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Prevalence of hypothyroidism among MDR-TB patients in Botswana

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Multidrug-resistant tuberculosis (MDR-TB) is a growing problem worldwide. Hypothyroidism is a known complication of treatment with para-aminosalicylic acid (PAS), ethionamide (ETH) or prothionamide (PTH), all of which are typically included in treatment of MDR-TB.[1–4] Although hypothyroidism is known to be associated with MDR-TB treatment, the magnitude of the problem remains unclear. A recent study published by Satti et al. reported a hypothyroid-ism prevalence of 69% in a cohort of 186 patients in Lesotho.[5] As this is higher than the prevalence reported in most other cohorts, the authors left the question open as to whether this was a unique phenomenon of their cohort or whether their findings could indicate an underreported problem. Here, we report our experience with regard to hypothyroidism among patients treated for MDR-TB in Botswana.

We have been prospectively following all MDR-TB patients in Botswana since January 2007. For the purpose of this report, we used the definition of hypothyroidism used by Satti et al., i.e., thyroid stimulating hormone (TSH) > 10.0 μIU/l.[5] Screening for hypothyroidism among patients on MDR-TB treatment is recommended by national guidelines, but thyroid function tests are ordered at the discretion of the managing clinician. Of 452 patients included in the analysis, 213 (47.1%) had their TSH levels checked at some point in their treatment: 73 (16.2% of the cohort and 34.3% of those with TSH levels checked) were found to have evidence of hypothyroidism. The median time from initiation of MDR-TB treatment to hypothyroidism was 260 days (range 132–365). Other characteristics of the cohort are shown in the Table.

We conducted multivariate logistic regression to identify potential factors associated with the development of hypothyroidism, an independent analysis of the entire cohort and an analysis of those patients who had their TSH levels checked. The model included sex, age, human immunodeficiency virus (HIV) status, use of PAS, ETH, time on treatment, culture conversion at 6 months and outcome. As PTH is not available in Botswana, none of the patients were receiving this drug. Male sex was the only variable associated with the development of hypothyroidism (adjusted odds ratio 2.5, 95% confidence interval 1.4–4.4).

Our MDR-TB cohort is one of the largest to be studied prospectively for hypothyroidism. Our results support the findings reported by Satti et al., and suggest that hypothyroidism may be an important, yet under recognised problem among patients being treated for MDR-TB.[5] To our knowledge, the association between male sex and the development of hypothyroidism on MDR-TB treatment has not been reported previously. The reason for this association is unclear, and may be related to methodological issues intrinsic to the design of the study. Nevertheless, our experience, together with that of other authors, highlights the need for better designed prospective studies.

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References

1. Drucker D, Eggo MC, Salit IE, Burrow GN. Ethionamide induced goitrous hypothyroidism. Ann Intern Med. 1984; 100:837–839. [PubMed: 6721300]
2. Furin JJ, Mitnick CD, Shin SS, et al. Occurrence of serious adverse effects in patients receiving community-based therapy for multidrug-resistant tuberculosis. Int J Tuberc Lung Dis. 2001; 5:648–655. [PubMed: 11467371]
3. Nathanson E, Gupta R, Huamani P, et al. Adverse events in the treatment of multidrug-resistant tuberculosis: results from the DOTS-Plus initiative. Int J Tuberc Lung Dis. 2004; 8:1382–1384. [PubMed: 15581210]
4. Thee S, Zöllner EW, Willemse M, Hesseling AC, Magdorf K, Schaaf HS. Abnormal thyroid function tests in children on ethionamide treatment. Int J Tuberc Lung Dis. 2011; 15:1191–1193. [PubMed: 21943844]
5. Satti H, Mafukidze A, Jooste PL, McLaughlin MM, Farmer PE, Seung KJ. High rate of hypothyroidism among patients treated for multidrug-resistant tuberculosis in Lesotho. Int J Tuberc Lung Dis. 2012; 16:468–472. [PubMed: 22326109]

Table

Clinical characteristics of MDR-TB patients: screening for and diagnosis of hypothyroidism

	All patients (*n* = 452) median [IQR] or *n* (%)	**Patients with TSH levels checked (*n* = 213) median [IQR] or *n* (%)**	**Patients diagnosed with hypothyroidism (*n* = 73) median [IQR] or *n* (%)**
Age, years	37 [28–48]	38 [28–48]	40 [28–49]
Male sex	249 (55.1)	140 (65.7)	53 (72.6)
On PAS	33 (7.3)	16 (7.5)	5 (6.8)
On ETH	85 (18.8)	49 (23.0)	14 (19.2)
HIV-infected	289 (63.4)	135 (63.4)	49 (67.1)
CD4 cells/mm^3	240 [129–372]	241 [126–413]	239 [138–370]
On ART	269 (93.1)	130 (96.3)	47 (95.9)

MDR-TB = multidrug-resistant tuberculosis; TSH = thyroid stimulating hormone; IQR = interquartile range; PAS = para-aminosalicylic acid; ETH = ethionamide; HIV = human immunodeficiency virus; ART = antiretroviral therapy.