Tuberculosis in Peritoneal Dialysis Patients in an Endemic Region

Tuberculosis has been paid more attention in recent years because of the increase in the number of patients with immune suppression—such as those with renal failure. In the present study, we analyzed patients on peritoneal dialysis (PD) in our city to determine the prevalence and clinical characteristics of tuberculosis in those patients.

Patients who had been on a PD program for more than 3 months were reviewed. Demographic characteristics, primary renal disease, comorbidities, and duration of PD were recorded. With regard to tuberculosis, the timing of the diagnosis, any previous history of antituberculosis treatment, family history, site of presentation, drugs used, drug side effects, and disease outcome were recorded.

Among 322 patients from 5 PD units who were reviewed, 4 (1.24%) were found to have tuberculosis. Pulmonary involvement was noted in 2 (50%). The diagnosis was made through microbiology in 1 patient, through pathology in 1, and through clinical and radiologic assessment in the remaining 2. Mild transaminitis was recorded in 2 patients as a side effect of treatment. Of the 4 patients, 2 were cured, 1 died, and 1 was taking ongoing treatment.

The prevalence of tuberculosis was significantly higher in the study population than in the general population. In a dialysis population, a diagnosis of tuberculosis is often difficult, and extrapulmonary involvement is more common, as observed in our study. The diagnosis of tuberculosis may be made through non-microbiologic approaches, and temporary transaminase elevations may be seen during therapy.

Key words
Tuberculosis, diagnosis, treatment

Introduction
Tuberculosis has been paid more attention in recent years because of the increase in the number of patients with immune suppression—such as those with renal failure. The clinical presentation of tuberculosis is different in patients with chronic renal failure than in those with a competent immune system. Extrapulmonary tuberculosis is more common in the hemodialysis (HD) population, with rates of 38% and 50% having been reported (1–3). The diagnosis is usually late, sometimes postmortem, because of nonspecific clinical presentation (fever of unknown origin, fatigue, loss of weight), negative tuberculin skin test (anergy), and a low probability of microbiologic evidence (acid-resistant bacilli, culture in tuberculosis media) (4). Moreover, because most of the reports in the literature are related to HD patients, data about the prevalence of tuberculosis in peritoneal dialysis (PD) populations are limited. As a result, an effective program for the prevention, screening, early diagnosis, and treatment of tuberculosis is needed in this population.

The PD population differs somewhat from the HD population in terms of immune disturbances, which may affect the prevalence of tuberculosis in the former group. Some cases present as culture-negative peritonitis or culture-positive peritonitis unresponsive to appropriate antibiotics. Diagnosis requires a high index of suspicion. In the present study, we analyzed patients on PD in our city to determine the prevalence and clinical characteristics of tuberculosis in those patients.

Methods
Patients who had been on a chronic PD program for more than 3 months in any of 5 PD centers representing various socio-economic and cultural characteristics of our city’s population were reviewed for the study. Patients who were not residents of the city, but only
guests; patients who had temporarily been switched to PD from HD for mechanical or metabolic reasons; and patients had been on PD for less than 3 months were excluded. Clinical, demographic, and laboratory parameters were obtained for those among the included patients who had been diagnosed with tuberculosis at least 3 months after the start of PD.

Demographic parameters (age, sex, birthplace, education status, occupation), primary renal disease, comorbid diseases, and duration of PD were recorded.

All PD patients in Turkey have a chest X-ray annually. If clinical or radiologic evidence raises suspicion of either pulmonary or extrapulmonary tuberculosis, then further radiologic and microbiologic examinations are performed. Our retrospective review of the patient files found those who had been diagnosed with tuberculosis. Using a predefined form, we recorded the timing of the tuberculosis diagnosis; previous history of anti-tuberculosis treatment; family history; site of presentation; names, doses, and durations of drugs; side effects of treatment; and disease outcome. If patients switched between PD centers, they were recorded as attending the center in which they were diagnosed with tuberculosis.

The statistical analysis was carried out using the SPSS software application for Windows (version 13.0: SPSS, Chicago, IL, USA). Numeric parameters are expressed as mean ± standard deviation.

Results
We reviewed 322 patients (156 women, 166 men) from the 5 PD units. Among the patients reviewed, 4 (1.24%) were diagnosed with tuberculosis. All were young adults, and 3 of the 4 were men. None of the patients had history of immunosuppressive medications or any disease other than chronic renal failure that might cause immunosuppression. Table I presents demographic characteristics and PD treatment data for the study patients. Neither the patients nor their families had a history of tuberculosis.

Pulmonary involvement was noted in 2 of the 4 patients (50%); of the others, 1 had peritoneal tuberculosis, and 1 had tuberculous lymphadenitis. The diagnosis was made through microbiology in 1 patient, through pathology in 1, and through clinical and radiologic assessment in the remaining 2.

The 2 patients with presumed pulmonary tuberculosis presented with low-grade fever, weight loss, nonproductive cough, and pulmonary infiltrates, without cavity formation, on chest radiography. Nonspecific and specific cultures of blood and sputum were negative. With no clinical response to broad-spectrum antibiotics, they were accepted as having pulmonary tuberculosis. Appropriate treatment resulted in improved wellness and resolution of symptoms and radiologic findings.

Planned treatment for 3 of the patients involved the use of 4 antituberculosis drugs in the first 3 months, followed by therapy with 2 drugs for another 9 months (Table II). One patient was treated with 3 drugs, but the reason for the omission of the 4th drug could not be ascertained from the patient’s chart. In the patient with tuberculous peritonitis, the peritoneal catheter was removed; he was switched to HD, first with a non-cuffed jugular catheter and then with an arteriovenous fistula.

No serious side effects from the drug therapy were observed, except for mild transaminitis in 2 patients. Transaminase levels returned to normal levels after withdrawal of the drugs; the drugs were then reinstated with gradually increasing doses.

In 2 patients, a complete cure was achieved; 1 patient died from tuberculoma of the brain in the 4th month of treatment; and 1 patient with tuberculous peritonitis was receiving ongoing treatment, with a good clinical response at the 4th month (Table II).

Discussion
Studies of the incidence and prevalence of tuberculosis in the dialysis population have reported varying results (1,4,5). Data on the PD population are limited. The 322 patients reviewed in the present study make it the largest study of this type performed in Turkey. According to reports from the local health authority, there are 677 PD patients in our city; we therefore reviewed 47.56% of the PD population. Compared with HD patients, PD patients appear to have an increased incidence of peritoneal involvement in tuberculosis—findings that come from case reports (3,6,7).

According to registry reports from the Ministry of Health in Turkey, the incidence and prevalence of tuberculosis in the general population in 2007 were 25.2 per 100,000 and 27.9 per 100,000 respectively. The prevalence in our study population (1.24%) is significantly higher. According to the 2009 statistical reports from the Ministry of Health, Istanbul is the
TABLE I  Demographic and peritoneal dialysis (PD) treatment data for the study subjects

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>27</td>
<td>23</td>
<td>35</td>
<td>22</td>
</tr>
<tr>
<td>Sex</td>
<td>Female</td>
<td>Male</td>
<td>Male</td>
<td>Male</td>
</tr>
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<td>Primary renal disease</td>
<td>Crescentic GN</td>
<td>Unknown</td>
<td>Unknown</td>
<td>Unknown</td>
</tr>
<tr>
<td>PD modality</td>
<td>CAPD</td>
<td>APD</td>
<td>CAPD</td>
<td>CAPD</td>
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<tr>
<td>Immunosuppressive medicationa</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Comorbidities</td>
<td>Juvenile rheumatoid arthritis</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
</tbody>
</table>

TABLE II  Tuberculosis (TB) data for the study subjects

<table>
<thead>
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<th>4</th>
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</thead>
<tbody>
<tr>
<td>Time to diagnosis (months)a</td>
<td>5</td>
<td>9</td>
<td>22</td>
<td>5</td>
</tr>
<tr>
<td>Prior history of TB</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personal</td>
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<td>None</td>
<td>None</td>
<td>None</td>
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<td>Family</td>
<td>None</td>
<td>Lung</td>
<td>None</td>
<td>None</td>
</tr>
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<td>Site of involvement</td>
<td>Lung</td>
<td>Cervical and mediastinal lymph nodes</td>
<td>Lung</td>
<td>Peritoneum</td>
</tr>
<tr>
<td>Diagnostic method</td>
<td>Clinical and radiologic findings</td>
<td>Pathology</td>
<td>Clinical and radiologic findings</td>
<td>Microbiology</td>
</tr>
<tr>
<td>Drugs used</td>
<td>Isoniazid, plus rifampicin, plus morphozinamid</td>
<td>Isoniazid, plus rifampicin, plus ethambutol, plus morphozinamid</td>
<td>Isoniazid, plus rifampicin, plus ethambutol, plus pyrazinamide</td>
<td>Isoniazid, plus rifampicin, plus ethambutol, plus pyrazinamide</td>
</tr>
<tr>
<td>Side effects</td>
<td>None</td>
<td>None</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>Outcome of TB</td>
<td>Cure</td>
<td>Cure</td>
<td>Death from brain tuberculoma in the frontal lobe</td>
<td>Continuing treatment</td>
</tr>
</tbody>
</table>

a  Prior or current.
GN = glomerulonephritis; CAPD = continuous ambulatory PD; APD = automated PD.

The presentation of tuberculosis may be different in PD patients than in HD patients. Pulmonary involvement is still in first place (4), but tuberculous peritonitis has a special place in PD. Early diagnosis and treatment is mandatory in peritoneal tuberculosis. Clinical findings are indistinguishable from those in bacterial peritonitis, with fever, abdominal pain, and cloudy effluent being the most frequent (8–10). Cell count cannot differentiate peritoneal tuberculosis from other peritoneal infections. Serositis caused...
Conclusions
The prevalence of tuberculosis is higher in PD patients than in the general population, and the disease is mostly extrapulmonary. Presentation may not be as obvious in dialysis patients as in a nonuremic population, and the diagnosis may be considered using approaches other than microbiology.

Disclosures
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References

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