

Research Article

Health-Related Quality of Life (HRQoL) in Co-Morbid Tuberculosis Relapse Patient: A Case Report from Malaysia

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Abstract

Purpose: To describe changes in HRQoL of pulmonary tuberculosis (PTB) patient and illustrate impact of malnutrition and Type II diabetes on relapse of PTB.

Case: A Chinese male patient with complaints of productive cough, and loss of weight and appetite was registered; sputum smear confirmed that patient had PTB. Diagnosis was also supported by routine investigations. Patient had past history of PTB and Type II diabetes mellitus. For management of secondary tuberculosis, he was prescribed WHO recommended therapy. Elevated HbA1c levels and history of drop-off serum albumin concentration at the start of treatment demonstrated inappropriate glycaemic control and malnutrition over the past months. SF-36v2 was used to estimate HRQoL scores at start, after two months and at the end of TB therapy. Although patient's perception of mental and physical health improved with progress of treatment, vitality (VT), social functioning (SF) and role emotion (RE) scores were still lower than Malaysian norms. Patient was declared 'cured' but state of 'health' as defined by WHO was not achieved.

Conclusion: Relapse of PTB might be a consequence of inappropriate glycaemic control and malnutrition. This case report demonstrates the need for more comprehensive efforts at TB programs to improve HRQoL of TB patients.

Keywords: Health-Related Quality of Life, Pulmonary tuberculosis, Malnutrition, Type II diabetes, SF 36v2

Received: 10 August 2011

Revised accepted: 2 July 2012

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INTRODUCTION

Tuberculosis (TB) is a public health tragedy with an annual incidence rate of around 9 million cases worldwide. TB treatment is quite difficult for patients and providers because of the chronic nature of the disease. DOTS (Directly observed treatment short course) strategy was adopted in the mid-1990s as a basis of tuberculosis control. In this strategy, isoniazid (H), pyrazinamide (Z), rifampicin (R), ethambutol (E), streptomycin (S) are recommended as first-line treatment [1]. Outcome of tuberculosis treatment is reported on the basis of categories (Table 1) developed and recommended by a working group of WHO and International Union against Tuberculosis and Lung Disease (IUATLD) [1].

Relapse of tuberculosis is a situation whereby a patient becomes and remains culture-negative while receiving anti-tuberculosis drugs but develops active tuberculosis again after completion of treatment [2]. Chang *et al* [3] reported diabetes as one of the significant risk factors for pulmonary tuberculosis relapse.

Health Related Quality of Life (HRQoL) can be defined as person's perception of his or her physical or mental health. It covers broad domains including physical, psychological, economic, spiritual and social wellbeing [4].

SF-36 is a generic HRQoL questionnaire and consists of 36 items covering 8 dimensions (sub-scales): Physical function (PF), Role physical (RP), Bodily pain (BP), General health (GH), Vitality (VT), Social function (SF), Role emotional (RE) and Mental health (MH). Each dimension scores from 0 to 100 (with 100 being the best score and 0 the worst). The scales can be aggregated to two summary measures Physical Component Summary (PCS) and Mental Component Summary (MCS) [5]. SF-36 is a reliable and valid tool to assess HRQoL both in non-clinical and diseased population [5].

We discuss in this report a relapse case of pulmonary tuberculosis. Patient was diabetic for the preceding ten years. Glycaemic control of patient was poor. HRQoL was assessed at three different time points (start of therapy, at the end of intensive phase and at the end of treatment) using a licensed SF-36v2 questionnaire.

Table 1: Tuberculosis treatment outcome categories according to WHO and IUATLD recommendations

Outcome	Definition
Cure	A patient whose sputum smear or culture was positive at the beginning of the treatment but who was smear- or culture-negative in the last month of treatment and on at least one previous occasion.
Treatment completed	A patient who completed treatment but who does not have a negative sputum smear or culture result in the last month of treatment and on at least one previous occasion.
Treatment failure	A patient whose sputum smear or culture is positive at 5 months or later during treatment. Also included in this definition are patients found to harbor a multidrug-resistant (MDR) strain at any point of time during the treatment, whether they are smear-negative or -positive.
Died	A patient who dies for any reason during the course of treatment.
Default	A patient whose treatment was interrupted for 2 consecutive months or more.
Transfer out	A patient who has been transferred to another recording and reporting unit and whose treatment outcome is unknown.

Table 2: Health Related Quality of Life (HRQoL) scores at three different time points of TB treatment

Time point	PF	RP	BP	GH	VT	SF	RE	MH	PCS	MCS
Start of treatment	40	50	31	40	38	50	58	40	36	36
After 2 months of treatment	80	81	62	62	56	63	92	75	47	49
End of treatment	80	86	74	62	63	75	75	70	51	46

CASE DESCRIPTION

A 58 year old Chinese male patient (weighing 54 kg) visited a primary health care unit with complaints of productive cough, and loss of weight and appetite for more than one month. He was referred to a chest clinic, where his sputum smear was found to be positive (S +1, 1-9 acid fast bacilli/100 fields) for acid fast bacilli (AFB). Chest radiograph showed bilateral apical pleural thickening and right middle zone consolidation. Erythrocyte sedimentation rate (ESR) of patient was elevated to 80 mm/h. Albumin concentration was 30 g/L. He had a past history of pulmonary tuberculosis (PTB) for which he was treated for 9 months and declared cured. Ten years earlier, he was diagnosed with Type II diabetes for which he was placed on gliclazide (160 mg) and metformin (1 g) tablets, 2 times a day. At the time of registration as a relapse TB patient, his fasting blood glucose and HbA1c levels were 10.7 mmol/L and 12.9 %, respectively. With all these findings, he was diagnosed as sputum smear confirmed case of pulmonary tuberculosis. Drugs prescribed for intensive phase (IP) of TB treatment were isoniazid (225 mg), rifampicin (450 mg), pyrazinamide (1200 mg), ethambutol (825 mg) (in fixed dose combination) and vitamin B6 (10 mg), administered once a day for two months at a primary health care unit. Culture and sensitivity results confirmed absence of resistant *Mycobacterium* strains to standard quadruple chemotherapy.

After two months of IP treatment, patient's sputum was negative for AFB and his cough was completely resolved. He also gained 1 kg of weight. Chest x-ray showed haziness in the middle zone of right lung. No data on

ESR, albumin concentration and fasting blood glucose were available. At this moment, patient's therapy was converted to continuation phase (CP) for which he was prescribed isoniazid (250 mg), rifampicin (600 mg) and vitamin B6 (10 mg) daily for 7 months at the primary health care unit. Haziness in the middle zone of right lung was resolved after 4 months of continuation phase. At the closing stage of therapy (9 months), patient was unable to produce sputum; therefore, sputum smear examination for AFB was not done. However, his fasting blood glucose was 11.9 mmol/L, which is well above the acceptable limit.

Table 2 shows HRQoL scores. Patient was asked to fill a self-administered SF-36v2 questionnaire (Mandarin version) at three different time points. Obtained responses were entered in scoring software version 4 provided by Quality Metric, Inc.

DISCUSSION

Incidence and exacerbation of TB are positively associated with malnutrition and diabetes. Malnutrition and diabetes mellitus can render the immune system more vulnerable to invading microorganisms such as *Mycobacterium tuberculosis*. Wang *et al* [6] reported that in hyperglycemia, alveolar macrophages have less H₂O₂ (hydrogen peroxide) and are less activated. Diabetes also affects chemotaxis of monocytes and antigen presentation by phagocytes in response to *Mycobacterium tuberculosis*. Past medical history of patient was suggestive of poor glycaemic control and decreased albumin concentration. After relapse, his fasting blood glucose levels at start and end of TB therapy were still

uncontrolled. At the time of registration, elevated HbA1c (12.9 %) suggested poor glycaemic control over the past months.

One of the major factors for poor glycaemic control during TB treatment is drug interaction between rifampicin and the sulfonyleureas. Rifampicin is an inducer of cytochrome P450 enzyme that decreases sulfonyleurea serum concentrations [7]. Rifampicin can also cause early-phase hyperglycemia with associated hyperinsulinaemia. These effects of rifampicin on glycaemic control require careful monitoring with appropriate dose adjustment of anti-diabetic agents.

In the present case, SF-36v2 scores at the start of therapy were lower than reported by Azman *et al* [8] for Malaysian normal population. This finding is consistent with previously reported studies stating that HRQoL is adversely affected in chronic illness such as TB [9]. At the end of IP (after 2 months), improvement in HRQoL scores had been observed which was attributed to improvement in clinical signs and symptoms. However, BP, VT and SF scales were still below Malaysian norms suggesting that the patient was still experiencing body pain, had difficulty in performing routine activities with minimal participation in social activities. Body pain and difficulty in performing routine activities might be a consequence of hyperglycemia and malnutrition status. At this stage, PCS and MCS scores were also less than United States 1998 norms. At the end of TB treatment, SF-36v2 scores showed improvement but VT, SF and RE were still below Malaysian norms. PCS scores at the end of therapy were slightly above US norms but MCS scores demonstrated negative emotions. These negative emotions might be due to perceived stigma and lack of tuberculosis knowledge [10]. WHO defines "health" as a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity [11]. In the present case, although there is evidence that

disease was cured but a state of "health" was not achieved.

CONCLUSION

Relapse of pulmonary tuberculosis might be due to poor glycaemic control and malnutrition. There is a strong need to document diabetes monitoring parameters in medical records of TB patients so that their therapies can be tailored according to their clinical conditions. Establishment of TB-diabetes clinic can give more promising results in achieving successful treatment outcome of co-morbid TB patients. This case report demonstrates the need for more comprehensive efforts of TB programs to improve HRQoL of TB patients. Besides providing the prescribed treatment, DOTS providers and health managers should identify and address emotional, physical and societal impact of tuberculosis. SF 36v2 can be used to monitor the progress of treatment from the patient's perspective.

ETHICAL APPROVAL

Ethical approval was obtained from Ministry of Health, Malaysia (ref. dim. KKM/NIHSEC/08/08/04P10-69).

COMPETING INTEREST

Authors declare that they have no competing interest.

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