the small sample size.

Our study has several limitations. The study has several limitations. First, the result of the study may not be generalised or applicable to other settings since it was confined to one primary care centre in KL. Secondly, the factors associated with the development of LVH in this study may not be robust as the study was cross-sectional. However, with the limited resources in primary care setting in Malaysia, we believe that the result from this preliminary study is useful and relevant to the daily clinical practice. It is useful in developing a strategy to identify LVH in patients with hypertension. It is consistent with the European Society of Cardiology Guidelines which recommends

echocardiography for hypertensive patients whose routine ECG does not show the presence of LVH.⁷

Conclusion

The study found that the prevalence of LVH was high among hypertensive population in a primary care setting. Effort should be made for early detection of LVH. Therefore, as frontliners, primary care doctors must develop a proper strategy to address this problem. Male and obese patients are at higher risk and must be considered for an echocardiograph assessment even though their ECG may not show the presence of LVH.

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Reliability and Validity of the Revised Summary of Diabetes Self-Care Activities (SDSCA) for Malaysian Children and Adolescents

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Abstract

Background: Self-care plays an important role in diabetes management. One of the instruments used to evaluate self-care in patients with diabetes is the Summary of Diabetes Self-Care Activities (SDSCA) questionnaire. A validated instrument in the Malay language is used to assess self-care practice among children and adolescents with diabetes in Malaysia.

Objective: To translate and evaluate the psychometric properties of the revised version of the SDSCA questionnaire in the Malay language.

Methods: Forward and backward translations were performed. An expert panel reviewed all versions for conceptual and content equivalence. The final version was administered to paediatric patients with diabetes between August 2006 and September 2007. Reliability was analysed using Cronbach's alpha and validity was assessed using exploratory factor analysis.

Results: A total of 117 patients aged 10–18 years were enrolled from nine hospitals. The reliability of overall core items was 0.735 (with item 4) while the reliabilities of the four domains were in the range of 0.539–0.838. As core item number 4 was found to be problematic and it was substituted by item 5a (from the expanded SDSCA) to suit local dietary education and practice; and the reliabilities of the overall core item (0.782) and the four domains (0.620 – 0.838) improved. Factor loadings of all the items were greater than 0.4, loaded into the original domains, and accounted for 73% of the total variance.

Conclusion: The Malay translation of the revised English SDSCA is reliable and valid as a guide for Malaysian children and adolescents suffering from diabetes.

Introduction

The prevalence of Diabetes mellitus is rising rapidly and the number of people with diabetes is projected to increase from 285 million in 2010 to 439 million in 2030.¹ Children and adolescents are not spared from this.^{1, 2} Of the estimated 479,600 children with type 1 diabetes worldwide, 24% are from Southeast Asian countries.³ Type 2 diabetes is also

becoming more prevalent among adolescents in these countries. In Malaysia, the Diabetes in Children and Adolescents Registry (DiCARE) reported that among children and adolescents with diabetes in 2006–2007 17.5% had newly diagnosed type 2 diabetes.⁴

Self-care practices are considered a core component of diabetes care.^{5–9} Adequate self-care has been shown to improve blood glucose

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levels, glycosylated hemoglobin (HbA1c), and dietary habits¹⁰. A diabetes self-care activities measure, together with glycaemic control, can provide essential data for clinicians, diabetes educators, and patients to evaluate and modify treatment.¹¹ In a busy diabetes clinic with inadequate support staff, it is essential to have a simple measure of diabetes self-care activities that is both valid and reliable.

The Summary of Self-Care Diabetes Activities (SDSCA) questionnaire¹¹ is in the public domain and freely accessible. This self-report instrument measures levels of diabetes self-care across different components of the diabetes regimen over the previous seven days. The original SDSCA was a 12-item scale developed to assess four aspects of diabetes regimen: diet, exercise, glucose testing, and diabetes medications.¹² The most recent revised version of the SDSCA questionnaire, based on seven studies, has been reduced to 11 items.¹¹ The revised version added items on foot care and cigarette smoking, which may need to be modified or deleted for use in children with diabetes. It also provides 14 additional items that could be utilised to address specific self-care questions such as medication use. Respondents are asked to circle how many days in the past seven days they displayed a diabetes-specific behaviour. Response choices range from 0 to 7, with higher scores indicating better performance of self-care activities.

This instrument has been designed to measure diabetes self-care activities among type 1 and type 2 diabetes mellitus patients.¹² Most previous studies involved adults with diabetes, although a large age range was included.¹¹ The same questionnaire had been successfully adapted for adolescents as young as 12 years old with type 1 diabetes¹¹. Its use in past studies indicated that the SDSCA is a multi-dimensional measure of diabetes self-management with adequate internal and test-retest reliability.

To date, there has been no reliable and validated instrument in Malay, which is the national language of Malaysia. Although it would

have been ideal to develop a local instrument, due to resource constraints we opted to adapt, translate, and test the revised SDSCA instrument to measure diabetes self-care practices. This study was conducted to assess the cross-cultural adaptation and to validate the revised SDSCA questionnaire which had been translated into Malay.

Methods

This was a multicentre cross sectional study. A sub-study for test-retest and a follow-up was conducted two weeks after the baseline study. The revised SDSCA questionnaire was chosen for this study because it is simple, reliable, and valid.¹¹ Permission to use and translate the questionnaire was obtained from the author. The study was conducted in three phases (see Figure 1 for study flow diagram) from August 2006 to September 2007. Phase 1 consisted of forward and backward translation of the revised English version to Malay; Phase 2 involved pre-testing the pre-final Malay version; and Phase 3 was the validation study. This study was approved by the University Malaya Medical Centre Ethics Committee, Hospital Universiti Sains Malaysia Ethics Committee and Ministry of Health's Medical and Research Ethics Committee.

Phase 1 (Translation process)

The translation followed the EuroQoL translation guidelines,¹³ with the aim of preserving content and meaning. During this phase, two forward translations were completed: one by a clinician who was involved in diabetes care for the young (M1) (not blinded to the study) and the other by a certified translator (M2) from the Malaysia National Institute of Translation, (blinded to the study). Both the M1 and M2 versions were back-translated into English (E1 and E2) by a different clinician and a certified translator. Forward and backward translations were done by the pairs independently. The researchers and the translators then formed the expert

panel to review all five versions (the original, two forward translations, and two backward translations) to reconcile the discrepancies. The Malay version (either M1 or M2) that produced the back-translation (either E1 or

E2) that was closest to the revised English version (E) was chosen as the pre-final 1 SDSCA Malay version. This version, together with the revised English version (E), was pretested on 16 patients.

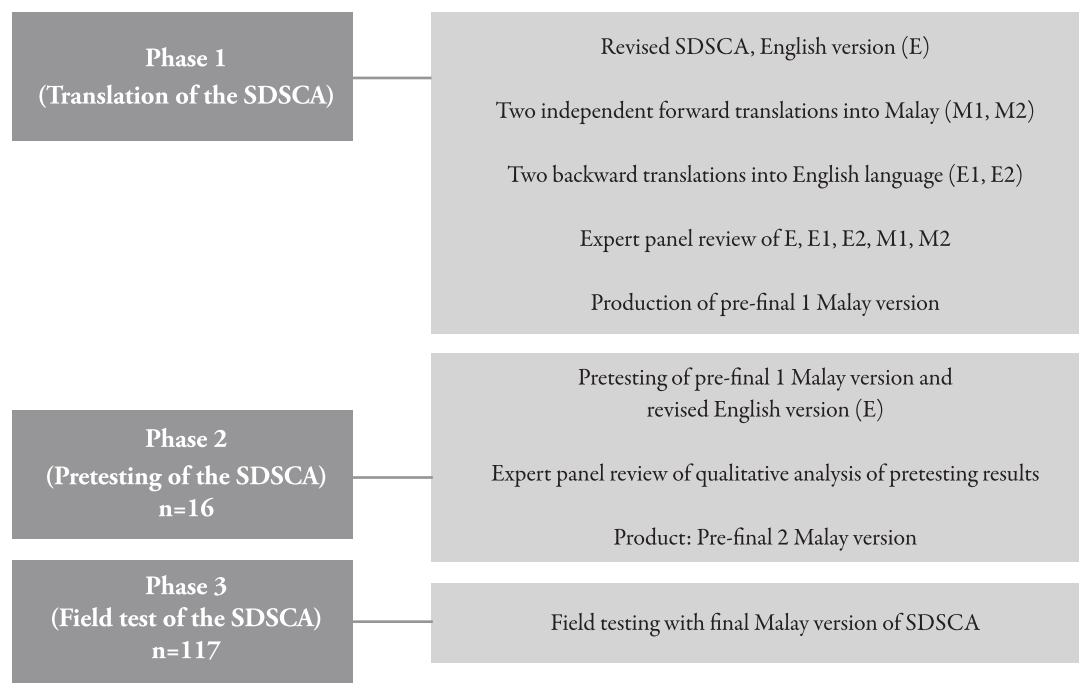


Figure 1. Overview of the study flow process of cross-cultural adaptation and validation of the (SDSCA) questionnaire

Phase 2 (Pretest)

We performed a pretest of the pre-final 1 Malay version on July 3 (time 1) and July 17 (time 2), 2007, at the Pediatric Clinic, University Malaya Medical Centre. Seven adolescents with diabetes aged 11–18 years were involved; two had type 2 diabetes. All the patients passed a fluency test that required them to read a short passage from a local English daily and to translate it into Malay. During the pretest, each patient provided demographic data and completed two versions (pre-final 1 and original English version) of the SDSCA questionnaire. The Malay and English versions were administered in random sequence. This was followed by a focus group discussion to investigate the clarity, comprehensibility, and suitability of the text in the translated questionnaire.

To determine the stability of the pre-final 1 Malay version of SDSCA, we recruited another

nine adolescents with diabetes from the same centre, who were fluent in both English and Malay. The questionnaires were administered to them on two occasions and two weeks apart. They completed both English (E) and Malay (pre-final 1) versions on the first occasion and only the Malay (pre-final 1) version on the second occasion. The outcome was then analysed by an expert panel, which generated the pre-final Malay version that later became the final version.

Phase 3 (Validation)

The final Malay version of the SDSCA was field-tested in nine paediatric clinics of the Ministry of Health and in university hospitals throughout the country. All eligible patients who attended their routine diabetes clinic follow-up visits on the day the study was conducted were approached individually (face-to-face) by the investigator or research personnel and were given informational

materials describing the study. Those who wanted to participate were recruited. The inclusion criteria were children and adolescents with diabetes mellitus aged 10–18 years who could read and write in Malay, irrespective of the duration and type of treatment received. Patients known to have cognitive impairment or severe psychosis were excluded.

For Phase 3, we calculated the sample size based on the rule of thumb for exploratory factor analysis. Gorsuch proposed minimum sample of 1:5 per item.¹⁴ Since SDSCA contained 10 items, the minimum sample size is 50 patients. We recruited more than 100 patients to accommodate drop out. Patients and their parent(s) gave written consent and each patient was given two self-administered questionnaires: (a) demographic survey, and (b) the final Malay version of the SDSCA which were completed within 15–20 minutes.

Data analysis

Phase 1 and 2: The cross cultural adaptation of the Malay translated version (M1 and M2) was on the basis of face validity, content validity, and test–retest reliability. Face validity was assessed via patient's review; content validity was verified by an expert panel; and test–retest reliability was evaluated using the kappa agreement coefficient.

Phase 3. The internal consistency of the final Malay version of SDSCA was evaluated using Cronbach's alpha, with values of more than 0.5 considered as acceptable and 0.7 or more considered good.¹⁵ For construct validity, exploratory factor analysis (EFA) was applied using the principal component analysis (PCA) extraction method with Varimax rotation. Kaiser-Meyer-Olkin values, communalities, total variance explained, and factor loadings were calculated to evaluate the factor solution. Factor loadings of 0.4 or more were considered a good fit.¹⁶ Statistical analyses were conducted using PASW 18.0 (version 18.0; Chicago, IL).

Results

Pretest (Phase 2)

In general, patients (n=16) agreed that the final Malay version was clearer and easier to comprehend. One patient had difficulty understanding item 5a (“membahagikan pengambilan,” which means “dividing the intake,” to be replaced with “mengambil,” which means “to take”). Patients commented that there were three questions which they believed were irrelevant to them: item 7a (not applicable to type 2 diabetes patients not on insulin), item 8a (not applicable to type 1 diabetes), and item 14a (not applicable to non-smokers). The expert panel decided to overrule all comments, as the initial translation of item 5a conveyed more accurate meaning or emphasis while items 7a, 8a, and 14a maintained the questionnaire's original structure. The proportion agreement for each item between the English version and the pre-final 1 Malay version ranged from 77.8% to 97.8%. For test–retest reliability, the proportion agreement of each item of the Malay translated version on time 1 and time 2 ranged from 60.0% to 90.0%.

Table 1. Demographic characteristics of patients

Profile characteristics	frequency (%)
Mean Age (in year) ^a	13.9 (2.7)
Age group (yr)	
10 – <13	41(35.0)
13 – <16	41(35.0)
16 – <19	35(30.0)
Gender	
Male	55(47.0)
Female	62(53.0)
Ethnicity	
Malay	70(59.8)
Chinese	27(23.1)
Indian	15(12.8)
Other	5(4.3)

Phase 3

A total of 117 patients with a mean age of 13.9 (SD 2.7) years participated in the study. About one-third of the patients (35.0%) were 10-13 years. There were 55 (47.0%) male patients, with Malays being the majority (Table 1).

Although the revised version of the SDSCA questionnaire was used for this study, reliability and validity were tested only on core items applicable to both type 1 and type 2 diabetes patients. The overall reliability was 0.735 with the reliabilities of the four domains ranging from 0.539 to 0.838 (Table 2).

Table 2. Internal consistency of the final Malay version of the revised SDSCA questionnaire

Domain	Items	Cronbach's alpha
Overall	1 – 10	0.735
Diet	1 – 4	0.539
General diet	1 – 2	0.903
Specific diet	3 – 4	-0.094
Exercise	5 – 6	0.749
Blood sugar	7 – 8	0.838
Foot care	9 – 10	0.620

Table 3. Factor solution of the items in the final Malay version of the revised SDSCA

Items	Components			
	Diet	Sugar	Exercise	Foot care
2. Follow a healthy eating plan (on average per week, over the past month)	0.919			
1. Follow a healthy eating plan in the last week	0.862			
3. Eat five or more servings of fruits and vegetables	0.537			
8. Test your blood sugar according to the number of times recommended by your health care supervisor		0.878		
7. Test your blood sugar		0.865		
4. Eat high fat foods such as red meat or full-fat dairy products		-0.427		
6. Participate in a specific exercise session			0.879	
5. Participate in a 30-minute exercise session			0.858	
10. Inspect the inside of your shoes				0.806
9. Check your feet				0.731

As the diabetes-specific diet subscale (items 3 and 4) was found to have a low Cronbach's alpha (-0.094) value, we performed EFA, which showed that item 4 appeared to load into a different domain (i.e., glucose monitoring)

with a factor loading of -0.427 (Table 3). To improve the factor solution and to suit local dietary education and practices, item 4 was substituted by item 5a from the expanded version. With this change, internal consistency

improved for overall, diet, and diabetes-specific diet scales, from 0.735 to 0.782, from 0.539 to 0.742, and from -0.094 to 0.348, respectively (Table 5). By substituting item 5a for item 4, the item loaded into the original domain (diet) and the factor loading improved to 0.712. In addition, all the items were into their original domains and had factor loadings greater than 0.4. Overall, they accounted for

73% of the total variance (Table 4). Analysis of a subgroup of patients aged 10-13 years showed that the reliability and validity were consistent with the results of analysis using data from all patients (Tables 4 and 5). The similarities and differences between the revised Malay version (after substituting item 5a for item 4) and original revised English SDSCA is summarised in Table 6.

Table 4. Factor loadings* of the items in the final Malay version of the revised SDSCA questionnaire among all patients and patients aged 10–13

Items	Components			
	Diet	Sugar	Exercise	Foot care
2. Follow a healthy eating plan (on average per week, over the past month)	0.870 <i>0.874</i>			
1. Follow a healthy eating plan in the last week	0.813 <i>0.646</i>			
5a. Space carbohydrates evenly through the day	0.712 <i>0.607</i>			
3. Eat five or more servings of fruits and vegetables	0.449 <i>0.794</i>			
7. Test your blood sugar		0.902 <i>0.912</i>		
8. Test your blood sugar according to the number of times recommended by your health care supervisor		0.877 <i>0.905</i>		
6. Participate in a specific exercise session			0.892 <i>0.852</i>	
5. Participate in a 30-minute exercise session			0.848 <i>0.884</i>	
10. Inspect the inside of your shoes				0.875 <i>0.887</i>
9. Check your feet				0.759 <i>0.738</i>

*Factor loadings without italic = overall. Factor loading in italic = children aged 10–13

Table 5. Summary of exploratory factory analysis and reliability results of the final Malay version of the SDSCA questionnaire

	With item 4 All patients	With item 5a All patients	With item 5a Subgroup(10–13)
<i>Exploratory Factor Analysis</i>			
KMO*	0.67 (p<0.001)	0.70 (p<0.001)	0.63 (p<0.001)
Communalities	0.493–0.893	0.602–0.944	0.709–0.918
Total variance			
Explained	71%	73%	81%
Factor solution	Valid solution except item 4	Valid solution	Valid solution
<i>Reliability</i>			
Overall	0.735	0.782	0.804
Diet	0.539	0.742	0.760
General diet	0.903	0.903	0.874
Specific diet	-0.094	0.348	0.400
Exercise	0.749	0.749	0.809
Blood sugar	0.838	0.838	0.898
Foot care	0.620	0.620	0.686

*KMO = Kaiser-Meyer-Olkin; p value of Bartlett's Test of Sphericity

Table 6. Comparison of the original English, revised English and revised Malay SDSCA questionnaire

Domain/Item	Original English SDSCA	Revised English SDSCA	Revised Malay version
1. General diet			
1. Follow healthy diet/Recommended diet (last 7 days)	Y	Y	Y
2. Limited-calorie diet for diabetics	Y	N	N
3. Fruits and veg. (fiber) (last 7 days)	Y	Y	Y
4. High-fat food (fatty food)(last 7 days)	Y	Y	N (replaced with item 5a)
5. Sweet food	Y	N	N
6. Follow healthy diet plan (past 1 month)	N	Y	Y
2. Exercise			
1. 20 mins (last 7 days)	Y	N	N
2. 30 mins (last 7 days)	Y (%)	Y (number of days)	Y
3. Specific exercise session (last 7 days)	Y	Y	Y

Table 6. (Continued)

Domain/Item	Original English SDSCA	Revised English SDSCA	Revised Malay version
3. Blood glucose testing			
1. Test blood (last 7 days)	Y	Y	Y
2. Test blood per recommendation (last 7 days)	Y	Y	Y
4. Medication		(moved to Additional Items)	(moved to Additional Items)
1. Taking diabetes medication (last 7 days)	N	Y	Y
2. Taking insulin injection (last 7 days)	Y	Y	Y
3. Taking diabetes pills (last 7 days)	Y	Y	Y
6. Foot care			
1. Inspect feet (last 7 days)	N	Y	Y
2. Inspect inside of shoes (last 7 days)	N	Y	Y
7. Smoking			
1. Smoke (last 7 days)	N	Y	N (unsuitable for children)
Additional items (extended version)			
1a. Advice on diet		Y	Y
2a. Advice on exercise		Y	Y
3a. Advice on blood testing		Y	Y
4a. Advice on medication			
5a. Diet – balancing carbohydrate intake (last 7 days)		Y Y	Y Y (replace item 4)
6a. Medication – as above			
7a. Medication – as above		Y	Y
8a. Medication – as above		Y	Y
9a. Foot care – wash feet (last 7 days)		Y	Y
10a. Foot care – soak feet (last 7 days)			
11a. Foot care – dry in between toes after wash (last 7 days)		Y	Y
12a. Smoking – asked about smoking		Y	N (not suitable for children)
13a. Smoking – advice to stop smoking		Y	N (not suitable for children)
14a. Smoking – the last time smoking		Y	N (not suitable for children)

*Y=Yes, N=No

Discussion

The Malay version (translated) was found to be equivalent to the revised English version. We did not face major challenges in translating and adapting the English SDSCA into the Malay language as we had the support and cooperation of the expert panel and the patients. During the pre-test, the patients felt that the Malay-translated version of the SDSCA was easier to understand. However, a few issues were raised about the suitability of the words (one item) and the appropriateness of items related to their type of diabetes (three items). These concerns were overruled by the expert panel, which deemed all items to be appropriately translated with conceptual content similar to the revised English version. By testing this questionnaire on bilingual patients, the proportion agreement for the revised English version and the pre-final 1 Malay version for each item demonstrated good agreement.

For test-retest reliability, the proportion agreement in this study was higher than in previous study¹¹, indicating stability of responses across the two time intervals. This may be explained by the shorter time interval in our study (two-weeks), compared with the three-month interval in previous studies¹¹. The shorter interval may have resulted in less variation in self-care practices and lifestyle. Given its face validity and stability, no changes were made, and the prefinal Malay version was subjected to field testing (Phase 3).

The internal consistency of all domains in the final Malay version of the SDSCA questionnaire was acceptable. However, we discovered that the diabetes-specific diet subscale was not reliable and performed poorly in factor analysis. This domain was also found to be the least reliable item in the original English SDSCA version as well as the Spanish version.^{10, 12} Item 4 ("On how many of the last SEVEN DAYS did you eat high-fat foods such as red meat or full-fat dairy products?") appeared problematic, probably because of the poor understanding of the concept of high-fat food

among these patients. Item 4 is reverse coded according to the SDSCA scoring guidelines¹², but the Cronbach's alpha remained negative despite reverse scoring. To improve internal consistency of the diet scales, item 5a ("On how many times in the last SEVEN DAYS did you space carbohydrates evenly through the day?") from the expanded version was substituted for item 4, which resulted in the improvement of the reliability for overall and diet domains in the revised Malay version. This was similarly observed in the Spanish version.¹⁰ Item 4, therefore, may need a separate assessment with a more-detailed questionnaire addressing specific types of high-fat food and the frequency of intake.

Factor analysis performed on the revised Malay version found that all items were loaded in their original domains, providing strong evidence that the questionnaire is constructively valid. Similar results were found when analysis was limited to younger patients, aged 10–13 years. These findings indicate that the revised Malay version of SDSCA may be used in younger children between ages 10–13 years, even though the original/revised English SDSCA questionnaire was validated in patients aged 12 years and older. To our knowledge, this is the first study where translation and validation of the English SDSCA into any language was performed exclusively among children and adolescents, aged 10–18 years with both type 1 and type 2 diabetes.

Based on the above findings we decided to substitute item 4 with item 5a for clinical use and future studies. This version, which we have named revised Malay version of SDSCA, will be made widely available in clinics for future use. However, we admit that this revised Malay version may not be suitable for some patients whose primary language is not Malay, especially children who attend the vernacular schools (i.e., Indian or Chinese primary schools) and whose main languages are Tamil and Mandarin respectively. Hence, these children may have difficulty understanding either the revised Malay or revised English SDSCA version. There

are some children who are more proficient in English, and may find the revised English version more appealing than the revised Malay version.

This questionnaire is potentially very useful during an outpatient visit as a quick assessment of diabetes self-care to identify areas for improvement. This questionnaire may also be used to monitor changes in a patient's self-care activities over time. Regular monitoring of self-care practice is likely to promote compliance in diabetes management and consistency in self-care.

We recommend that this questionnaire be used for children older than 10 years who are fluent in Malay, and that future research should validate this Malay version of SDSCA questionnaire among adult Malaysian patients. In addition, prospective studies to evaluate the impact of regular usage of this questionnaire on the metabolic outcome of children and adolescents with diabetes should be conducted.

In summary, the Malay-translated version of the revised SDSCA questionnaire is highly reliable and valid, and may come in handy

for Malaysian children aged 10–18 years and adolescents with diabetes.

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Perception of Quality of Life among People with Diabetes

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Abstract

Diabetes is a chronic disease that affects a patient's quality of life. This cross-sectional study aimed to determine the socio-demographic and disease profile factors associated with poor quality of life among patients with diabetes. The study was conducted at a primary health care clinic in Kuching between August to November 2010. Short Form - 36 (SF - 36) questionnaire was used to assess the quality of life of diabetic patients aged ≥ 18 . A total of 142 respondents participated in the survey. After adjusting for age, those with no education scored lower at vitality ($p=0.043$) and emotional health ($p=0.033$) compared with those who have tertiary education. Those working in the private sector scored better for physical functioning ($p=0.042$) compared with pensioners and the unemployed. Patients with uncontrolled diabetes scored lower in the role-emotional domain ($p=0.003$). Participants who were on <3 ($p=0.014$) and ≥ 3 ($p=0.024$) oral medications had better score for role-physical than those on insulin. Those on insulin had worse score for bodily pain than those on oral medication only (vs <3 oral drugs, $p=0.026$; vs ≥ 3 oral drugs, $p=0.001$). Various socio-demographic factors, uncontrolled diabetes and insulin usage were found to have negative impact on a diabetic patient's quality of life. Programmes addressing the physical and emotional needs of diabetic patients at the primary health care setting are essential to help improve their quality of life.

Introduction

Globally, the number of people with diabetes has increased sharply and are projected to increase by over 80% in upper-middle income countries.¹ In Malaysia, the prevalence of diabetes is also on the upward trend.²⁻³ Chronic diseases like diabetes may affect a person's quality of life in many ways. Although better glycaemic control is associated with higher quality of life, complexity of regimens aimed at achieving the glycaemic control may have an adverse impact on patients' quality of life.⁴ The negative impact of insulin injections on patients' quality of life are often overlooked. Newer mode of insulin delivery, such as non-invasive insulin inhalers, could address

this shortcoming and help improve quality of life.⁵ Reduced compliance to diet and medications⁶ and increased risk of diabetes-related complications⁷ are also associated with depression among diabetic patients, which may affect their quality of life. Thus, a diabetic patient's quality of life should be a primary consideration when prescribing a treatment regimen.

Studies have documented poor quality of life among diabetic patients who have suffered from this condition for a long time⁸⁻⁹ and is associated with old age,^{8,10} gender (especially women),^{8,11-12} diabetic complications^{8,13-14} concomitant diseases^{8,15-16} and disease severity.¹⁷

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Understanding the factors that contribute to poor quality of life among people with diabetes may help physicians in improving care. Studies on diabetes in Malaysia mainly focus on relationship between diabetes management, depression and quality of life.¹⁸⁻²¹ There are few studies that look at the relationship between the socio-demographic characteristics and disease profile of diabetic patients and quality of life, particularly in a primary health care clinic. Furthermore, in a multi-cultural society such as Malaysia people have unique health beliefs and practices²² which may influence their quality of life. Thus, this study aimed to determine the socio-demographic and disease profile factors associated with poor quality of life among diabetes patients in a primary health care clinic.

Methods

This was a cross-sectional study conducted at the Mosque Road Polyclinic, in Kuching. Kuching, the capital of Sarawak, is the fourth largest urban area in Malaysia with an estimated population of 579,900 people comprising Chinese, Malays, and indigenous groups such as Iban, Bidayus, Melanaus and Orang Ulu.

Mosque Road Polyclinic is the largest primary health care clinic in Kuching with a dedicated diabetic clinic managed by a team of health care professionals. Until June 2010, the clinic had 9,956 registered diabetic patients. The clinic operates twice weekly, with an estimated 25-30 patients a day. We took three months to conduct the study and collected data once a week. A total of 180 respondents were recruited. We conducted universal sampling among patients with type 2 diabetes mellitus aged 18 and above who were treated in the clinic during the study period.

Data were collected using a set of pre-tested and validated questionnaire consisting of socio-demographic characteristics (age,

race, sex, marital status, education level, and occupation), disease profile (duration of diabetes, co-morbidities, treatment, diabetes control/management and blood pressure control), and the SF-36[®] questionnaire. The disease profile was obtained from the patient's record. For the assessment of diabetes control, the latest HbA1c readings were taken into account if available; otherwise, fasting blood sugar (FBS) readings were recorded. If both HbA1c and FBS readings were unavailable, the latest random blood sugar (RBS) readings were taken. Patients who had HbA1c readings of less than 6.5% or FBS in the range of 4.4 mmol/L to 6.1 mmol/L or RBS in the range of 4.4 mmol/L to 8.0 mmol/L were defined as having controlled DM.²³

Controlled blood pressure is defined as systolic blood pressure of ≤ 130 mmHg and diastolic blood pressure of ≤ 80 mmHg and for those with normal renal function, and systolic blood pressure ≤ 125 mmHg and diastolic blood pressure ≤ 75 mmHg for those with renal impairment/ gross proteinuria.²⁴ The complications and self-reported co-morbidities include asthma, hypertension, hyperlipidemia, ischemic heart disease, retinopathy and foot problem. The treatment for diabetes mellitus was divided into < 3 oral hypoglycaemic drugs, ≥ 3 oral hypoglycaemic drugs and insulin with or without oral hypoglycemic drugs.

The SF-36 Health Survey is a generic questionnaire designed to examine a person's perceived health status. The validated questionnaires are in three languages - English, Malay²⁵ and Chinese.²⁶ It measures the following eight health concepts (1) general health; (2) role limitation due to physical health; (3) bodily pain; (4) physical functioning; (5) role limitation due to emotional problems; (6) energy/fatigue; (7) social functioning; (8) emotional health.

We conducted face-to-face interviews with the respondents who were waiting to be seen by a doctor at the clinic. The purpose of the study was explained to them and consent

was obtained.

The study was approved by the Malaysia Research Ethics Committee, Ministry of Health Malaysia (NMRR-10-770-6873).

All statistical analyses were performed using SPSS version 16.0 (IBM Corporation, New York). For descriptive data, percentages, mean and standard deviation were used. ANCOVA was used to compare the differences between groups under each subscale. Post hoc tests were conducted to determine which groups were significantly different. P-value of less than 0.05 is regarded as statistically significant.

Results

A total of 142 diabetes patients participated in this study, with a response rate of 79%. The average age of respondents was 55.7 (SD 11.12) years, and 81.7% of them were female. Approximately 90% of the respondents were married. Majority of the respondents were ethnic Malays (59.9%). More than 70% of the respondents had primary and secondary school level education. Approximately 49% of the respondents were housewives. Further information on the socio-demographic background is presented in Table 1.

Table 1: Socio-demographic profile of the respondents (n=142)

Variable	n	%	Mean ± S.D.
Age			55.67 ± 11.12
< 50 years	43	30.3	
50-59 years	45	31.7	
60-69 years	41	28.9	
≥ 70 years	13	9.2	
Gender			
Male	26	18.3	
Female	116	81.7	
Marital status			
Married	130	91.5	
Single	8	5.6	
Divorced	4	2.8	
Race			
Malay	85	59.9	
Chinese	42	29.6	
Pribumi & others	15	10.6	
Education level			
No formal education	26	18.3	
Primary	51	35.9	
Secondary	52	36.6	
University	13	9.2	
Occupation			
Government	13	9.2	
Private	28	19.7	
Housewife	69	48.6	
Pensioner/ unemployed	32	22.5	

Table 2 shows the disease profile of the respondents. Majority of the respondents had diabetes for 1-10 years (63.4%) with the mean duration of 6.10 (SD 6.54) years. Most of the respondents (n=126, 88.7%) had co-morbid conditions, and the most common co-morbid conditions were hypertension (68.3%) and hyperlipidaemia (38.7%). Forty-six respondents (32.4%) had well controlled blood glucose while 56 (39.4%) had their blood pressure controlled to target. Majority of the patients (n=116, 81.7%) were taking less than 3 oral hypoglycaemic medications and

only 16 respondents (11.3%) took insulin with or without oral hypoglycaemic medications. Approximately 65 respondents (45.8%) took only hypoglycaemic medications while 77 respondents (54.2%) took hypoglycaemic medications together with other medications.

Adjusted mean differences for SF36 with its sub-scales are presented in Table 3. Malay respondents were reported to have significantly higher adjusted mean score in emotional health component (81.3, CI=77.5 to 85.2) compared with Chinese (68.8, CI=63.4 to 74.3)(p=0.002).

Table 2: Disease Profile of the Respondents

Variable	n(%)	Mean ± S.D.
Duration of Diabetes		6.10±6.54
<1 year	32(22.5)	
1-5 years	53(37.3)	
6-10 years	37(26.1)	
> 10 years	20(14.1)	
Without co-morbid condition	16(11.3)	
With co-morbid condition	126(88.7)	
Co-morbid conditions and complications		
Asthma	3(2.1)	
Hypertension	97(68.3)	
Hyperlipidemia	55(38.7)	
Ischaemic Heart Disease	3(2.1)	
Retinopathy	28(19.7)	
Foot Problem	19(13.4)	
Diabetes Mellitus control		
Controlled	46(32.4)	
Uncontrolled	96(67.9)	
Blood Pressure control		
Controlled	56(39.4)	
Uncontrolled	86(60.6)	
Diabetes Medications		
<3 oral hypoglycaemic medications	116(81.7)	
≥3 oral hypoglycaemic medications	10(7)	
Insulin ±oral hypoglycaemic medications	16(11.3)	
Diabetic Treatment Type		
Diabetic medications only	65(45.8)	
Diabetic medications +other medications	77(54.2)	

Table 3: Adjusted mean* SF-36 by socio-demographic factors and Disease Profile of Respondents (N=142)

	Adjusted Mean(95%CI)							
	General Health	Role-physical	Bodily Pain	Physical Functioning	Role-emotional	Vitality	Social Functioning	Emotional Health
Gender								
Male (n=26)	2.9(2.8,3.1)	72.9(57.8,88.2)	85.3(76.5,94.1)	84.5(76.1,93.0)	76.8(62.3,91.4)	73.6(66.2,81.1)	86.5(79.2,93.9)	75.5(68.3,82.8)
Female (n=116)	2.9(2.8,3.1)	62.50(55.3,69.7)	76.8(72.6,81.0)	76.7(72.7,80.7)	77.6(70.7,84.5)	69.9(66.4,73.4)	87.5(84.0,90.9)	77.3(73.9,80.7)
p-value	0.939	0.222	0.087	0.099	0.926	0.374	0.816	0.658
Race								
Malay (n=85)	2.9(2.8,3.0)	61.0(52.6,69.4)	76.9(71.9,81.9)	77.2(72.4,81.9)	74.6(66.5,82.6)	72.3(68.2,76.4)	88.9(84.9,93.0)	81.4(77.5,85.2)
Chinese (n=42)	3.1(3.0,3.3)	72.2(60.1,84.2)	79.6(72.5,86.6)	80.8(74.1,87.5)	81.2(69.7,92.6)	65.5(59.7,71.3)	83.3(77.5,89.1)	68.8(63.3,74.3)
Pribumi & Others (n=15)	3.0(2.8,3.3)	67.2(45.1,82.2)	83.1(71.4,94.9)	76.3(65.1,87.5)	83.6(64.5,102.7)	75.4(65.7,85.1)	89.2(79.5,98.9)	73.0(66.0,84.2)
p-value	0.041 ^a	0.319	0.580	0.647	0.519	0.103	0.264	0.001 ^b
Education								
None (n=26)	2.9(2.7,3.1)	65.2(49.7,80.6)	83.6(74.6,92.6)	70.7(62.0,79.3)	80.7(65.8,95.6)	65.0(57.6,72.5)	82.0(74.5,89.5)	69.9(62.7,77.2)
Primary (n=51)	2.9(2.8,3.1)	57.4(46.6,68.3)	72.8(66.4,79.1)	77.8(71.7,83.8)	74.8(64.4,85.3)	71.3(66.1,76.5)	89.1(83.8,94.4)	78.3(73.2,83.4)
Secondary (n=52)	3.0(2.9,3.1)	65.4(54.5,76.3)	79.4(73.0,85.7)	80.7(74.6,86.8)	75.2(64.7,85.7)	69.6(64.4,74.9)	87.9(82.6,93.2)	76.5(71.4,81.7)
University (n=13)	2.9(2.7,3.2)	86.5(65.0,107.9)	85.8(73.3,98.3)	84.3(72.3,96.3)	90.5(69.8,111.1)	82.9(72.5,93.2)	88.6(78.1,99.1)	87.8(77.7,97.9)
p-value	0.878	0.131	0.119	0.224	0.532	0.054 ^c	0.472	0.041 ^d
Occupation								
Government (n=13)	3.1(2.7,3.4)	79.1(56.7,101.6)	74.3(61.1,87.5)	84.4(72.2,96.7)	91.3(69.9,112.7)	75.4(64.4,86.4)	85.7(74.9,96.5)	83.5(72.9,94.2)
Private (n=28)	2.9(2.7,3.1)	71.7(56.7,86.6)	80.7(71.9,89.5)	87.2(79.1,95.4)	71.1(56.9,85.3)	72.4(65.1,79.7)	92.9(85.7,100.1)	78.9(71.8,86.0)
Housewife (n=69)	2.9(2.8,3.0)	61.9(52.6,71.3)	77.6(72.1,83.1)	76.6(71.5,81.7)	79.2(70.3,88.1)	70.7(66.1,75.2)	85.0(80.5,89.5)	77.33(72.9,81.8)
Pensioner/unemployed(n=32)	3.16(0.57)	54.69(44.65)	76.25(25.77)	66.56(26.41)	70.83(41.26)	66.09(16.84)	88.28(17.94)	72.00(17.39)
p-value	0.174	0.097	0.741	0.000 ^e	0.222	0.337	0.301	0.247
Duration of diabetes								
<1 year (n=32)	2.9(2.8,3.1)	58.5(44.7,72.4)	78.2(70.0,86.4)	78.8(71.0,86.6)	77.6(64.2,90.9)	70.6(63.8,77.4)	87.6(80.8,94.3)	81.1(74.5,87.7)
1-5 years (n=53)	2.9(2.8,3.1)	64.4(53.8,75.1)	77.8(71.5,84.1)	79.7(73.7,85.6)	78.8(68.6,89.1)	72.5(67.2,77.7)	88.7(83.5,93.9)	77.1(72.1,82.2)
6-10 years (n=37)	3.0(2.8,3.1)	75.0(62.2,87.8)	80.3(72.7,87.9)	75.3(68.1,82.5)	74.3(62.0,86.7)	69.4(63.0,75.7)	85.8(79.5,92.0)	74.7(68.6,80.8)
>10 years (n=20)	3.2(2.9,3.4)	54.3(37.0,71.7)	76.5(66.2,86.8)	78.2(68.5,88.0)	79.5(62.8,96.3)	68.0(59.5,76.6)	86.2(77.7,94.7)	74.2(66.0,82.5)
p-value	0.380	0.199	0.936	0.843	0.944	0.804	0.901	0.482

Table 3: (Continued) Adjusted mean* SF-36 by socio-demographic factors and Disease Profile of Respondents (N=142)

	Adjusted Mean(95%CI)							
	General Health	Role-physical	Bodily Pain	Physical Functioning	Role-emotional	Vitality	Social Functioning	Emotional Health
Presence of co morbid condition								
No co morbid condition (n=16)	3.1(2.9,3.4)	66.5(46.7,86.4)	69.4(57.9,80.9)	80.1(75.1,97.0)	73.9(55.1,92.8)	69.2(59.6,78.9)	88.3(78.7,97.9)	75.7(66.3,85.1)
With co morbid condition (n=126)	3.0(2.9,3.1)	64.2(57.2,71.1)	79.5(75.5,83.5)	77.1(73.3,81.0)	77.9(71.3,84.5)	70.8(67.4,74.2)	87.2(83.8,90.6)	77.1(73.9,80.4)
p-value	0.271	0.827	0.103	0.132	0.698	0.763	0.829	0.776
DM control								
Controlled (n=46)	2.9(2.8,3.1)	68.5(57.0,80.0)	75.6(68.9,82.3)	76.7(70.3,83.1)	91.0(80.4,101.6)	72.2(66.7,77.8)	89.9(84.4,95.5)	80.3(74.9,85.7)
Uncontrolled (n=96)	3.0(2.9,3.1)	62.5(54.6,70.5)	79.7(75.1,84.3)	78.8(74.4,83.2)	71.1(63.7,78.3)	69.8(65.9,73.7)	86.1(82.2,89.9)	75.4(71.7,79.2)
p-value	0.876	0.401	0.324	0.598	0.003 ^f	0.479	0.255	0.146
BP control								
Controlled (n=56)	3.0(2.8,3.1)	62.1(51.7,72.6)	79.7(73.6,85.8)	80.6(74.8,86.4)	79.2(69.2,89.1)	69.6(64.5,74.7)	85.7(80.7,90.7)	75.1(70.2,80.0)
Uncontrolled (n=86)	3.00(2.9,3.1)	66.0(57.5,74.4)	77.5(72.6,82.4)	76.5(71.9,81.2)	76.4(68.4,84.4)	71.2(67.1,75.3)	88.4(84.3,92.4)	78.2(74.2,82.2)
p-value	0.627	0.574	0.580	0.279	0.666	0.625	0.414	0.338
Treatment Medication of Diabetes								
<3 oral drugs (n=116)	2.9(2.8,3.0)	66.9(59.8,73.9)	78.9(74.9,83.0)	78.9(74.9,82.9)	79.8(72.9,86.6)	71.4(67.9,74.9)	88.3(84.8,91.7)	78.6(75.2,81.9)
≥3 oral drugs (n=10)	3.1(2.8,3.4)	79.5(55.3,103.7)	95.9(82.0,109.8)	79.4(65.6,93.3)	69.6(46.0,93.1)	75.0(63.0,87.1)	78.6(66.6,90.5)	69.4(57.8,81.1)
Insulin ± oral drugs (n=16)	3.0(2.8,3.3)	37.5(18.5,56.4)	63.2(52.3,74.2)	72.0(61.1,82.8)	65.6(47.2,84.1)	62.3(52.9,71.7)	86.0(76.6,95.4)	70.3(61.1,79.4)
p-value	0.721	0.009 ^g	0.001 ^h	0.493	0.288	0.155	0.296	0.103
Diabetic Treatment Type								
Diabetic medicine only (n=65)	3.1(2.9,3.2)	66.7(57.0,76.3)	76.5(70.9,82.2)	78.2(72.8,83.5)	78.3(69.1,87.5)	70.8(66.1,75.5)	89.0(84.4,93.7)	78.7(74.1,83.2)
Diabetic medicine + other medications (n=77)	2.9(2.8,3.0)	62.5(53.6,71.4)	79.9(74.7,85.1)	78.1(73.2,83.0)	76.8(68.3,85.2)	70.4(66.1,74.7)	85.9(81.6,90.1)	75.6(71.4,79.8)
p-value	0.103	0.532	0.385	0.986	0.811	0.890	0.324	0.325

*Adjusted for age.

Post-hoc test

^aMalays vs Chinese, p=0.041, ^bMalays vs Chinese, p=0.001, ^cUniversity vs no education, p=0.043, ^dUniversity vs no education, p=0.033, ^ePrivate vs pensioner, p=0.042, ^fDM controlled vs DM uncontrolled, p=0.003, ^g<3 oral drugs vs insulin, p=0.014; 3 or more oral drugs vs Insulin, p=0.024, ^h<3 oral drugs vs insulin, p=0.026; 3 or more oral drugs vs Insulin, p=0.001

The respondents with no formal education had significantly lower adjusted mean score in vitality ($p=0.043$), and emotional health ($p=0.033$) when compared with those possessing university qualifications.

The pensioners or unemployed group had significantly lower adjusted mean score in physical functioning component when compared with those in the private sector ($p=0.042$).

The mean scores in the general health component did not differ between respondents whose diabetes were controlled and uncontrolled as seen in Table 3. However, the respondents with uncontrolled diabetes had significantly lower adjusted mean score in the role-emotional component ($p=0.003$) compared with those with controlled diabetes.

The respondents taking insulin had significantly lower adjusted mean scores in role-physical ($p=0.014$) and bodily pain ($p=0.026$) components compared with respondents taking <3 oral drugs. Similar associations were found between respondents with insulin and those taking 3 or more drugs for both sub-scales (role-physical, $p=0.024$; bodily pain, $p=0.001$).

For other socio-demographic factors and disease profile (gender, duration of diabetes, presence of co morbid condition, blood pressure control and diabetes treatment type), no significant differences were found in the adjusted mean scores for general health component and its sub-scales.

Discussion

Most studies found no association between ethnicity and quality of life among diabetic patients.^{10,27} However, one study found that Chinese immigrants to the United States have scored lower on quality of life assessment compared with European-Americans.²⁸ In our study, although ethnic Malays have significantly higher adjusted mean score in

emotional health compared with Chinese, their general health component adjusted mean score was lower. Cultural background and health beliefs may have affected the perception of both general health and emotional health of different ethnic groups. In addition, as the Malays constitute the biggest sample size in this study, the finding is inconclusive. Further study is needed to clarify the nature of this relationship.

Under the subscale level for all components, respondents with university education had the highest adjusted mean scores compared with other groups. Significant difference was noted between those with university level education and those without education (vitality and emotional health). This is consistent with other studies.^{10,27} Patients who have better glycaemic control tend to be more optimistic and thus, cope well with the disease resulting in better quality of life.²⁷ Patients with higher education are more likely to equip themselves with knowledge on the disease that helps them to manage it better.²⁷

Pensioners and the unemployed had significantly lower adjusted mean score in physical functioning component compared with those working in the private sector. As pensioners and the unemployed may have lower income, this may explain the lower physical functioning score for these two categories as other studies have found that older patients have lower physical functioning score^{10,29} and those with lower incomes have lower scores in all components of quality of life.¹⁰

This study did not find any significant difference between respondents with comorbidity condition and without comorbidity condition terms of general health component and all sub-scales. This finding is different from a study by Redekop et al¹³ which found that co-morbidities can have a negative effect on patient's quality of life. Comorbidities, such as hypertension and dyslipidaemia may lead to coronary artery disease which may affect

patient's quality of life.¹² A prevalence of high of co-morbidity (88.7%) in this study may have contributed to the insignificant mean scores for quality of life between the groups.

Respondents with controlled and uncontrolled diabetes did not differ much in their general health scores. This is consistent with the study conducted by Murali et al where poorer glycaemic control did not result in a lower quality of life.³⁰ At the subscale level, only role-emotional component was found to be associated glycaemic control. Patients who have better glycaemic control tend to be more optimistic and thus, cope well with the disease resulting in better quality of life.³¹

For blood pressure control, there was no significant differences between uncontrolled and controlled group in general health score and its sub-scales. This may be due to hypertension which is often asymptomatic.¹²

In terms of diabetes treatment, there is a huge disparity in the adjusted mean score for role-physical and bodily pain components between those with on oral medications (either < 3 or >3) and insulin. This finding is consistent with the study by Redekop et al¹² which found that insulin therapy is one of the factors that lead to lower health-related quality of life. Injection of insulin injections may create fear and have adverse effects, such as hypoglycaemia.¹³

There is a relationship between the comorbidities and the amount of medications and this directly affect patients' quality of life.³² Those consuming more drugs have poorer quality of life compared with those who do

not.³² In addition, adverse effects of drugs can also affect patient's quality of life.³³ However, in this study, we did not find any significant difference in the quality of life between those who were on diabetes medications only and those on additional drugs.

The strength of this study is that it included indigenous population of East Malaysia. The limitation of this study is that most of the respondents were Malays which is attributed to the sampling method. A majority of the patients who were on follow-up at the government clinics were Malays. Further study is needed to ascertain whether there is any differences in quality of life between the ethnic groups.

Conclusion

Lower education level, unemployment, uncontrolled diabetes and insulin treatment were found to have a negative impact on the quality of life among diabetic patients. Programmes addressing the physical and emotional needs of patients are essential to improve their quality of life. Health education should also cater to those who have low education level. A more holistic healthcare system that looks into the psychological aspect of the patients should be considered.

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An Audit of Sputum Smear Negative Pulmonary Tuberculosis Cases in Kinta District, Perak, in 2011

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Keywords:

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Abstract

58 cases of sputum smear negative pulmonary tuberculosis (PTB) were reported to Kinta Health Department between January and June 2011. It was found that 47 cases (81%) were sputum smear negative cases. Six cases (10.3%) were actually sputum smear positive but were wrongly reported as smear negative. Five cases (8.6%) were misdiagnosed as tuberculosis. Majority of these patients (82.7%) sought consultation and treatment after two weeks of having cough. Only 6.9% sought treatment for cough that was less than two weeks old. Accurate diagnosis of PTB is crucial and the Perak State Health Department needs to quickly adopt steps to improve the situation.

Introduction

Tuberculosis is now creating a new crisis globally.¹ It remains the leading cause of death attributed to infectious diseases. Recent statistics have reawakened awareness on the magnitude of the problem caused by the disease.² According to World Health Organization (WHO), there are approximately 20 million active cases in the world today infecting 50-100 million people annually. Mortality due to the disease is approximately 3 million annually, of which at least 80% are in the developing countries.²

Sputum smear microscopy using Ziehl-Neelsen (ZN) staining for detecting acid fast bacilli (AFB) is currently the most feasible microbiological method for diagnosing PTB especially in developing countries due to its efficiency, low cost and high positive predictive value for mycobacterium tuberculosis.^{3,4} The smear positivity for AFB is a variable. Positive smears indicate large bacterial load in the

lung lesions compared with negative cases which show less bacterial load.³ Sputum smear negative cases are less infectious but are still capable of transmitting the disease. Therefore, sputum smear negative cases present a challenge to tuberculosis management.^{3,5}

In Kinta District, Perak, it was found that there was an increase in the number of sputum smear negative pulmonary tuberculosis cases between January and June 2011. There were 58 cases as compared with 40 in the same period in 2010 and 48 cases in 2009.⁶ The primary objective of the study was to ascertain the reason for an increase in the number of sputum smear negative pulmonary tuberculosis cases between January to June 2011. The secondary objective was to determine the socio-demographic factors, underlying co-morbidities, duration of symptoms prior to diagnosis, chest X-ray changes, symptoms experienced and venue of diagnosis, previous PTB contacts, as well as the documentation of the sputum AFB direct smear results on the TBIS 10A-1

form (Ministry of health TB treatment data collection form).

Methods

This was a retrospective case review analysis. The study was conducted at the record office of Hospital Raja Permaisuri Bainun (HRPB) Ipoh, Perak, where we reviewed patients' folders as well as the TBIS 10A-1 forms from the chest clinic at HRPB, two government health clinics and the private hospitals in Ipoh between January and June 2011. The case review and data analysis were conducted over a period of one month. All cases of sputum smear negative PTB with or without extra-pulmonary involvement were included. All cases of sputum smear positive PTB were excluded. Microsoft Excel 2010 software was used for data entry and data analysis.

Results

A total of 178 cases of PTB was reported between January and June 2011, of which 79 (44.4%) were sputum smear positive, 58 (32.6%) were sputum smear negative and 41 (23.0%) were extra-pulmonary tuberculosis. Polymerase chain reaction tests were not conducted for the sputum smear negative cases. Out of the 58 sputum smear negative cases, 8 had concurrent extra-pulmonary tuberculosis cases. It was found that out the 58 cases, 47 (81%) were sputum negative. It was found that the spectrum Smear results were not recorded in the TBIS 10A-1 form in 11 cases (19.0%). Of these, five cases (8.6%) were misdiagnosed as tuberculosis (two were lung carcinoma, two were finally not pulmonary tuberculosis and one was diagnosed as chronic lung disease) and six cases (10.3%) were sputum smear positive. Almost half of the patients (46.5%), were aged 40 to 59 years old. Majority of patients with sputum smear negative PTB were males (69%); 44.8% were Malays, 36.2% Chinese, 17.2% Indians and 1.7% Japanese. Majority of the patients with sputum smear negative PTB (74%) were treated in HRPB Ipoh while 26% were treated at the government health clinics or district hospitals.

As for co-morbidities, 31.0% of these patients were smokers, 27.6% had diabetes mellitus, 17.2% had hypertension, 17.2% had HIV infection, 15.5% were intravenous drug users and 8.6% had hepatitis C infection. It was also found that majority of these patients (82.7%) sought consultation and treatment after two weeks of cough as compared with 6.9% who sought treatment for cough lasting less than two weeks. As for other symptoms, 53% experienced fever, 50% had loss of appetite, 38% had loss of weight, 26% had night sweats and, 3.5% had shortness of breath. More than half of these patients had moderately advanced or advanced chest X-ray changes (56.9%). From the analysis, five cases were infected as a result of contact with people with PTB and were diagnosed from contact tracing and screening.

Discussion

Diagnosing and managing sputum smear negative pulmonary tuberculosis cases have become increasingly challenging for clinicians. It requires a high clinical suspicion, good quality of sputum sample and meticulous radiological interpretation. This is because the clinical and radiological manifestations of PTB may be atypical as in the case of sputum smear negative PTB.⁷

The incidence of tuberculosis in Perak in 2011 was 53.6 per 100,000 people and in Kinta District was 43.4 per 100,000 people. The case detection rate of newly diagnosed sputum smear positive tuberculosis cases in Perak state in 2011 was 67% and in Kinta District was 43%. The CDR target for newly diagnosed patients with TB to have positive sputum smear is 70%.⁸ This target was not achieved in Kinta District and Perak in 2011 due to an increase in sputum smear negative cases. This study found that there was an increase of 32.6% in sputum smear negative cases. Sputum smear positive cases were still high in terms of proportion - (44.4%). A study undertaken by Kedah Medical Centre in 2004 showed that sputum smear negative cases were proportionately higher (62.2%), compared with sputum smear positive cases,

(22.8%).⁷ Another study in Lahore conducted in 2007 also found that there were sputum smear negative cases (60.0%) than sputum smear positive cases, (40.0%).³ This study showed a higher proportion of sputum smear positive cases as compared with the above two studies probably because of the recent increase in emphasis on achieving the Millennium Development Goal *6C For The Control Of Tuberculosis*, especially attaining the target of case detection rate of more than 70%.⁸

Out of the 58 reported cases of sputum smear negative cases, 10.3% were sputum smear positive and were wrongly reported as smear negative. The documentation error was attributed to the inexperienced junior doctors at the tertiary hospital (five cases) and medical officers from the government health clinic (one case). It was also found that 19% of the TBIS 10A-1 forms were not filled up and were assumed to be sputum smear negative cases. One patient was found to have no sputum sample as he had non productive cough and did not undergo a bronchoscopy. This patient was also as reported a case of sputum smear negative PTB.

We also found that majority of these patients (82.7%) sought consultation and treatment only after two weeks of having cough as compared with only 6.9% who sought treatment for cough lasting less than two weeks. According to the Millennium Development Goal *6C For The Control Of Tuberculosis* 2012, the target set for the state of Perak was to screen all patients at the outpatient clinics who have been coughing for more than a week; and to screen all patients with comorbidities, especially those with diabetes who have poor glycaemic control, lost weight and coughed for more than three days.⁸ These were measures taken by the state to enhance early detection of PTB.

Following this audit, remedial measures were suggested and implemented by the Perak State Health Department. Doctors were informed of the importance of accurate and proper reporting and documentation particularly

filling up the TBIS 10A-1 form as this will facilitate in retrieving accurate data for analysis as well as aid in improving clinical management of tuberculosis holistically. In addition, the health staff advised patients on how to provide good quality sputum sample in order to obtain a better yield of AFB. A study conducted in Chicago reported that a minimum of 5ml of sputum improves the sensitivity of acid fast smear for mycobacterium tuberculosis.⁹ The technical guidelines of WHO International Union Against Tuberculosis and Lung Disease specify that PTB suspects are required to submit three sputum samples - the first and third are spot specimens taken at the centre, and the second should be an early morning sputum.⁴

Patients who could not produce sputum sample for examination but are symptomatic or have a highly suspicious radiological findings should have a bronchoscope arranged to enable lavage fluid smears examined for AFB.¹⁰ Health staff were also reminded to improve public awareness via health education such as using the tuberculosis quick flip charts and medical campaigns to ensure patients with symptoms seek early medical assistance.

There are a few limitations in this study. The information obtained from the TBIS 10A-1 forms could only be verified with the source documents from (HRPB), Ipoh but not with the private hospitals. Another limitation is the lack of information on laboratory errors including unsatisfactory sputum specimen as this was a retrospective study and we were unable to retrieve some information from the TBIS 10A-1 forms as well as from the source documents at HRPB Ipoh.

In conclusion, there is potential for further study to evaluate the effectiveness of these remedial measures.

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Cat's Curse: A Case of Misdiagnosed Kerion

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Keywords:

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Abstract

Kerion is an inflammatory type of tinea capitis which can be mistaken for bacterial infection or folliculitis as both conditions display similar clinical features. It occurs most frequently in prepubescent children and rarely in adults. We report a 26-year-old woman who presented with multiple tender inflamed nodules on her scalp. Her condition was misdiagnosed as bacterial abscess and treated with multiple courses of antibiotics without improvement. Later, her condition was re-diagnosed as kerion based on clinical appearance, history of contact with infected animal and Wood's lamp examination. Symptoms and lesions resolved completely with systemic antifungal treatment leaving residual scarring alopecia. The delay in the diagnosis and treatment of this patient resulted in permanent scarring alopecia.

Introduction

Kerion, also known as kerion celsi, is an inflammatory fungal infection of the hair follicle and shaft which is transmitted from human to human or from animal to human, gaining entry through broken hair shaft or traumatised scalp. Though the exact prevalence of this condition is unknown, it is found to be more common among children. Different pathogens have been implicated to cause kerion and the predominant pathogen is dermatophyte fungi of the genus *Trichophyton* and *Microsporum*.^{1,2}

Its classical symptoms are extremely tender inflammatory boggy nodules, hair loss and purulent discharge and are hence, frequently mistaken for folliculitis or carbuncle secondary to bacterial infection. Severe hypersensitivity reaction to the fungal element is thought to be responsible for the emergence of inflammatory tinea capitis. Kerion is commonly seen on the scalp although it may occur anywhere including the vulva.³ The most common complication is

scarring alopecia, although rare life threatening cases have been reported.⁴

We report a case of kerion on the scalp of an adult, which was misdiagnosed as bacterial infection, resulting in delayed definitive treatment causing protracted symptoms and scarring alopecia.

Case Summary

A 26-year-old woman presented with multiple tender nodules on her scalp for one month. The lesions started with a single tender nodule on the vertex and gradually increased in number and size with subsequent purulent discharge. She received five different types of antibiotics, including one intramuscularly, over 4 weeks from several general practitioners without any improvement. She was single, lived with her family and had just started working as an executive officer in a software company. There was no history of any recent travel. No other

family members had similar lesions but her pet cat had patchy bald areas for many months.



Figure 1.
A. Multiple erythematous nodules on the frontal and vertex. **B.** Loss of hair, purulent discharge and yellow crusts were seen.

Examinations revealed multiple erythematous, tender, boggy nodules ranging from 2 to 4 cm in size on the frontal and vertex areas of the scalp. Yellow crusts, purulent discharge and

patchy hair loss were also noted (Fig 1). The left anterior cervical lymph nodes were palpable and tender. Wood's lamp examination revealed yellow-green fluorescence over the affected area. Plucked hair samples and scalp scrapings were sent for fungal culture. Swabs from the lesions were cultured for bacteria and fungi. A provisional diagnosis of kerion secondary to *Microsporum canis* was made and the patient was prescribed oral itraconazole 200mg daily, analgesics and ketoconazole shampoo for 6 weeks. Her household contacts were examined and no similar lesions were found. She was advised to seek treatment for her pet cat. Six weeks later, all lesions cleared leaving residual scarring alopecia in the affected areas. Swabs and hair samples for bacterial and mycological culture were negative.

Discussion

Kerion is a type of tinea capitis associated with painful, inflamed, boggy, deep abscesses, purulent discharge and regional lymphadenopathy. Failure to diagnose this condition early results in permanent alopecia in the affected areas. *Microsporum* especially *Microsporum canis* is the most common pathogen responsible for kerion in humans.⁵ It is a zoophilic species found in animal hosts such as dogs, cats, rabbits and guinea pigs. An infected animal may present with skin manifestations or may appear normal. Typical skin lesions in animals include patchy areas of hair loss on the head, ears or paws with surrounding inflammation. The diagnosis of this condition is clinically supported by presence of fluorescence under Wood's lamp examination and microscopic examination of the affected hair with potassium hydroxide (KOH). Definitive diagnosis is made by isolation of the fungus from culture of hair and scalp scales. However, fungal culture is often negative due to the difficulty in isolating the fungus, in which case treatment may be initiated based on clinical suspicion.⁶

In this patient, the diagnosis of kerion was

based on clinical features, history of contact with an infected animal and presence of yellow green florescence under Wood's lamp examination. Negative bacterial culture may be due to treatment with antibiotics prior to sampling in addition to the fact that kerion itself is an inflammatory lesion secondary to hypersensitivity reaction to fungal elements, and not due to bacterial infection.

Systemic antifungal therapy for two to six weeks is the treatment, which may be extended until clinical clearance is achieved. Griseofulvin, terbinafine, itraconazole or fluconazole may be used. A recent Cochrane review states that the efficacy of these medications is similar in the treatment of tinea capitis due to *Trichophyton* species.⁷ Itraconazole given in doses of 5 mg/kg/day either continuously or in pulses has been shown to be effective against *Microsporum* spp in children, with success rates of 88% after six weeks of therapy.⁸ Topical antifungal as monotherapy is not recommended as these agents are unable to penetrate the hair follicle adequately.⁹ Periodic monitoring during treatment with itraconazole is recommended as it can affect haemopoiesis, renal and hepatic function. It can also worsen heart failure and interact with drugs such as terfenadine, cyclosporin, statins, digoxin and warfarin. Terbinafine is safer compared with itraconazole with fewer side effects such as gastrointestinal disturbances. Griseofulvin may cause photosensitivity, hypersensitivity, enhance effects of alcohol and cause disulfiram-like reactions.

The role of oral or intralesional corticosteroids is controversial and probably unnecessary as the disease can be cured via systemic antifungal treatment.¹⁰ Adjunct topical therapies such as selenium sulphide or ketoconazole shampoo or

creams reduce disease transmission and shorten treatment duration. Antihistamines may be prescribed if pruritus is present to reduce dissemination of spores due to scratching. Antibiotic treatment is unnecessary as bacteria is not the underlying cause of kerion. Surgical excision of the lesion is also not recommended.⁹

Patients with kerion must avoid sharing hair brushes, combs, head scarves, beddings and towels with others to prevent transmission of fungal spores. Household contacts and animals should be screened and treated accordingly to prevent recurrences. Asymptomatic carrier state is rare in cases of *Microsporum canis* infection as it tends to manifest with obvious inflammatory clinical signs compared with *Trichophyton* spp which commonly presents with non-inflammatory lesions.⁹

Conclusion

As illustrated in this case, kerion is easily misdiagnosed as a bacterial infection due to its clinical presentation and appearance. Lack of response to antibiotic therapy should alert physicians to consider a non-bacterial aetiology. History of contact with infected animals may give a clue to the underlying diagnosis. In the absence of laboratory facilities, a trial of oral antifungal agent is justified while monitoring treatment response. This case also highlights the importance of proper care, early identification and treatment of an infected pet which could have prevented transmission in the first instance. In summary, clinicians should have a high index of suspicion for fungal infection when dealing with inflammatory scalp lesions. Treatment should be initiated early to prevent scarring alopecia and psychological distress.

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Nasopharyngeal (Tornwaldt's) Cyst: Rare Finding in a Habitual Snorer

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Abstract

A nasopharyngeal (Tornwaldt's) cyst is uncommon. It is often asymptomatic; however it may cause problem if it too big becomes. We present a case of a 24-year-old Malay girl who had been a habitual snorer for years but was unaware of the significance of her problem. Opportunities for an earlier referral and assessment were missed since we were not aware of her history despite previous related but non-specific consultations at our primary healthcare centre. She was referred to us a few years later when her nasopharyngeal cyst became infected. After a course of antibiotics, she proceeded with an endoscopic resection of the nasopharyngeal cyst. A follow-up visit six months later did not reveal a recurrence. This case highlights the importance of a good history for the diagnosis of a nasopharyngeal cyst.

Introduction

Nasopharyngeal (Tornwaldt's) cysts are rare and a result of abnormal embryological development at the posterior wall of nasopharynx. Its reported prevalence varies greatly ranging from 1.4% to 3.3% in autopsy series and from 0.2%-5% in MRI series.¹ Although it is relatively uncommon and majority are asymptomatic, it may cause clinically-significant symptoms. As such, the attending physician must be aware of this diagnosis since nasopharyngeal cysts can be treated.

Case Summary

We present a case of a 24-year-old Malay woman referred to us from a primary healthcare clinic. She had a two-week history of blood-tinged sputum especially in the morning. It was associated with foul breath and her left ear was blocked. A globular mass was noted extending into the oropharynx from above the

soft palate. Apart from being a habitual snorer, she was otherwise asymptomatic and did not experience symptoms of obstructive sleep apnoea such as excessive daytime somnolence or frequent nocturnal awakening. She also did not complain of any nose block, post-nasal drip, epistaxis or haemoptysis. Apart from the ear block, she did not have other ear symptoms. However, she visited the healthcare clinic twice in the past year complaining of throat discomfort which was treated for viral pharyngitis. A detailed sleep history was, not recorded during these consultations.

The patient was healthy looking with normal body mass index. Oral examination revealed a pink cystic inflamed mass extending into the upper part of oropharynx posterior to the soft palate. There was no adenotonsillar hypertrophy or any significant deviation of nasal septum. Nasal endoscopy revealed the origin of the mass from the left posterolateral nasopharyngeal wall medial to the fossa of Rosenmuller. Examination revealed left

middle ear effusion which was confirmed by an impedance test and the pure tone audiogram revealed a mild conductive hearing loss. The patient was diagnosed with having an infected nasopharyngeal cyst and treated with a course of oral amoxycillin/ clavulanic acid for one week to cover for common upper respiratory tract pathogens (eg. streptococcus pneumoniae, haemophilus influenza).

As the mass appeared to originate from the roof of the nasopharynx, a CT scan was done to rule out an intracranial problem such as a meningocele. The CT scan showed no intracranial extension of the soft tissue mass which measured 2.6cm x 1.3cm x 1.0cm extending from the left side of nasopharynx into the oropharynx.



Figure 1.
Endoscopic view of the nasopharyngeal cyst with its stalk (arrow) arising from the roof of the nasopharynx.

The patient underwent an endoscopic resection of the cyst. The histopathological examination of the lesion showed polypoidal tissue lined by stratified squamous the epithelium with no evidence of malignancy. At six-month follow up visit, her habitual snoring and middle ear effusion resolved. She was asymptomatic with no evidence of recurrence.

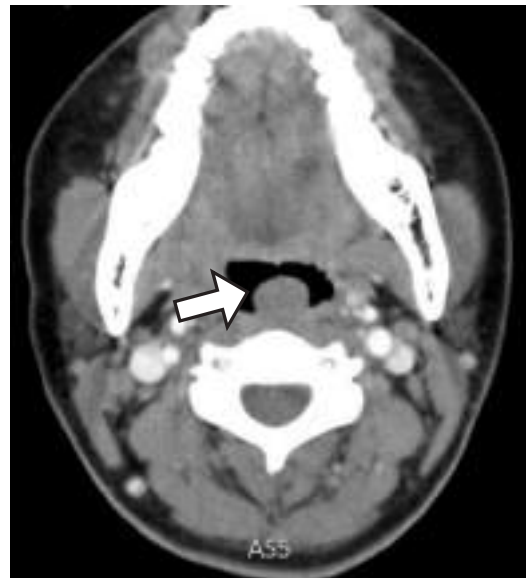


Figure 2.
CT scan (axial and coronal views) showing the presence of the nasopharyngeal cyst (arrow)

Discussion

A nasopharyngeal (Tornwaldt's) cyst develops from a congenital remnant of the notochord and pharyngeal ectoderm in the posterior nasopharynx. These residual tissues form a bursa or pouch that can become cystic.^{1,2} Its overall prevalence has not been well established with a peak age of presentation in the second and third decade of life.³ The presentations depends on the size of the cyst and its location

in the nasopharynx. Patients may present with non-specific nose or ear symptoms such as snoring, nasal obstruction, post nasal drip, ear block or a conductive hearing loss and this is due to eustachian tube dysfunction on middle ear effusion. A nasopharyngeal cyst may also become infected leading to symptoms of foul odour, sore throat or headache usually in the occipital region.^{1,3,4,5} As nasopharyngeal cysts are relatively rare and presents with non-specific symptoms, they are often not diagnosed early.

Therefore, awareness of the diagnosis is important as the symptoms could be easily resolved with surgical intervention. Referral to an otorhinolaryngologist for a thorough ENT assessment should be considered especially in patients whose symptoms do not resolve despite optimal medical treatment.

In this case, it has to be noted that previous visits to our primary healthcare clinic may have brought about suspicion of a nasopharyngeal pathology and an earlier referral to the ENT surgeon. Patients, especially young women, often do not volunteer information pertaining to the history of habitual snoring. It is however, important as snorers are known to experience frequent sore throat especially in the morning due to nocturnal mouth breathing which results in drying of the mucosa of the

posterior pharyngeal wall. This highlights the importance of a detailed history especially when early lesions may still be confined to the nasopharynx. Although habitual snoring could be attributed to the nasopharyngeal cyst in this case, it is a very rare cause. Other more common conditions should first be sought in patients with snoring such as obesity, adenotonsillar hypertrophy, deviated nasal septum, nasal polyposis and micrognathia.

The diagnosis of a nasopharyngeal cyst is mainly based on the presence of a pendulous polyp or a generalised bursa like swelling on nasal endoscopy. Depending on its appearance, surgical intervention may involve either a simple excision at the stalk of the pendulous polyp or a marsupialisation of a cyst appearing as a bursa. CT/MRI scan should be carried out if there is a suspicion of an intracranial origin.

Conclusion

Although nasopharyngeal cysts are uncommon and majority are asymptomatic, they may cause troublesome symptoms if they become large or infected. Clinical suspicion must be exercised for its diagnosis which can be easily determined with a simple nasal endoscope and effectively treated by surgical removal of the cyst.

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A Successful Antenatal Myomectomy

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Abstract

Complications that may occur while performing myomectomy in pregnancy can be prevented in a well-optimised surgery. Counselling and comprehensive peri-operative preparations are mandatory to minimise litigations and untoward events. Myomectomy in pregnancy remains a contentious issue. Degeneration of fibroid during pregnancy is common. However, conservative management suffices in majority of cases. In non-responsive conservative treatment, myomectomy may be an option. This article discusses our experience in treating a 38-year-old woman in her fourth pregnancy at 15 weeks gestation with symptomatic uterine fibroid. She had persistent abdominal pain since nine weeks gestation. She developed fever and acute abdomen at 15 weeks and the uterus was larger than dates. Ultrasound scan confirmed single pregnancy with a large intramural fibroid showing degenerative changes. A myomectomy was performed as a preventive measure to prevent massive haemorrhage. Although performing myomectomy during pregnancy is considered controversial, complications can be minimised with properly-planned surgery.

Introduction

Performing antenatal myomectomy remains controversial. Primary concerns include massive haemorrhage requiring blood transfusion, hysterectomy and foetal loss.

Uterine fibroid is usually asymptomatic. The surge in placental hormone resulting in an increase in fibroid size may complicate the pregnancy. There are possible risks of miscarriage, foetal growth restriction, preterm delivery and abnormal foetal presentation requiring operative delivery.¹ Foetal anomalies, namely limb deformities and contractures, may occur as a result of uterine fibroid.²

Fibroids-related complications happen in 5-8% of all pregnancies and conservative

management suffices in majority of cases.¹ Hyalinisation and red degeneration contribute to 50% of the complications, leading to intolerable pain.³ With adequate analgesia, most pregnancies have a favourable outcome. Myomectomy in selected cases is reported to be safe to mother and her foetus. Lelis et al reported only one case (out of 13) where a woman had a miscarriage without any complication of hysterectomy or massive bleeding.³ Justifying myomectomy remains contentious; doctors should take preventive steps to minimise complications that can lead to deleterious outcomes. Although uterine fibroid in pregnancy is not uncommon, there were no cases of antenatal myomectomy reported in our centre in the past five years. Detailed assessment at the primary care level is important to risk stratify and identify cases that will benefit from surgery.

Case Summary

A 38-year old woman, in her fourth pregnancy, presented at 15 weeks gestation, with an acute abdomen to a maternity unit in a district hospital in Makassar, Indonesia. She was diagnosed as having an anterior uterine fibroid measuring 10cm x 10cm at 9 weeks gestation. Although she experienced occasional abdominal pain, she had never sought medical attention. The pain became more persistent and severe at 10th week of gestation. It lasted until 15th week when she experienced intolerable and acute abdominal pain and developed fever.

Upon assessment, she was febrile but haemodynamically stable. The size of the uterus corresponded to 22 weeks gestation. Minimal abdominal examination was done due to tenderness. An ultrasound scan showed an intramural fibroid of 15x10 cm size and a viable foetus. Both ovaries appeared normal and there was no evidence of placental abruption. Her haemoglobin level was 13 g/dL, and the total white cell count and C-reactive protein was $15 \times 10^9/L$ and 2.1 mg/dL, respectively; this indicated possible inflammatory reaction. She was admitted for observation and treated with regular parenteral opioids and antibiotics for possible infection. As the pain was severe, the patient responded poorly to the medical treatment. Although myomectomy is invasive, it is an option to curb debilitating pain in degenerative fibroid. The couple were informed of the risk of bleeding requiring transfusion as well as possible hysterectomy and miscarriage.

Maylard incision was performed and a huge uterine fibroid at the anterior wall was confirmed. A Foleys catheter was used to occlude both uterine arteries after the broad ligaments were penetrated at its base using a clamp, avoiding the vascular area (Figure 1). The tie was released every eight minutes to allow perfusion to the viable foetus. The fibroid was enucleated using sharp dissection and the peripheral feeding vessels were occluded by “double stitches” suturing technique (Figure 2).



Figure 1.
Application of tourniquet at the base of broad ligament to occlude bilateral uterine arteries



Figure 2.
An intramural fibroid is being enucleated

Following removal of the single 10x10 cm intramural fibroid, the cavity was obliterated by interrupted sutures and the serosal layer was closed by “continuous baseball” sutures. Haemostasis was secured and the tie was released with estimated blood loss of 100ml. The red regeneration of leiomyomata was confirmed histologically. Tocolysis and administering progesterone were considered but due to limited resources, none was administered. Patient had an elective caesarean section at 38 weeks due to presence of previous myomectomy.

Discussion

Management of uterine fibroid in pregnancy, especially those showing degenerative changes, remains controversial as there are concerns of detrimental effects on maternal health jeopardising foetal viability and

growth. Generally, conservative management is recommended in uncomplicated cases. However, in symptomatic cases showing poor response to medical treatment, invasive procedure is an option.^{4,5} Myomectomy can be considered after comprehensive assessment and counselling to avoid untoward sequelae and risk of litigation.

Myomectomy is justified when there are degenerative changes of the fibroid in pregnancy causing intolerable pain. Heavy bleeding needing transfusion leading to risks of hysterectomy is a major concern in myomectomy procedure though this was not demonstrated in certain studies.^{2,5} This patient experienced persistent pain since nine weeks of pregnancy and it was associated with fever at 15 weeks which did not resolve with regular analgesia.

Injection of vasoconstrictor and Boley clamps application to the feeding vessels were found to be effective in minimising haemorrhage. The same principle was practiced in the current case by using a Foley's catheter to compress both uterine arteries at the base of the broad ligaments. Some medical practitioners recommended inclusion of the infundibulopelvic ligaments for fundal fibroid.^{6,7} However, another major concern was the reduction of foetal oxygenation if occlusion was prolonged. Even though, theoretically, there are collateral circulations following occlusion of the uterine supply, we were sceptical as the perfusion was less, leading to reduced bleeding during myomectomy in other cases.^{7,8} At present, there is no established consensus on this issue.

Traditionally, laparoscopic myomectomy in pregnancy is believed to be associated with foetal acidosis, foetal loss and bleeding. This could be due to carbon dioxide retention following pneumoperitoneum at surgery.⁸ However, this modality has become a trend with successful outcomes.⁹ A drastic improvement in learning curve may have contributed to its popularity. This treatment method was not applied in this case due to limited resources in this particular centre.

A meticulous surgery was performed to minimise haemorrhage, with double stitches suturing at the peripheral feeding vessels. Haemostasis was secured before closure and anti-adhesive gel was used to reduce adhesion. Although the endometrial lining was not encroached, an elective Caesarean section was performed at 38 weeks to prevent uterine rupture in labour.

Prostaglandin inhibitor namely, indomethacin, had been prophylactically used to prevent preterm labour as a conservative medical treatment in uterine fibroid; it works by relaxing myometrial tissues. However, a prolonged use especially in advanced pregnancy can lead to complications with premature closure of ductus arteriosus, and hence, not recommended.¹⁰ The use of this agent in post myomectomy has not produced conclusive results. As progesterone quiets the myometrial activity and prevents premature labour, its use is strongly recommended. A large meta-analysis significantly revealed a reduction of premature birth before 34 weeks in high-risk cases.¹¹ However, it was not prescribed in this case due to limited resources.

Conclusion

Complications of myomectomy during pregnancy can be avoided in optimised surgery. Risk-benefit assessment must be entirely evaluated to justify the surgical option, especially when conservative management has failed. Proper counselling on possible risks, comprehensive peri-operative preparations are mandatory to minimise possible litigation and untoward events.

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Vitamin B12 Deficiency Presenting as Pancytopenia in Pregnancy: A Case Report

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Vitamin B12 deficiency, pancytopenia, pregnancy

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Abstract

Vitamin B12 deficiency is a well-known cause of megaloblastic anaemia and pancytopenia. However, the incidence in pregnancy is rarely reported. We present a case of a 32-year old multigravid woman who was diagnosed with megaloblastic anaemia since 22 weeks gestation and progressed to develop severe pancytopenia at 30 weeks gestation. She was also diagnosed with vitamin B12 deficiency related to dietary and sociocultural habits. Folate and iron levels were normal throughout pregnancy. Treatment with parenteral cyano-cobalamin resulted in sustained improvement of haematological parameters. The pregnancy was carried to term and the baby was born weighing 2,050gm but otherwise well at birth and had normal developmental milestones thereafter. This case illustrates the clinical presentation of maternal vitamin B12 deficiency and demonstrates the importance of detecting and treating maternal vitamin B12 deficiency during pregnancy in at-risk patients. Failure to diagnose and institute treatment carries significant risks to both mother and child. Oral vitamin B12 supplementation should be considered for patients who are strict vegetarians or consume very little animal products.

Introduction

Pregnancy is associated with a steady and physiologic fall in serum vitamin B12 as well as red cell vitamin B12 with reports of mean serum vitamin B12 to be 300pg/ml in the first trimester, 250pg/ml in the second and 190pg/ml in the third trimester.¹ This physiologic fall is attributed to transfer of vitamin B12 to the foetus, hemodilution and changes in vitamin B12 binders (transcobalamin I). However, pregnancy alone is not the predisposing factor of vitamin B12 deficiency; other conditions such as pernicious anaemia, B12 malabsorption and nutritional deficiency attributed to a vegetarian diet need to be considered. Vitamin B12 deficiency commonly presents

with megaloblastic anaemia, and rarely, pancytopenia. The correlation between maternal and neonatal vitamin levels and corresponding neonatal homocysteine levels has been established. Vitamin B12 deficiency can potentially affect the pregnancy² depending on the severity of the deficiency; in severe cases, it can result in intrauterine death. Most effective treatment method is through administering parenteral vitamin B12. We report a case of a multigravida who presents with pancytopenia as a result of vitamin B12 deficiency.

Case Summary

A 32-year old gravida 8 para 7 was admitted at 31 weeks gestation with severe anaemia and

reduced effort tolerance. Her haemoglobin level was 6.4 g/dL. Patient was a small built lady who weighed 53 kg at 31 weeks gestation and is 152cm tall. She was pale requiring no other abnormalities were found after a thorough examination. The uterus size corresponded to her gestation period but the foetus was slightly below the 10th centile on the growth chart. There was no other evidence of foetal growth restriction at this stage and subsequent follow-ups showed normal foetal growth velocity.

She was diagnosed with mild anaemia (haemoglobin level of 10.0 g/dL) at 5 weeks gestation. Total white cell count was $5.6 \times 10^9/L$ and the platelet level was $168 \times 10^9/L$. No further investigation was conducted and she was given supplements in the form of oral ferrous fumarate 200mg daily, folate 5mg daily and vitamin B complex (1 mg vitamin B1, 1.5mg vitamin B2, 10mg vitamin B3). Despite being compliant to the above treatment, her haemoglobin level continued to decline. The MCV was high (>100 fl) at 22 weeks gestation indicating macrocytic anaemia. Her serum vitamin B12 was slightly low 160 pmol/L (normal 179-660 pmol/L) while serum folate, iron and ferritin were normal (serum ferritin 62.3 ng/mL, serum iron 49.1µg/dL, serum plasma folate 18.7 nmol/L). Full blood picture showed macrocytic red cells, moderate anisopoikilocytosis and reduced number of platelet ($120 \times 10^9/L$) without any clumping. The oral supplement was continued. At 30 weeks of pregnancy, she developed pancytopenia (haemoglobin 7.2 g/dl, total white cell count $2.9 \times 10^9/L$ and platelet $55 \times 10^9/L$) and the level of vitamin B12 dropped to 110 pmol/L. Her serum iron, ferritin and folate levels were normal. Plasma lactate dehydrogenase level was high at 2,476U/l (normal value of 313–618 U/l) but other laboratory results indicated normal liver and renal function. No auto-antibodies were present. Schilling test was not done in view of the pregnancy. The results of serial haematological parameters are shown in Figure 1.

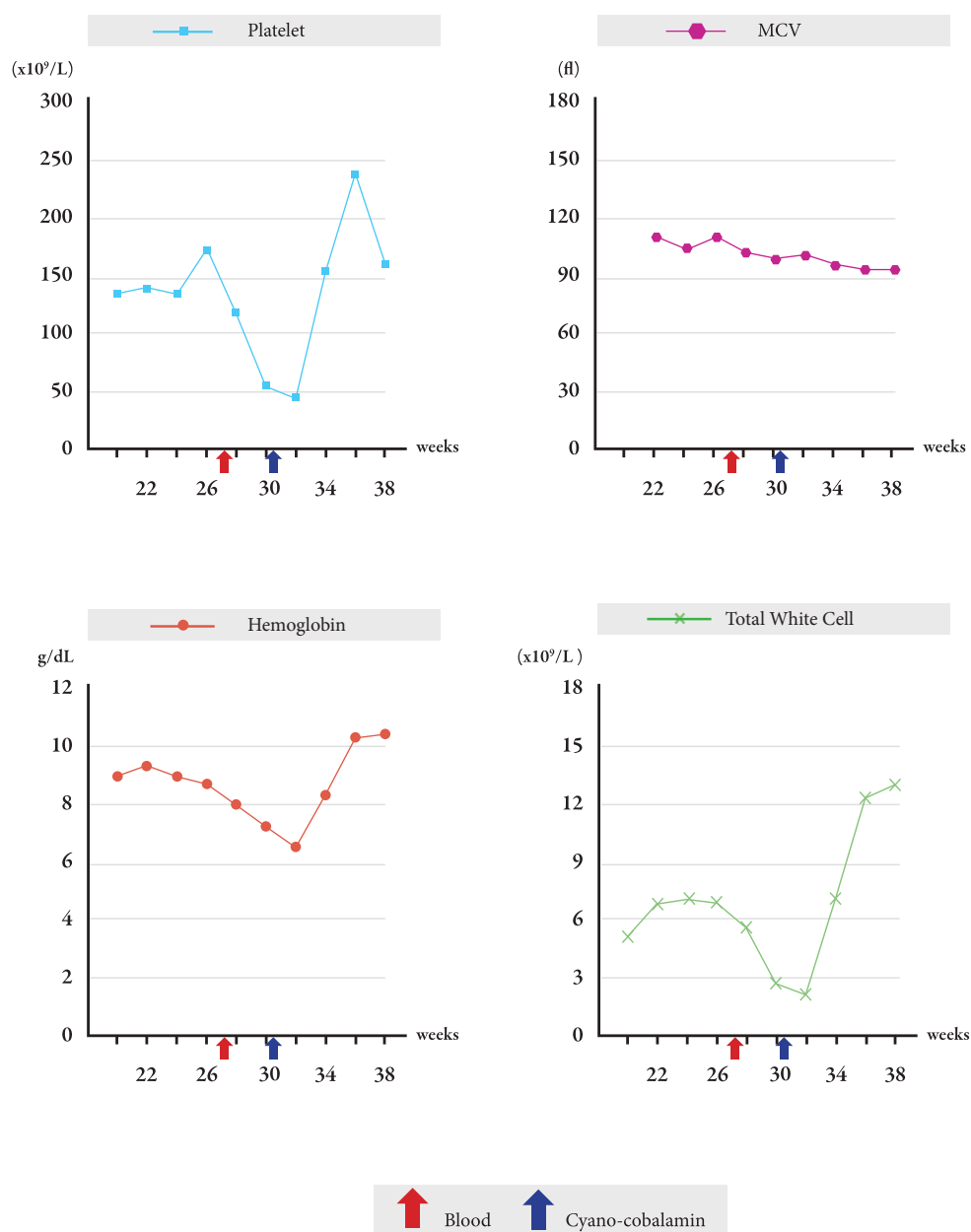
She was given two units of packed red cell in view of severe anaemia at 31 week of pregnancy. In view of worsening vitamin B12 deficiency despite oral supplements, 100µg of intramuscular cyano-cobalamin was given daily for one week followed by a weekly injection from 34 weeks onwards. Subsequently normalisation of white cell count, platelet count and MCV was seen and there was sustained improvement in the haemoglobin level.

The patient was not a vegetarian but had limited financial resources. She could only afford meat or chicken once weekly with small portions per serving. Her main diet consisted of bread, rice and green vegetables. She did not smoke, use recreational drug usage or consume alcohol. Her past medical history was unremarkable and she had never undergone any surgery. In her past pregnancies, she had been diagnosed with anaemia attributed to iron deficiency but there was no record of pancytopenia prior to this pregnancy. Between 1998 to 2006, she had seven pregnancies, six of which were delivered at term and the birth weights of the babies ranged between 1.55kg and 3.5kg. She delivered a 800g baby during her 5th pregnancy and the baby died on day 5 of life due to severe prematurity.

She went into spontaneous labour at 38 weeks gestation requiring an emergency caesarean section due to evidence of foetal distress. The baby weighed 2050g and was vigorous at birth with normal Apgar score. There was no clinical evidence of anaemia or other neonatal problems. At 6 months follow-up, the baby was well with no evidence of neurological sequelae and had normal developmental milestones.

Discussion

We presented a case of a multigravida who was diagnosed with pancytopenia secondary to vitamin B12 deficiency. She responded to parenteral vitamin B12 treatment and had a good pregnancy outcome. The diagnosis was made based on the demonstration of

Figure 1: Hematological parameters before and after treatment

megaloblastic changes in the peripheral blood, the presence of low serum vitamin B12 level and normal serum folate.

The cause of vitamin B12 deficiency in this patient is likely to be nutritional deficiency based on her dietary history and her haematological parameters. Although she was not a vegetarian,

there was minimal intake of animal products due to limited financial resources. Although pregnancy causes a reduction in serum vitamin B12 level, it alone does not cause vitamin B12 deficiency. Low levels of serum vitamin B12 have been documented among pregnant mothers in India who habitually took small portions of non-vegetarian foods

due to religious and socio-economic reasons.³ Another possible cause is mal-absorption of vitamin B12, which could be due to deficiency of intrinsic factor. Schilling test to investigate for mal-absorption is not performed in this patient due to pregnancy. Pernicious anaemia is rare in women of reproductive age group.

The effects of vitamin B12 deficiency in pregnancy depends largely on the severity of the deficiency. Most pregnancies proceed uneventfully but spontaneous abortion, intra-uterine death and low birth weight have been reported. There are reported cases of increased insulin resistance in the off-springs and infants who have low vitamin B12 levels at birth. The infants are also at risk of developmental defects and neurological damage.⁴⁻⁷ A list of potential complications related to B12 deficiency is shown in Box 1. Low birth weight and intra-partum foetal distress in this patient's newborn could be attributed to utero-placental insufficiency related to vitamin B12 deficiency; however, so far, the evidence supporting this is not consistent. In mothers who are deficient in vitamin B12 breast feeding may worsen the deficiency in the offspring. However, breastfeeding may still be encouraged among mothers of low socio-economic group as the benefits outweigh the risks. In this patient, since the vitamin B12 deficiency was diagnosed and treated prenatally, the infant is unlikely to suffer from the sequelae of vitamin B12 deficiency.

Box 1: Potential complications of vitamin B12 deficiency in pregnancy

- Spontaneous abortion
- Intra-uterine death
- Low birth weight infant
- Increased insulin resistance
- Developmental defects
- Neurological sequelae
- Intellectual impairment

Treatment of vitamin B12 deficiency in pregnancy is similar to that of non-pregnant patients. Generally, if there is no evidence of mal-absorption, oral B12 supplementation can be used. However, in this patient, parenteral vitamin B12 was used instead because the status of absorption could not be determined and it ensured better compliance to treatment compared with oral supplementation. An initial dosage of 100 to 1000ug initial dosage of 100 to 1000ug intramuscular injections can be given daily, on alternate days or weekly for 10 to 14 injections, followed by maintenance dose if needed. This patient showed improvement with the dose of 100ug daily for 7 days and weekly for subsequent weeks until delivery.

There is limited data on the prevalence of vitamin B12 deficiency in pregnancy. Most of the reported cases of vitamin B12 deficiency are among the Indian population and attributed to strict vegetarian diet or minimal non-vegetarian products in the diet. A comparative study done to determine the profile of vitamin B12 and folate status in Malaysians during 1987/88 and 1992/93 found an increasing prevalence of vitamin B12 deficiency compared with folate deficiency.⁸ Therefore, we recommend that pregnant and lactating women who are at risk of vitamin B12 deficiency to be given vitamin B12 oral supplementation in the dose of 2.6ug daily, as recommended by the World Health Organization.⁹

Conclusion

This case illustrates the clinical presentation of maternal vitamin B12 deficiency and demonstrates the importance of detecting and treating maternal vitamin B12 deficiency during pregnancy in at-risk patients. Failure to diagnose and institute treatment may carry significant risks to both mother and child. Oral vitamin B12 supplementation should be considered for patients who are strict vegetarians or consume little animal products in their diet.

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Ludwig's Angina: The Importance of Oral Cavity Examination in Patients with a Neck Mass

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Keywords

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Abstract:

Neck mass is a common condition in primary care. The most common affected area is the cervical lymph node. The neck region is also prone infection as structurally the nodes and spaces are in close contact with the upper respiratory tract and the alimentary tract. Oral cavity is one of the most common route for harbouring infection. Poor oral hygiene and periapical dental problems are the main causes. Thus, it is important to perform a complete oral cavity examination even when trismus is present. Besides dental caries, floor of the mouth should be inspected for oedema that may impose threat to the upper airway. We report a case of Ludwig's angina originating from a periapical lesion of the lower molar stressing the importance of oral examination in patient with neck mass.

Introduction

Ludwig's angina is defined as submandibular space cellulitis and it is characterised by a swelling at the submandibular region with concurrent elevation of the floor of the mouth and dental infection. It is a potentially fatal condition because the upper airway maybe comprised. It is more common in adults, though sporadic cases in paediatric group were reported.¹ Problems in the mandibular molars are identified as the most common source of infection. Clinical signs include woody-hard mass at the submandibular region. Airway observation can be treated by endotracheal intubation or surgical tracheostomy. Antibiotics improved mortality rate in patients with Ludwig Angina. Early diagnosis by the front-liners, such as the primary care doctors, is the most important step in managing Ludwig's angina.

Case summary

WNF, a 14-year old Malay girl, presented with

a three-day history of right submandibular swelling. She sought medical attention and was prescribed oral antibiotics. The swelling did not improve after three days of oral antibiotics. She experienced disturbed sleep because of the pain which was associated with limited mouth opening; however, there was no shortness of breath or change of voice. On further questioning, she had experienced recurrent episodes of tooth ache in which she never sought any dental treatment. In this recent episode, the neck swelling was preceded by 2-week history of tooth ache.

Clinical examination revealed a teenage girl with a right submandibular swelling. It measured 10cm x 7cm and had a woody-hard consistency. It was not fluctuant. The overlying skin was inflamed and the mass involved the submental triangle which crossed the opposite side. There was no other cervical lymphadenitis palpable.

Oral cavity examination revealed trismus with

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mouth opening limited to 2 finger-breadth. Floor of the mouth was oedematous. Dental hygiene was good except there was a tooth decay on the right lower molar. Percussion revealed tenderness over the tooth.

Orthopantomogram was obtained and showed the presence of dental caries at the right lower second molar near the pulp. There was a periapical lesion at the roots of the tooth.



Figure 1.
 Right submandibular diffuse mass crossing the midline

The diagnosis of Ludwig's angina was clinically established. She was admitted and started on intravenous cefuroxime 750mg TDS and metronidazole 500mg TDS. Chlorhexidine mouth wash was also prescribed. She was observed for any potential upper airway obstruction. After five days, the symptoms improved. Dental extraction of the right lower second molar was done and she was discharged. She was advised to continue with oral antibiotics for one week. Two weeks later, the patient had a follow-up visit at the outpatient clinic and was well without any residual symptoms.

Discussion

Ludwig's angina is a potentially life-threatening infection of the neck region. The inflammation



Figure 2.
 Examination of the oral cavity revealed trismus, raised floor of the mouth and positive tooth percussion on the right lower second molar



Figure 3.
 The right lower second molar (47) confirmed the dental caries and periapical lesions

occurs in the submandibular space causing oedema of the floor of the mouth. The tongue is at risk of being pushed upwards and posteriorly making the airway compromised. Mouth opening particularly the oral cavity and oropharynx, should be inspected. Floor of the mouth must always be checked for oedema which may cause a double-tongue appearance.

There is no specific guideline for the management of Ludwig's angina; the option include either conservative or surgical management.² Its management is largely dependent on clinical judgment of the patient at presentation and the clinician's experience in managing the problem. A complete oral cavity examination is warranted in order to establish the diagnosis and complications.

Dental infection is the most common source of cervical lymphadenopathy, leading to suppuration. Infection of the lower molar caries and periapical lesion can spread to

the adjacent submandibular space inducing cellulitis. History of dental ache, especially of the lower molar tooth, can be confirmed with panoramic view of the dental lesions by the orthopantomogram (OPG). In the absence of dental-related problem, clinically-suspected Ludwig's angina would justify a computed tomography because embedded foreign body in the upper neck soft tissue could mimic the condition.³

The patient must be admitted and broad spectrum antibiotics, which cover gram-positive, gram-negative, and anaerobes, should be instituted intravenously. The role of intravenous steroid is controversial as there is lack of evidence to show that it improves outcome.² In addition, the primary source of infection must be eradicated. In this case and most of other Ludwig angina cases, dental problems must be addressed through early referral to a dentist. Second and third permanent mandibular molars are usually seen in adults.¹ Thus, it is not uncommon to have Ludwig's angina initially seen and diagnosed by a dentist.

While dealing with the primary source of infection, the airway must be observed at all

times. Previously, tracheostomy was regarded as the treatment of choice for upper airway obstruction in Ludwig's angina. The airway should be secured by using nasal fiberoptic intubation as blind oral or nasotracheal intubation is contraindicated because of the risk of laryngospasm.⁴ With the advent of new antibiotics, the infection can be treated effectively without the need for an artificial airway.

Conclusion

In conclusion, Ludwig's angina should be suspected whenever a patient presents with submandibular swelling with oedema at the floor of mouth. Presence of trismus does not preclude a complete oral examination. Postive dental percussion especially at the mandibular molars, indicating the origin of the infection. At the initial stage, the oral cavity signs may not be prominent. Thus, the patient with submandibular swelling who is being treated as an outpatient must be closely monitored for signs of Ludwig's angina.

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