

Diamantis Kofteridis  
Elpis Mantadakis  
Athanasia Christidou  
George Samonis\*  
The University of Crete,  
Division of Medicine,  
PO Box 2208, 710 03 Heraklion,  
Crete, Greece

\*Corresponding author. Tel.: +30 2810 392426;  
fax: +30 2810 392802  
E-mail address: [georgsec@med.uoc.gr](mailto:georgsec@med.uoc.gr) (G. Samonis)  
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The Netherlands

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## Differences in characteristics between Afghani and Iranian patients with pulmonary tuberculosis

Tuberculosis (TB) imposes a heavy burden on the public health system of nations, especially in an unstable political environment such as Afghanistan. With a refugee population of 2.1 million, Afghanistan is the largest country of origin for refugees under United Nations High Commissioner for Refugees (UNHCR) care. Additionally, Afghanistan has one of the highest TB prevalence rates in the world (333 per 100 000).<sup>1</sup>

Due to a dearth of information on the characteristics of Afghani TB patients in the world, there is no accurate planning for detection and prevention of active disease and latent infection among this patient group. Accordingly, we sought to investigate the characteristics of Afghani refugees with TB and compare them with those of native Iranian TB patients.

This study was conducted in a tertiary TB center in Iran. All Iranian (i.e., patient and parents were born in Iran) and Afghani (i.e., patient and parents were born in Afghanistan) patients with culture-confirmed TB who were hospitalized in Masih Daneshvari Hospital from June 2003 through September 2004 were included in the study. Epidemiologic, clinical, and laboratory data were collected by trained healthcare staff using a standardized questionnaire. The total number of TB patients in the study was 640, including 476 (74%) Iranian patients and 164 (26%) Afghani patients. The male:female ratio was 356:284.

There were significant differences between Iranian and Afghani TB patients in terms of patient age, income, time interval from the first appearance of clinical manifestations to the first visit to the physician (patient delay), time interval from the patient's first visit to the physician to the final diagnosis (system delay), weight, number of persons per room at home, history of illicit drug use, and alcohol consumption (Table 1). There were also significant differences between the two groups of TB patients with regard to the presence of cough and fever (91.4% and 85.4% ( $p = 0.029$ ) and 71.1% and 81.7% ( $p = 0.008$ ) in Iranian and Afghani patients, respectively). Finally, significant differences were noted between Iranian and Afghani TB patients in terms of sputum smear positivity, presence of BCG scar, and multiply drug-resistant TB (MDR-TB), but there were no differences in frequency of cavitory lesions seen on chest X-ray.

Our analysis indicates that Afghani patients were younger than Iranian patients ( $p < 0.0001$ ), and this may indicate the high rate of TB incidence and transmission and/or poor TB control measures during previous years in Afghanistan. This finding is consistent with an earlier study among immigrants in Canada.<sup>2</sup> In this study, as in ours, there was no significant difference between the two groups with regard to gender. However, others have reported a gender difference that may be explained by underdiagnosis or underreporting of TB or differences in transmission dynamics in female patients.<sup>3,4</sup>

Afghani patients had lower socioeconomic status and higher number of persons per household compared to Iranian TB patients, which probably demonstrates the relationship between TB and poverty.<sup>5</sup> Both patient and system delays were significantly longer in Afghani patients, which may relate to differences in patient knowledge of TB and access to medical facilities in these two populations.

The prevalence of cough was significantly higher among Iranian patients, whereas fever and night sweats were more frequently seen in Afghani subjects. It has been shown that the prevalence of fever and night sweats is higher in young adults compared to elderly populations,<sup>6</sup> and this may be explained by our younger Afghani population.

A BCG scar was detected more often in Iranian patients. The rate of smear positivity ( $>+3$ ) was significantly higher in Afghani patients, which could be due to more advanced disease, perhaps related to longer patient and system delays. A higher proportion of Afghani patients also had more frequent MDR-TB. This might be explained by the presence of more resistant strains of *Mycobacterium tuberculosis*, such as the W-strain, among Afghani patients, or the result of more frequent treatment interruptions in non-adherent refugee patients. A study in the USA showed that immigrant patients were more likely to be resistant to at least one drug than non-immigrant Americans.<sup>7</sup>

In summary, most of the contrasting epidemiologic features of Afghani and Iranian patients with TB seem to relate to the lower socioeconomic status of Afghanis, both inside their home country and while living in Iran, and/or to the higher TB prevalence inside Afghanistan (including MDR-TB). The distinct epidemiologic features of the Iranian TB patients (including the higher incidence of HIV/AIDS) can be explained by lifestyle differences within a more affluent population. Our results should encourage health policy-makers to strengthen efforts to detect and treat both latent

**Table 1** Comparison of Afghani and Iranian TB patients.

Characteristic	Iranian TB patients (n = 476) (%)	Afghani TB patients (n = 164) (%)	p Value <sup>a</sup>
Mean age (years) (SD)	53 (20)	34 (17)	0.001
Mean per capita income (US\$) (SD)	1486 (2403)	937 (648)	<0.0001
Mean delay in treatment (months)			
Patient delay, mean (SD)	6.6 (11)	13.3 (26)	<0.0001
System delay, mean (SD)	4.9 (9)	8.6 (20)	<0.0001
Weight (kg) (SD)	54 (9)	49 (12)	0.017
Gender			
Female	217 (46)	67 (41)	0.293
Male	259 (54)	97 (59)	
No. of persons/room at home (SD)	1.9 (1.4)	3.2 (1.9)	<0.0001
History of illicit drug use			
Yes	106 (22)	5 (3)	<0.0001
No	370 (78)	159 (97)	
History of alcohol consumption			
Yes	61 (13)	1 (1)	<0.0001
No	415 (87)	163 (99)	
History of TB exposure			
Yes	92 (19)	40 (24)	0.101
No	384 (81)	124 (76)	
BCG scar visible			
Yes	171 (36)	41 (25)	0.011
No	275 (58)	116 (71)	
Undetermined	30 (6)	7 (4)	
Sputum culture positivity grade			
Negative	98 (21)	33 (20)	0.047
<+1	123 (26)	28 (17)	
++	95 (20)	27 (17)	
+++	131 (27)	60 (36)	
++++	29 (6)	16 (10)	
Drug regimen			
Standard	408 (86)	124 (76)	<0.0001
MDR-TB	39 (8)	35 (21)	
Other <sup>b</sup>	29 (6)	5 (3)	
Cavitary lesion on chest X-ray			
Yes	233 (49)	84 (51)	0.211
No	243 (51)	80 (49)	

<sup>a</sup> p Value for t-test or Chi-square test.

<sup>b</sup> Non-standard, non-MDR-TB regimen.

tuberculous infection and active disease among Afghani refugees.

*Conflict of interest:* No conflict of interest to declare.

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Mehdi Seyed Mirsaeidi\*  
 Payam Tabarsi  
 Omid Radpour  
 Davood Mansouri  
 Majid Amiri  
 Zarnaz Bagheri  
 Ali Akbar Velayati  
*Tuberculosis and Respiratory Infections,  
 Sajad Hospital, National Research  
 Institute of Tuberculosis and Lung Diseases,  
 Dar-Abad, Niavaran St. 19556 Tehran, Iran*

Kaveh Khoshnood  
 Ali Rowhani-Rahbar  
*Yale University, School of Public Health,  
 CT, USA*

Parisa Farnia  
*Mycobacteriology Department,*

*National Research Institute of  
 Tuberculosis and Lung Diseases, Tehran, Iran*

Golnaz Ebrahimi  
*Shaheed Beheshti University of  
 Medical Sciences and Health Services,  
 Tehran, Iran*

\*Corresponding author. Tel.: +98 912 378663;  
 fax: +98 212 296362  
 E-mail address: [mmir2@lycos.com](mailto:mmir2@lycos.com)  
 (M. S. Mirsaeidi)

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## Recurrent gastrointestinal bleeding due to a tuberculous mycotic aneurysm with an aortoduodenal fistula

The formation of an aortic aneurysm caused by infection with *Mycobacterium tuberculosis* is rare. In a recent review of the English literature from 1945 to 1999, only 41 cases of tuberculous mycotic aneurysm of the aorta were identified.<sup>1</sup> In this report, we present our experience with one such patient and a brief review of the English language literature.

An 80-year-old man was admitted to our hospital because of a one-week history of recurrent upper gastrointestinal bleeding. During this period, upper gastrointestinal panendoscopy had failed to show active bleeding. Only a 2-cm linear ulcer with white base over the high body of the stomach was detected. He was given blood transfusions and a proton pump inhibitor. Eight years before admission, he had had pneumonia of the right middle lobe. Bronchoscopic biopsy had revealed chronic granulomatous inflammation. Sputum mycobacterial culture was negative and he was treated with intravenous penicillin and erythromycin. Four years before admission, he had experienced fever, abdominal pain, and jaundice. An abdominal computerized tomography scan done at that time was negative for an abdominal aneurysm.

On admission, he complained of shortness of breath, cough, and tarry stool passage for one day. On examination, he appeared to be acutely ill. Vital signs showed blood pressure 123/68 mmHg, pulse rate 121/min, and respiratory rate 20/min. His temperature was 38.7 °C. Physical examination disclosed pale conjunctiva, irregular heartbeats, and epigastric tenderness. A pulsatile mass was not palpated. Laboratory examination showed severe anemia (hemoglobin level 9.1 g/dL dropped to 6.9 g/dL within six hours) and leukocytosis (white blood cell count  $17.9 \times 10^9/L$ ). Active oozing with blood flowing out from pyloric ring to antrum was seen on upper gastrointestinal endoscopy, but the origin of the bleeding was not identified. He underwent an exploratory laparotomy and a large inflamed mass, which contained a

saccular aneurysm, was found adjacent to the infrarenal abdominal aorta. The aneurysm was located anteriorly and in close proximity to the duodenum, with formation of a fistula within the third portion of the duodenum. The aneurysm was resected, and was replaced with an 18 mm Dacron graft. Bacterial culture of tissue from the aneurysm and aorta was negative. Blood culture on admission isolated *Peptostreptococcus micros*. Pathological examination of the aortic aneurysm showed tuberculous aortitis with atherosclerosis, and calcification. Cultures of sputum taken four weeks previously grew *Mycobacterium tuberculosis*, which was sensitive to isoniazid, rifampin, ethambutol, and streptomycin.

The patient developed acute renal failure requiring hemodialysis postoperatively and deteriorated clinically despite use of inotropic agents, total parenteral nutrition, and intravenous antibiotics. He died of septic shock 11 days after operation; blood and cultures of the abdominal drainage tube yielded *Candida albicans*.

Tuberculous aortitis is a rare condition. The mortality rate from rupture of aneurysm may exceed 70%.<sup>2</sup> Tubercle bacilli may reach the aortic wall in one of three ways:<sup>1</sup> (1) the bacilli may implant directly on the internal surface of the vessel wall; (2) the bacilli may be carried to the adventitia or media by the vasa vasorum; (3) involvement of the vessel wall may occur by direct extension from a contiguous focus such as a lymph node or paraspinal abscess. In the study of Long et al.,<sup>1</sup> they found that in 75% of patients with a tuberculous mycotic aneurysm, a contiguous tuberculous focus, mostly from a lymph node, paraspinal abscess, the lung, pericardium, vertebrae, and prostate, could be identified. It seems that the dominant mechanism of aneurysm formation is erosion through the aorta by a contiguous focus of disease. It is most likely that, in our patient, abdominal tuberculous lymphadenitis led to inflammation of the abdominal aorta, with subsequent formation of an aneurysm with fistula formation to the duodenum. Tubercle bacilli can also directly erode through the aorta into the duodenum, causing massive gastrointestinal bleeding, without formation of an aneurysm.<sup>3</sup> In the report of Long et al.,<sup>1</sup> massive bleeding was a more