Review of non-tuberculous mycobacteria. King Khalid National Guard Hospital, Jeddah.

Sir,

Tuberculosis is still an important communicable disease in many parts of the world, and the number of cases worldwide is rising, particularly in developing countries, because of the increasing incidence of acquired immune deficiency syndrome (AIDS). It is the leading cause of death from a single infectious disease, accounting for over a quarter of avoidable deaths among adults. It is estimated that about one-third of the world’s population are infected with tubercle bacilli and currently eight million new cases of active tuberculosis occur per annum, 95% of these in the developing countries.

Although the incidence of AIDS is very low in Saudi Arabia, two previous studies have indicated that prevalence of tuberculosis is high particularly in the south of the country and in Jeddah area. However, in subsequent five years our understanding of the disease and the medical facility in the Kingdom has improved and at this point of time we decided to review the mycobacterial infections in the King Khalid National Guard Hospital (KKNGH), a tertiary referral hospital, Jeddah, to have more insight into the current situation of the disease and how effective are the current measures.

A retrospective study of all patients seen and suspected of having mycobacterial infection, and who had specimens sent to the Microbiology Laboratory between January, 1993 to June 1995 (30 months), served as our study population. Information was obtained regarding the patient’s age, nationality, type of specimen, isolate obtained and its sensitivity to various antimicrobial agents. All specimens were processed after decontamination using standard microbiological technique. Every specimen was stained by the auramine technique and screened. All positive smears were counterstained by the Ziehl-Neelsen method and confirmed as acid-fast bacilli (AFB). All specimens were cultured in duplicate on Lowenstein-Jensen’s medium and Middlesbrook medium.
Cultures were incubated at 36°C for 6-8 weeks. All positive isolates were confirmed as mycobacterium species by Ziehl-Neelsen stain with characteristic morphological appearance, and entered into the laboratory computer. All isolates were sent to the Mycobacterium Reference Unit, Public Health Laboratory Service, University Hospital of Wales, Cardiff, UK, for full identification and appropriate sensitivity tests. It is the practice in our hospital for patients to be handed three or more sputum cups to produce three consecutive early morning sputum samples. Hence, if more than one isolate is obtained from a patient within a short period, it is regarded as one isolate.

During the 30 month period, 4288 samples were examined for mycobacteria. Of these, 83 (1.94%) were ZN smear positive and 349 (8.14%) were culture positive Table 1. One hundred and fifty samples obtained from 78 patients yielded MTB (mycobacterium tuberculosis), while 199 samples had an MOTT (mycobacteria other than mycobacteria tuberculosis) isolated. Cases of pulmonary MTB were higher than extra pulmonary 50/28, 45 were cultured in the sputum, 5 in pleural aspirates, 14 in pus, 4 EMU, 2 in CSF, and 9 in tissue biopsies. Of the 78 patients with MTB, 66 (84.6%) were Saudis, while 12 (15.4%) were non-Saudis, with female predominance amongst non-Saudi patients and a peak in the age group 15-24 and at over 55 years. Table 2. Of the 78 isolates of MTB, only 9 (11.5%) strains were resistant to one or more anti-tuberculous agents. 6/9 were primary resistance i.e. never received anti T.B. drugs. The resistance rate to each drug was as follows: isoniazide 10.3% (8/78); ethambutol 1.3% (1/78); rifampicin 5.1% (4/78); pyrazinamide 1.3% (1/78); and streptomycin 7.7% (6/78).

In a nation-wide study in Saudi Arabia, Kassimi placed Jeddah as an area of high prevalence of tuberculosis (20%) as compared to 6% for the national average, based on Mantoux test. The annual risk of infection, which is thought to be a more accurate indication of tuberculosis attack rate, was calculated at 1.5% for the Jeddah area, compared to 0.5% for the national average and 0.1% for the rural communities in the Kingdom. The annual risk of infection is the percentage of unvaccinated children who convert to positive Mantoux in any given year. The high prevalence rate observed in the Jeddah area was thought to be due to influx of illegal settlers in Jeddah and contact with millions of pilgrims yearly.

In a previous retrospective study carried out in our hospital by Zaman covering 1984-1986, 76 cases of mycobacterial infections were observed among our hospital population. Fifty three of these 76 patients had M. tuberculosis infection while 23 had atypical mycobacteria. The overall incidence was found to be greater in the 25-34 and over 64 year age group. The male/female ratio was observed to be 37/16.

In the present study covering January 1993 to June 1995, 150 (3.5%) of 4,288 samples, from only 78 patients, yielded M. tuberculosis. Population served expanded to more than 50,000 now. The low prevalence of tuberculosis in our population due to several factors, viz: pre-employment medical examination of recruits, which includes chest x-ray and Mantoux test, improved residential accommodation for both guardsmen and hospital personnel and the positive attitude of the government of Kingdom of Saudi Arabia towards the traditional predisposing factor for the spread of tuberculosis namely, poverty, social deprivation, poor hygienic conditions, poor nutritional status and low socio-economic conditions. However, overcrowding remains to be addressed, especially, with millions of pilgrims and residual illegal migrants who are coming from highly endemic areas that have high prevalence of drug-resistance M. tuberculosis, in fact, these probably constitute the high risk group.

Only 5 cases of tuberculosis were encountered under the age of 15 years which is probably a reflection of the efficacy of BCG vaccinations. The first noticeable peak occurs at younger age, who are predisposed to disruption to social life that subsequently predicate an increase exposure to bacilli. At the other extreme of life, 24 (30.8%) were 55 years and above, this second peak may be attributed to accumulated latent foci of infection in immunologically stressed elderly, a similar observation was reported by Milaat in Jeddah in

**Table 1** - Mycobacteria isolated from KKNGH patients.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of Samples</th>
<th>Positive Smears</th>
<th>Positive cultures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>1601</td>
<td>35</td>
<td>54</td>
</tr>
<tr>
<td>1994</td>
<td>1433</td>
<td>20</td>
<td>57</td>
</tr>
<tr>
<td>June 1995</td>
<td>1254</td>
<td>28</td>
<td>39</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4288</strong></td>
<td><strong>83</strong></td>
<td><strong>150</strong></td>
</tr>
</tbody>
</table>

**Table 2** - Distribution of M. tuberculosis among Saudi/Non-Saudi patients at KKNGH.

<table>
<thead>
<tr>
<th>Age (yrs)</th>
<th>&lt; 5</th>
<th>5-14</th>
<th>15-24</th>
<th>25-34</th>
<th>35-44</th>
<th>45-54</th>
<th>55-64</th>
<th>&gt; 64</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0/0</td>
<td>2/0</td>
<td>9/0</td>
<td>5/1</td>
<td>3/1</td>
<td>2/0</td>
<td>8/1</td>
<td>9/0</td>
<td>38/4</td>
</tr>
<tr>
<td>Female</td>
<td>0/0</td>
<td>2/0</td>
<td>11/0</td>
<td>4/3</td>
<td>3/3</td>
<td>3/0</td>
<td>2/0</td>
<td>66/12</td>
<td></td>
</tr>
</tbody>
</table>

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Drug resistance is one of the problems encountered in our patients, there have been very few reports on the prevalence of resistant M. tuberculosis in Saudi Arabia and these have shown wide variation. In Riyadh, Al-Orainey reported 21.3%, while 44% was reported in Giza, and 22.6% in Taif. In Jeddah, 19% resistance was observed in 1986 and 21% in 1991. In our study the prevalence of resistant M. tuberculosis was found to be only 11.5% (9/78). In the study by Zaman, the resistance rate among KKNGH population was found to be 25% (24/96). The highest resistance in our study was recorded against isoniazide 10.3%, while in the earlier study, the highest resistance was recorded against rifampicin 7.2% and only 1.8% against isoniazide. This shift in sensitivity pattern is probably due to change in treatment practices. Control effort directed against high risk group should go in hand with published guideline which are available to identify, treat and prevent the problems of drug resistance.

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References