SHORT COMMUNICATION

Screening for tuberculosis and LTBI in diabetes patients, Pohnpei, Federated States of Micronesia

R. R. Defang,¹ R. Brostrom,^{2,3} S. Ram,⁴ E. Johnson,¹ P. S. Perman¹<http://dx.doi.org/10.5588/pha.13.0081>

A retrospective cohort study was performed in Pohnpei, a small Pacific Island, to evaluate the feasibility and results of screening adult diabetes (DM) patients for tuberculosis (TB) and latent tuberculous infection (LTBI) using a symptom screen, tuberculin skin testing and chest radiography. Of 79 patients, 65 (82%) completed screening. Two (3%) patients with active TB and 16 (25%) with LTBI were referred for anti-tuberculosis treatment and isoniazid preventive therapy, respectively. It is feasible and worthwhile to screen diabetes patients for TB, but a number of changes are needed to improve both the screening process and the diagnostic yield.

Diabetes mellitus (DM) increases the risk of active tuberculosis (TB),¹ complicates anti-tuberculosis treatment with delayed sputum conversion, increases death or failure of treatment and increases rates of recurrent TB after successful completion of treatment.² The interaction between these two diseases is important in the Pacific Islands. Recent data show that the Federated States of Micronesia (FSM) has one of the highest TB rates in the Pacific (160 cases per 100 000 population in 2010),³ and that a high additional burden of type 2 DM was identified in a survey in 2002, indicating an adult prevalence of 32%.⁴

In line with new regional TB-DM standards,³ the Pohnpei State or National TB Programme (NTP) guidelines recommend screening patients in DM clinics for TB and latent tuberculous infection (LTBI). Pohnpei has a population of 34 000 and is one of four island states in FSM. Pohnpei has a central DM clinic and 10 peripheral health centres, where DM care is provided on a weekly basis.

The present study was conducted in the central DM clinic to assess preliminary findings of screening for TB in adults presenting for routine DM care in Pohnpei. Specific objectives were to describe the process of integrating TB screening in the DM clinic and to report on initial results.

ASPECT OF INTEREST

This was a retrospective evaluation of the implementation of new TB screening procedures as part of routine DM care in Pohnpei. At each weekly DM clinic, TB nursing staff joined DM staff to record weight, fasting blood glucose and blood pressure. Patients were interviewed about TB symptoms (cough ≥ 3 weeks, fever,

night sweats, blood in sputum, anorexia and weight loss) and a tuberculin skin test (TST) was administered. Individuals with a previous positive TST or who had undergone a TST in the past year were screened for symptoms but not with TST. TSTs were read by TB clinic staff after 48–72 h and the results were recorded in the DM clinic logbook. Patients with a positive TST or positive symptom screen underwent a chest radiograph (CXR), and sputum specimens were collected for smear microscopy for acid-fast bacilli if the CXR was abnormal.

Patients with no symptoms, a positive TST and normal CXR were diagnosed as LTBI and started on self-administered isoniazid preventive therapy for 9 months (IPT). Patients diagnosed with active TB were referred to the Pohnpei NTP and treated under the DOTS strategy using the standard World Health Organization (WHO) four-drug regimen (2HRZE/4HR).⁵ IPT and anti-tuberculosis treatment were provided free of charge.

Adults with DM who attended the clinic between July and December 2011 were included in the study. Data variables were collected from TB and diabetes registers in a paper-based proforma and single-entered into a spreadsheet, verified and corrected by chart review and transferred to EpiData (version 3.1, EpiData Association, Odense, Denmark) for analysis.

The study was approved by the Ethics Advisory Group (EAG) of the International Union Against Tuberculosis and Lung Disease, Paris, France, and the FSM Secretary of Health, Pohnpei, FSM.

No patients reported TB symptoms during the screening process. Of the 79 adults with diabetes who were screened for TB and LTBI (Table), 65 (82%) completed TB screening; two (3%) had active TB: a patient who was already receiving anti-tuberculosis treatment at the time of screening and a patient with newly diagnosed pulmonary and extra-pulmonary TB who was referred for anti-tuberculosis treatment. Sixteen (25%) patients with LTBI were started on IPT. A further six persons with no symptoms, a positive TST but no CXR were also started on IPT.

DISCUSSION

This is the first report from the FSM on integrated screening for TB and LTBI in patients with DM in a

*H = isoniazid; R = rifampicin; Z = pyrazinamide; E = ethambutol. Numbers before the letters indicate the duration in months of the phase of treatment.

AFFILIATIONS

1 Pohnpei State Department of Health Services, Kolonia, Pohnpei, Federated States of Micronesia

2 Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, Georgia, USA

3 TB Branch, Hawaii Department of Health, Honolulu, Hawaii, USA

4 Fiji National University, Suva, Fiji

CORRESPONDENCE

Rupihner Defang
Pohnpei Tuberculosis Control Programme
Pohnpei State Department of Health Services
Kolonia, Pohnpei
Federated States of Micronesia 96978
Tel: (+691) 320 6489
Fax: (+691) 320 8382 e-mail: rdefang@gmail.com

KEY WORDS

diabetes mellitus; tuberculosis; bi-directional screening; Pacific Islands

Received 7 September 2013
Accepted 25 February 2014

PHA2014;4(2):S53–S55
© 2014 The Union

TABLE Screening for TB and LTBI in patients with diabetes in Pohnpei, Federated States of Micronesia, 2011

Screening process	n (%)
All patients screened for TB and LTBI	79
Patients who did not complete the screening process	14 (18)
Did not complete TST	8
Completed TST, but did not undergo chest radiograph	6
Patients who completed the screening process	65 (82)
Patients with TB symptoms	0
Active TB already diagnosed and being treated at screening	1
New case of active TB	1
New case of LTBI	16
Normal	47

TB = tuberculosis; LTBI = latent tuberculous infection; TST = tuberculin skin test.

routine setting. In general, the screening process worked well, although a small proportion of patients (<20%) with no symptoms failed to complete TST or undergo CXR. Despite the small numbers of patients screened, two active TB cases were identified, one as a result of our active case finding approach and the other who had recently been diagnosed by the NTP. More than a quarter of the patients were found to have LTBI. All patients with TB or LTBI were referred for anti-tuberculosis treatment or IPT.

International recommendations call for bi-directional screening for DM and TB.⁶ Previous reports from routine settings in Asia or Africa have shown that it is more challenging to screen for TB in DM clinics than to screen for DM in TB clinics,⁷⁻⁹ and our own small study in Pohnpei confirms this. It is unclear whether IPT has a useful role in preventing TB in high-risk groups such as DM patients. Two uncontrolled studies conducted over 40 years ago showed a beneficial effect of IPT among DM patients,¹⁰ but stronger and more robust evidence is needed. The practice of starting IPT in persons with no CXR, as was done here with six patients, is not recommended in the current NTP guidelines and must be addressed.

Of note, this effort required no additional programme funds, as all activities were performed as part of routine care. Furthermore, NTP nurses have received DM training every year for the last 5 years.

The strengths of this study are that it was conducted in a routine setting, which allowed a critical evaluation of a feasible methodology to accomplish screening for TB in a DM clinic in Pohnpei, and that patients were evaluated by a single provider in a standardised fashion. Study limitations include incomplete inclusion of all patients with DM receiving care in Pohnpei, as patients were not screened when the TB nurse was away. Some patients refused TB screening, and we have no data on those who were not screened.

CONCLUSION

Our study shows that it is feasible and worthwhile to screen DM patients for TB and LTBI in Pohnpei. However, a number of improvements are necessary. There must be better recording of DM patients, with the ultimate aim being to screen all patients attending the clinic; and more attention should be paid to ensuring that all patients undergo TST and CXR. Cross-training for other TB and DM nurses will be required to improve capture and sustainability. This experience shows that TB screening in DM clinics will be essential to improve the detection of TB in FSM.

References

- 1 Jeon C Y, Murray M B. Diabetes mellitus increases the risk of active tuberculosis: a systematic review of 13 observational studies. *PLOS MED* 2008; 5: e152. Review.
- 2 Baker M A, Harries A D, Jeon C Y. The impact of diabetes on tuberculosis treatment outcomes: a systematic review. *BMC Med* 2011; 9: 81.
- 3 Curry International Tuberculosis Center. USAPI Standards for the management of tuberculosis and diabetes, 2010. Oakland, CA, USA: Curry International, 2010. http://www.currytbcenter.ucsf.edu/about/tb/TB_DM_USAPI_Standards_document_12_01_2010.pdf Accessed February 2014.
- 4 World Health Organization Western Pacific Region. Federate States of Micronesia (Pohnpei). NCD risk factors: STEPS report. Suva, Fiji: WHO WPR, 2008. http://www.who.int/chp/steps/STEPS_Report_Micronesia.pdf Accessed February 2014.
- 5 World Health Organization. Treatment of tuberculosis: guidelines. 4th ed. WHO/HTM/TB/2009.420. Geneva, Switzerland: WHO, 2010.
- 6 World Health Organization & International Union Against Tuberculosis and Lung Disease. Collaborative framework for care and control of tuberculosis and diabetes. WHO/HTM/TB/2011.15. Geneva, Switzerland: WHO, 2011.
- 7 Lin Y, Li L, Mi F, et al. Screening of patients with diabetes mellitus for tuberculosis in China. *Trop Med Int Health* 2012; 17: 1302-1308.
- 8 India Diabetes Mellitus-Tuberculosis Study Group. Screening of patients with diabetes mellitus for tuberculosis in India. *Trop Med Int Health* 2013; 18: 646-654.
- 9 Feleke Y, Abdulkadir J, Aderaye G. Prevalence and clinical features of tuberculosis in Ethiopian diabetic patients. *East Afr Med J* 1999; 76: 361-364.
- 10 Stevenson C R, Critchley J A, Forouhi N G, et al. Diabetes and the risk of tuberculosis: a neglected threat to public health. *Chronic Illn* 2007; 3: 228-245.

ACKNOWLEDGEMENTS

This research was supported through an operational research course that was jointly developed by the Centre for Operational Research, International Union Against Tuberculosis and Lung Disease, Paris, France (The Union) and Médecins Sans Frontières, Brussels-Luxembourg, and run in the South Pacific by The Union and the Public Health Division of the Secretariat of the Pacific Community, Nouméa, New Caledonia. Additional support for running the course was provided by the School of Population Health, The University of Auckland, Auckland, New Zealand; the College of Medicine, Nursing and Health Sciences, Fiji National University, Suva, Fiji; the Division of TB Elimination, Centers for Disease Control and Prevention, Atlanta, GA, USA; Regional Public Health, Hutt Valley District Health Board, Lower Hutt, New Zealand; the National TB Programme, Fiji Ministry of Health, Suva, Fiji; the Sydney Emerging Infections and Biosecurity Institute, The University of Sydney, Sydney, NSW, Australia and the Dunedin School of Medicine, The University of Otago, Dunedin, New Zealand. Funding for the course was provided by the Global Fund to Fight AIDS, TB and Malaria, Geneva, Switzerland; the World Diabetes Foundation, Gentofte, Denmark; and the Australian Agency for International Development, Canberra, ACT, Australia. Conflict of interest: none declared.

Une étude rétrospective de cohorte a été réalisée à Pohnpei, un petit îlot du Pacifique, afin d'évaluer la faisabilité et les résultats du dépistage de patients adultes avec une diabète (DM) à la recherche d'une tuberculose (TB) ou d'une infection tuberculeuse latente (LTBI) grâce à un arbre de décision basé sur les symptômes, sur un test cutané à la tuberculine et sur une radiographie pulmonaire. Parmi 79 patients, 65 (82%) ont achevé le dépistage.

Deux (3%) patients avaient une TB active et 16 (25%), une LTBI ; ces patients ont été référés pour traitement de TB ou traitement préventif par isoniazide, respectivement. Il est donc faisable et utile de dépister les patients DM à la recherche d'une TB, mais la procédure de dépistage doit être améliorée grâce à différentes modifications afin d'obtenir de meilleurs résultats en termes de diagnostic.

En Pohnpei, una pequeña isla del Pacífico, se llevó a cabo un estudio retrospectivo de cohortes con el propósito de evaluar la factibilidad y los resultados de una detección sistemática de la enfermedad tuberculosa y la infección tuberculosa latente (LTBI) en los pacientes adultos con diagnóstico de diabetes (DM), mediante un cuestionario de síntomas, la prueba cutánea de la tuberculina y la radiografía de tórax. Se incluyeron 79 pacientes, de los cuales 65 completaron el plan de detección (82%). Se estableció el diagnóstico de tuberculosis

(TB) activa en dos pacientes (3%), en 16 pacientes el de LTBI (25%) y los pacientes se remitieron a fin de suministrarles el tratamiento antituberculoso y el tratamiento preventivo con isoniazida, respectivamente. Se demostró que es factible y útil practicar la detección de la TB en los pacientes con DM, pero es preciso establecer una serie de modificaciones con el fin de mejorar el mecanismo de detección sistemática y aumentar el rendimiento diagnóstico.