Estimation of the burden of chronic and allergic aspergillosis in India
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Abstract
Objective: India is the world’s second most populous country, with high rates of TB and HIV. Comprehensive baseline data is necessary for effective prioritization of limited public health resources. Using scoping review methodology and deterministic modelling, we have estimated the incidence and 5yr period prevalence of chronic pulmonary aspergillosis (CPA) following TB and prevalence of allergic bronchopulmonary aspergillosis (ABPA) complicating asthma in India.
Methods: The bases for the computations have been published (Denning et al., Bull WHO 2011;89:864-72 and Denning et al. Med Mycol 2013. In press). Estimated pulmonary TB rates were updated from 2007 to 2011 using WHO statistics, with deaths excluded. Asthma rate in adults was estimated from the country-specific prevalence of asthma from the GINA report applied to population estimates (mean prevalence of current wheezing in children was 88% of adults in the countries which participated in both studies). Additional modelling was done to accommodate several ABPA studies in India.

Results:
In 2011, the population of India was estimated at 1,241,000K. The number of cases of pulmonary TB in India was 3,100K (249/100K) and the mortality was 300K (24/100K). The annual estimated incidence of new CPA cases was 85,012 while 5 year period prevalence was 267,987. Rates of ABPA complicating asthma with good denominators of referral populations (n=5 studies) vary from 0.7 to 3.5%, with the median being 2.5%. The number of adult asthmatics is estimated at 23,709K and ABPA at 592,719. It rates of 5%, 7% and 20% are applied, the gross numbers of ABPA patients estimated in India rises to 1,185K, 1,600K and 4,742K respectively. All estimates (n=7) of Aspergillus sensitization rates in adult asthmatics in India exceed 16% and are 50% in asthmatics admitted to ICU with asthma.

Conclusion: The total burden of antifungal-responsive chronic and allergic aspergillosis in India is likely to exceed 860,000 patients. Epidemiological studies are required to better categorize the burden of these diseases in India.

Conclusions
- The total burden of antifungal-responsive chronic and allergic aspergillosis in India is likely to exceed 860,000 patients.
- Epidemiological studies are required to better categorize the burden of these diseases in India.

Methods
We estimated the adult burden of asthma by the GINA estimates. The prevalence of ABPA complicating asthma was estimated at 2.5% (0.7-3.5%) [Ref. 1]. The following factors were used in estimation of ABPA:

Asthma rate in adults was estimated from the prevalence of asthma from the GINA report applied to population estimates (mean prevalence of current wheezing in children was 88% of adults in the countries which participated in both studies). Additional modeling was done to accommodate several ABPA studies in India.

The burden of CPA complicating pulmonary TB was made on the following assumptions [Ref. 2]:

- The total burden of antifungal-responsive chronic and allergic aspergillosis in India is likely to exceed 860,000 patients.
- Epidemiological studies are required to better categorize the burden of these diseases in India.

References

Background & Objectives
- Asthma of any severity may be complicated by allergic bronchopulmonary aspergillosis (ABPA).
- Treated pulmonary tuberculosis (PTB) can lead to complications, including progressive loss of lung function, persistent symptoms and the most subtle, yet the most severe, chronic pulmonary aspergillosis (CPA).
- Both ABPA and CPA respond well to antifungal therapy.
- Using scoping review methodology and deterministic modelling, we estimate the prevalence of ABPA complicating asthma, and the incidence and 5yr period prevalence of CPA following PTB in India.

Results
- In 2011, the population of India was estimated at 1,241,000K.
- The number of cases of pulmonary TB in India has fallen slightly from 3,300K to 3,100K (2,100K – 4,000K) (249/100K) and the mortality also from 331K to 300K (24/100K).
- The annual estimated incidence of new CPA cases has risen from 83,000 to 85,012 and 5 year period prevalence from 261,679 to 267,987.
- Rates of ABPA complicating asthma with good denominators of referral populations (n=5 studies) vary from 0.7 to 3.5%, with the median being 2.5% [Ref. 1].
- The number of adult asthmatics is estimated at 23,709K and ABPA at 592,719.
- If rates of 5%, 7% and 20% are applied [Refs. 3-6], the gross numbers of ABPA patients estimated in India rises to 1,185K, 1,600K and 4,742K respectively.
- All estimates (n=7) of Aspergillus sensitization rates in adult asthmatics in India exceed 16% and are 50% in asthmatics admitted to ICU with asthma [Ref. 7].

Table: Summary of CPA/ABPA in India

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>Time frame</th>
<th>N (adults)</th>
<th>ABPA N</th>
<th>Comments</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976</td>
<td>34-1977</td>
<td>437/17</td>
<td>17</td>
<td>46/17</td>
<td>10 patients excluded</td>
<td>Khan et al</td>
</tr>
<tr>
<td>2005</td>
<td>745</td>
<td>115/8</td>
<td>8</td>
<td>12/10</td>
<td>Healthy control group also evaluated</td>
<td>Maurya et al</td>
</tr>
<tr>
<td>2006</td>
<td>745-115</td>
<td>8-15</td>
<td>7</td>
<td>12/10</td>
<td>Full diagnostic data not provided for all ABPA patients</td>
<td>Agarwal et al</td>
</tr>
<tr>
<td>1976</td>
<td>437/17</td>
<td>15/8</td>
<td>8</td>
<td>12/10</td>
<td>Healthy control group also evaluated</td>
<td>Maurya et al</td>
</tr>
<tr>
<td>2005</td>
<td>8-15</td>
<td>305/10</td>
<td>15/8</td>
<td>12/10</td>
<td>Full diagnostic data not provided for all ABPA patients</td>
<td>Agarwal et al</td>
</tr>
<tr>
<td>2010</td>
<td>1 year</td>
<td>215/15</td>
<td>15/21</td>
<td>Excluded: those in receipt of steroids for 2 weeks in prior 15 months, 6 patients grew A. fumigatus.</td>
<td>Ghosh et al</td>
<td></td>
</tr>
</tbody>
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