THE SPECTRUM OF TUBERCULOSIS AMONG PATIENTS OF THE KING ABDUL AZIZ UNVERISTY HOSPITAL, JEDDAH, SAUDI ARABIA

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Abstract. A retrospective study, reviewing the medical records of 157 patients with a final diagnosis of tuberculosis on discharge, was conducted at King Abdul Aziz University Hospital during the period July 1999 to July 2001. The data included demographic characteristics, the spectrum of clinical presentations, diagnostic methods, and the outcome of treatment. A total of 157 patients were admitted with tuberculosis; their median age was 33(± 15.33) years. Fifty-seven (36%) were Saudis and 100 (64 %) were non-Saudis. Pulmonary tuberculosis and pleural effusion were the commonest presentations (37.6%). Diagnosis was confirmed in most cases by either a positive sputum smear for AFB or by pleural biopsy; in five patients the diagnosis was made on clinical grounds and pleural fluid analysis. There was a wide spectrum of extra-pulmonary tuberculosis, diagnosed histologically except in five cases, in which treatment was started empirically based on high clinical suspicion and a strongly positive tuberculin test.

INTRODUCTION

Tuberculosis (TB) is a major worldwide public health problem. The failure to eliminate TB, a curable and preventable disease, is the result of many factors: the nature of the tubercle bacillus, which remains dormant for an extended period of time; poor patient compliance with long-term treatment; the continued immigration of infected people from endemic countries, misdiagnosis by physicians; the lack of affordable treatment (Al Hajjaj *et al,* 1991; Raviglion *et al,* 1995).

The pattern of disease may be modified by socioeconomic, genetic, dietary, and other poorly understood factors. During the last two years, a total of 157 patients with TB were admitted to the King Abdul Aziz University Hospital, Jeddah; this study reviews the spectrum of clinical presentation, diagnostic methods, and treatment outcomes.

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MATERIALS AND METHODS

King Abdul Aziz University Hospital is a government teaching hospital in Jeddah, Saudi Arabia. One hundred and fifty-seven patients were admitted either to medical or surgical wards with a final diagnosis of tuberculosis during the two-year period of July 1999 to July 2001. Medical records were reviewed; the following data were collected: age, sex, nationality, site of TB (pulmonary or extrapulmonary), clinical presentation, diagnostic methods (*eg* ESR, PPD, radiology, fluid aspiration, histopathology), treatment, and treatment outcome.

Statistical analysis was carried out using SPSS (Statistical Package for Social Science) 7.5. Results were presented as means (± SD) or as percentages.

RESULTS

During the two-year period, July 1999 to July 2001, 157 patients were admitted with a final diagnosis of tuberculosis. The median age on presentation was 33 (±15-33) years. The patients studied were 92 females and 66 males,

with a F: M ratio of 1.4:1. Fifty-seven (36%) were Saudis; one hundred (64%) were non-Saudis. The mean length of hospital admission was 21.8 (range 1-180) days.

Intracranial tuberculoma

Three patients had multiple intracranial tuberculomas: two presented with grand mal epileptic seizures; one presented with confusion and diplopia; headache was common to the three patients. All three patients had a computerized tomographic scan (CT brain) which showed multiple ring-enhancing lesions and a large amount of brain edema. The diagnosis of tuberculoma was confirmed by stereotactic brain biopsy in two patients; the third patient was diagnosed on clinical grounds, CT findings, and CSF analysis (predominant lymphocytes). Clinical improvement with anti-tuberculosis drugs and steroids was seen in all patients.

Spinal cord tuberculosis

A total of 12 (7.6%) of patients had spinal cord tuberculosis: their median age was 14 (±25.3) years. Six patients presented with paraplegia, four with psoas absceses. All complained of backache. Five cases had associated pleural effusion. The diagnosis was established on MRI, which showed psoas abscess. The diagnosis was confirmed by positive AFB isolated from psoas abscess aspiration in two patients, and by histological examination of material obtained at surgery in eight patients. The diagnosis was made on clinical grounds and the histological examination of pleural biopsy in two patients. Clinical recovery with anti-tuberculosis drugs was accomplished in 6 patients only, 4 patients needed vertebral fixation together with anti-tuberculosis drugs. Median hospital stay was 23 (±9.5) days.

TB meningitis

A total of 10 patients had TB meningitis: their median age was 27 (±8.4) years. All 10 patients had fever and headache. Three patients presented with coma, two with confusion, and one with diplopia. The diagnosis was made on clinical ground in association with lymphocytosis, elevated protein and low-normal sugar in the CSF. All of these patients recovered with anti-tuberculous treatment and steroids. One patient's condition was complicated by multiple cranial nerve palsies and hydrocephalus. Median hospital stay was 37.22 (±29.7) days.

Gastrointestinal tuberculosis

A total of 12 patients had gastrointestinal TB. All presented with ascites due to TB peritonitis. The diagnoses were based on lymphocytosis, elevated protein in ascitic fluid, and positive AFB in two patients. Histological diagnosis from laparoscopic peritoneal biopsy samples was made in 10 patients. Six patients presented with abdominal pain, fever, diarrhea, vomiting, and weight loss. Small bowel lumen was involved in two patients; colon was involved in four patients. Histological diagnosis was made in all of these patients by fiberoptic endoscopy. Four patients presented with severe abdominal pain, fever, and weight loss due to abdominal lymphadenopathy. Diagnosis was confirmed by lymph node biopsy obtained during laparotomy and a positive TB culture in one patient. All patients recovered with anti-tuberculosis drugs, except one who died of septicemia secondary to TB peritonitis.

Cervical lymphadenopathy

Of the 25 patients with cervical lymphadenopathy, only 10 had fever or weight loss. Cold abscesses were found in three patients. Diagnosis was established in all patients by caseating granulomas on lymph node biopsy; acid-fast bacilli were isolated from the pus of three patients with cold abscesses. Three patients had a strong family history of tuberculosis. All patients recovered with anti-tuberculosis treatment. One patient's condition was complicated by scarring and sinus formation at the site of TB.

Supraclavicular and submandibular lymphadenopathy

A total of seven patients had either supraclavicular or submandibular lymphadenopathy. Diagnosis was established on clinical

Table 1
Distribution of patients by nationality.

Nationality (and ethnic origin)	No. of patients	%
Saudis	57	36
African (Somali, Chadian, Ethiopian, Nigerian)	20,11,12,1	28
Arabs (Yemeni, Palestinian, Sudanese, Syrian)	19,4,2,1	16.7
Far East (Indonesian, Philippines)	6,7	8.4
Asian (Bangladeshi, Pakistani, Burmese)	10,4,2	10.3
American	1	0.7
Total	157	100

Table 2
Types of tuberculosis.

Type of tuberculosis	No. of patients	%
Pulmonary	37	23.6
Cervical lymphadenopathy	25	15.9
Pleural effusion	22	14
Gastrointestinal	22	14
Spinal cord	12	7.6
Disseminated	11	7
Meningitis	10	6.3
Submandibular lymphadenopathy	7	4.5
Mediastinal lymphadenopathy	2	1.3
Pericarditis	2	1.3
Skin	2	1.3
Breast	2	1.3
Intracranial tuberculoma	3	1.9
Total	157	100

grounds in association with strongly-positive TB skin tests and caseating ganuloma shown by lymph node biopsy. All patients responded to anti-tuberculosis treatment.

Mediastinal lymphadenopathy

Two patients presented with the symptoms of fever and weight loss and had mediastinal lymphadenopathy on CT scan. One had caseating granulomas in tissue obtained by mediastinoscopy. The other patient was diagnosed clinically and by a positive skin test and a strong family history of tuberculosis. Both responded to anti-tuberculosis drugs.

Disseminated tuberculosis

All the 11 patients with disseminated TB, had fever and miliary mottling on chest X-rays. Diagnosis was established in three cases by a sputum smear positive for acid-fast bacilli; the sample was obtained by bronchoscopy. Liver biopsy was taken from two patients and lymph node biopsy from one. All showed caseating granulomas with Langhan's giant cells. Two patients had AIDS with multi-organ involvement: in these patients the diagnosis was made on clinical grounds. Two patients responded to empirical anti- tuberculosis. All patients recovered with anti- tuberculosis drugs, except one who died a few days after admission.

Peripheral arthritis

One patient presented with a left knee effusion; synovial biopsy showed TB granulomas.

TB pericarditis

Two patients had signs and symptoms of heart failure. One patient had constrictive pericarditis and a granuloma of the pericardium was found during surgery. The second patient presented with pericardial effusion: diagnosis was made on the basis of pericardial fluid analysis, a positive tuberculin skin test, and complete recovery with empirical anti-tuberculosis drugs.

TB skin

There were two patients with TB skin disease. One had lupus vulgaris diagnosed clinically and confirmed by skin biopsy, and the other had generalized multiple skin abscesses, from which AFB were isolated.

TB breast

Two patients presented with TB breast. One had a mass, which showed granulomas on biopsy; the other had an abscess from which AFB was isolated.

Pulmonary tuberculosis

A total of 37 patients had pulmonary tuberculosis: they presented with fever, weight loss, and cough. Only three patients had hemoptysis. Patients had a range of abnormal chest X-rays findings, namely apical fibrocaseation, lung cavities, lung abscesses and bronchopneumonia with a positive sputum smear for AFB. All patients recovered with anti-tuberculosis medication, except one patient who died from respiratory failure secondary to severe tuberculous lung disease compounded by chronic obstructive lung disease.

TB pleural effusion

A total of 25 patients had pleural effusions: they presented with fever and cough. Diagnosis was made on pleural fluid analysis, which showed a moderate increase in the white cell count and a lymphocytosis and an elevation of protein. Caseating granulomas on pleural biopsy confirmed the diagnosis in 20 patients. In five patients, the diagnosis was based on clinical suspicion, positive tuberculin skin tests, and pleural fluid analysis, because pleural biopsy was technically difficult in the presence of encysted pleural effusion. All patients showed remarkable recovery with anti-tuberculosis drugs. However, three patients required a combination of anti-tuberculosis drugs and steroids.

DISCUSSION

King Abdul Aziz University Hospital (KAUH) is a 340-bed government teaching hospital providing healthcare to an international population of mixed socioeconomic status. All patients with a final diagnosis of tuberculosis indicated by discharge computer coding were included in the study.

TB was more common in females than males; the females-to-males ratio was 1.4 : 1. More than 60% of patients with tuberculosis were non-Saudis with low socioeconomic status. This could be explained by the fact that Jeddah is a highly commercial center, where may expatriates come to work; this is in contrast to reports from Asir and the central region of Saudi Arabia, where most patients are Saudis (Zaman, 1991; Al-Wabel *et al,* 1995). However, this pattern is similar to that of other Gulf States, *eg* Kuwait and Bahrain, where tuberculosis is commoner among expatriates (Bahr *et al,* 1990; Malik and Khalfan, 1990).

Only 37 (23.6%) patients had pulmonary tuberculosis in the present study. This low percentage could be attributed to the hospital policy of not admitting patients with active pulmonary tuberculosis and a history of hemoptysis or with multiple cavities on chest X-rays. These cases are referred to the TB Center in Jeddah (Al-Dababbagh *et al,* 1991).

The diagnosis of extra-pulmonary tuberculosis was delayed due to the absence of fever, weight loss, high ESR, and abnormal chest X-ray. Of the total number of patients, 50 had either a negative tuberculin skin test or the tuberculin test was not conducted. However, a positive tuberculin test is unhelpful in

Saudi Arabia where the disease is endemic (Farer, 1983; Al-Kassimi *et al,* 1991; Huebner *et al,* 1993). There was a wide range of extrapulmonary tuberculosis in this study: the diagnosis was confirmed histologically in the majority of cases.

TB meningitis

TB meningitis was diagnosed mainly on clinical suspicion in association with lymphocytosis, elevated protein, and low sugar in the CSF. CSF smears for AFB was negative in all our patients. PCR was not performed, as it is not available in our institute. One patient developed multiple cranial nerve palsies and hydrocephalus due to a delay in diagnosis and referral. Early ventricular shunting may save patients in cases of hydrocephalus secondary to tuberculous meningitis when cerebral edema cannot rapidly be reversed by anti-tuberculosis treatment in conjunction with steroids (Kennedy and Fallon, 1979; Murray *et al,* 1981).

Spinal tuberculosis

Pott's disease is a common cause of morbidity. It results in paraplegia, cauda equina sings and symptoms and psoas abscesses, even in the absence of bone or disc involvement. Long hospital stays, as noticed in this study, are needed for physiotherapy and rehabilitation (Pertuise *et al,* 1999).

Gastrointestinal tuberculosis

Peritoneal tuberculosis was the commonest type of gastrointestinal involvement presenting most often with ascites; diagnosis was based on laparoscopic peritoneal biopsy and positive AFB in ascitic fluid. The main presentations of the disease involving the bowel were fever, abdominal pain, and diarrhea. The colon was most commonly involved and the diagnosis of GIT involvement was made by tissue biopsy during gastroduodenoscopy and colonoscopy (Novis *et al,* 1973). Intra-abdominal lymphadenopathy presented mainly with abdominal pain. Lymph nodes seen on CT scan were biopsied on laporatomy, which confirmed the diagnosis.

Disseminated tuberculosis

Disseminated tuberculosis follows reactivation of a healed primary focus and subsequent hematogenous spread. The presentation was fever of unknown origin in all patients. TB must be considered in patients with suppressed immunity. Two patients had AIDS (Barners *et al,* 1991; Markwiz *et al,* 1997), one had SLE, and one had end-stage renal disease. Miliary mottling on the chest X-rays strongly suggests the diagnosis, but is often absent for the first six weeks of the illness as observed in some of our patients, which leads to a delay in the diagnosis. Smears taken from the sputum, CSF, bone marrow, material obtained from skin abscesses, lymph nodes, pleural and peritoneal fluid for the detection of acid-fast bacilli may give positive results. An important diagnostic clue is finding hepatic granulomas on biopsy, as was the case in three of our patients. Tuberculosis is the commonest cause of granulomatous hepatitis in this region of the world. Disseminated tuberculosis has a 20-30% mortality rate even with adequate treatment. The cause of death may be respiratory failure, concomitant pneumonia, pulmonary emboli, pulmonary edema, or renal failure. Multiple organ involvement is one of the manifestations of disseminated tuberculosis. This occurred in four of our patients, in whom the pericardium, bone, eye, chest, liver, spleen, meninges, and lungs were involved (Sydow *et al,* 1992). Response to treatment is slow; fever usually takes two to eight weeks to resolve; radiographic changes generally clear within one month, although they may persist for three months or more. This was shown in both this study and in earlier work (Combs *et al,* 1990).

Tuberculous lymphadenopathy

Tuberculous lymphadenopathy is a common yet less severe form of TB compared with other types of tuberculosis. Single or multiple lymph nodes have been found at almost every site; the commonest site is the cervical lymph nodes. It is important to distinguish TB from lymphoma: for this reason biopsy is crucial. Isolated tuberculous mediastinal lymphadenopathy in adults has been reported in two cases

(Hand *et al*, 1979), the differential diagnoses were lymphoma and malignant metastases. A trial of anti-tuberculosis medication is an acceptable alternative to mediastinoscopy or thoracotomy when there is a strong clinical suspicion of tuberculosis and close outpatient supervision.

Intracranial tuberculoma

Tuberculoma is one of the common causes of intracranial tumor in Saudi Arabia and in countries where tuberculosis is prevalent. Fever and weight loss are often absent and most patients have normal chest X-rays. Tuberculoma must be considered in the differential diagnosis of headache, confusion, rapid deterioration of visions and epilepsy. The diagnosis was made initially by computerized tomography, which showed multiple mass lesions and extensive cerebral edema with ring enhancement; definitive diagnosis was established by stereotactic brain biopsy in two patients. However, strong clinical grounds in association with CT scan findings, is a reasonable basis on which to start anti-tuberculosis drugs as an alternative to stereotactic brain biopsy or craniotomy, especially where facilities are not available or when financial pressures may be a factor (Ramamurthi and Vardarajan, 1981).

CONCLUSION

Tuberculosis is a common disease in Saudi Arabia and has a wide spectrum of presentations, it should be considered in every patient. The late diagnosis of this curable disease could result in tragedy and treatment should be started after confirming the diagnosis either by a modern technique for the isolation of acid-fast bacilli, or by culture or PCR of aspirates or tissue samples obtained by fiberoptic endoscopy, laparoscopy, liver biopsy, laparotomy, and bone marrow biopsy. CT scanning and brain biopsy using stereotactic surgery may be indicated for tuberculomas. It is reasonable to start anti-tuberculosis chemotherapy if there is a strong clinical suspicion and facilities for close outpatient supervision in cases where tissue biopsy is difficult to obtain, *eg* in mediastinal lymphadenopathy or brain tuberculoma.

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