Respiratory Infection in Childhood

- Prof W E K Loening

Summary

The prevalence of ARI is similar in all population groups, but the morbidity and mortality is much higher in disadvantaged groups. GPs should empower parents to manage their children by giving them the knowledge of the features and natural course of ARI, and alert them to notice any deviation from this.


KEYWORDS:

Respiratory Tract Infections; Child; Physicians, family; Parents.

Although the main focus of this paper is on acute respiratory infection (ARI) an approach to the child with a chronic cough will be discussed.

ARI has been called an “international tragedy of almost unprecedented magnitude.” The reasons for this strong language are the lack of recognition of the magnitude of the problem and insufficient funding for research and for preventive programmes. It has been calculated that, on a global scale, one third of 15 million childhood deaths are due to pneumonia. In developed countries such as the UK, ARI accounts for 10% of the under 5’s mortality. In developing countries (eg Papua New Guinea) the case fatality varies from 25%, where no health care was available, to 1.9% where primary health care was provided.

Epideimiology

It must be strongly emphasized that the incidence of ARI does not vary from one community to another, but the morbidity does. Determinants of severe disease have been established to some extent in that infants under a year, and particularly the preterm-baby are the most vulnerable. Further details can be found in Table I.

Pathology

The vast majority of upper ARIs are viral in nature resulting in a mucosal inflammatory response. A varying degree of viraemia will give rise to systemic symptoms and signs. A non-specific superimposed bacterial infection is common, mild and self-limiting. The natural course of the acute phase of the illness is 5-7 days.

Viral invasion of the lower airways, particularly of the bronchioles, will cause predominantly expiratory obstruction and distal accumulation of secretions. Damage to the deeper structures of the smaller bronchi may be more than transient with subsequent bronchiectasis. Primary viral or secondary bacterial pneumonia may accompany viral infection of the airways. The pathology of these is well described in standard textbooks.

Clinical Features

The features of an upper ARI are too well known to be enumerated here. It is pertinent, however, to highlight those signs which suggest lower
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Table I. Epidemiological Factors Determining Severity of ARI

<table>
<thead>
<tr>
<th>Host</th>
<th>Agent</th>
<th>Environment</th>
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</thead>
<tbody>
<tr>
<td>Infant</td>
<td>Strep pneumoniae</td>
<td>Crowding</td>
</tr>
<tr>
<td>Preterm</td>
<td>H influenzae</td>
<td>Poor health care</td>
</tr>
<tr>
<td>Unvaccinated</td>
<td>Mycoplasma</td>
<td>Poor maternal education</td>
</tr>
<tr>
<td>Not breastfed</td>
<td>Resp syncitial virus</td>
<td>Smoke</td>
</tr>
<tr>
<td>Congenital anomaly</td>
<td>Adenovirus</td>
<td>Cold weather</td>
</tr>
<tr>
<td>Malnourished</td>
<td>Para-influenza virus</td>
<td></td>
</tr>
</tbody>
</table>

Respiratory infection – eg pneumonia and bronchiolitis. The most important sign – and regrettably the most neglected – is tachypnoea. Respiratory rate > 50/min in infants and young children and > 60/min in the newborn is strongly suggestive of lower ARI. An axillary temperature > 38,5°C in conjunction with tachypnoea is further confirmatory evidence. Inter- and subcostal as well as supra clavicular and suprasternal recession are similarly indicative of lung pathology but are less easily detected, particularly in the obese infant. Refusal of feeds suggest more serious disease whereas restlessness or drowsiness are features of respiratory failure.

secretions, making expectoration more difficult, and cause drowsiness.

The incidence of ARI does not vary from one community to the other, but the morbidity does

(3) Supportive therapy is essential eg
- cleaning the nasal passages in small infants
- antipyretics where indicated
- adequate fluid intake
- small frequent feeds, particularly also during convalescence
- chest physiotherapy.

(4) The severity of the infection must be determined and management adjusted accordingly. See Table II.

From the above it will be clear that the great majority of infants with ARI will do better without any medication. Should you fear that the parents will be dissatisfied with that management, the following suggestions may be helpful:
- Enquire as to the reason for the consultation. Underlying fears may be expressed which can be followed with appropriate enlightenment.

Table II. Management of the Child with ARI

<table>
<thead>
<tr>
<th>Clinical Features</th>
<th>Recommended therapy</th>
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<tbody>
<tr>
<td>Cough and Coryza</td>
<td>Paracetamol for ± 2 days</td>
</tr>
<tr>
<td>Temp &lt; 38,5°C</td>
<td>Suppress cough if dry and painful</td>
</tr>
<tr>
<td>Cough &amp; Tachypnoea</td>
<td>Above Rx plus simple antimicrobial, eg cotrimoxazole</td>
</tr>
<tr>
<td>± Temp ≥ 38,5°C</td>
<td></td>
</tr>
<tr>
<td>+ Recession</td>
<td>Admission to hospital</td>
</tr>
<tr>
<td>+ Refusal of feeds</td>
<td>Sol penicillin 6 hly iv or im</td>
</tr>
<tr>
<td></td>
<td>or amoxycillin po</td>
</tr>
<tr>
<td></td>
<td>or chloramphenicol po</td>
</tr>
<tr>
<td>Cough &amp; Tachypnoea</td>
<td>Above therapy and high or intensive care.</td>
</tr>
<tr>
<td>Refusal of feeds</td>
<td></td>
</tr>
<tr>
<td>Drowsiness</td>
<td></td>
</tr>
<tr>
<td>± Cyanosis</td>
<td></td>
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</tbody>
</table>
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- Involve the parents in the management as far as possible by explaining the features of lower ARI. Furthermore, parents must be aware of the natural history of ARI and of the need for a return visit should there be any deviation from this course.

Notable Exceptions/Pitfalls

(1) **Epiglottitis** - This affects children rather than infants and presents with rapidly progressive features of upper airway infection and choking at the onset of the disease. Localized reduced air entry and/or localized wheezing should alert one to the problem.

(2) **Croup** - (Laryngo-tracheo-bronchitis) presents with stridor - initially inspiratory - hoarseness and varying degrees of respiratory distress. It occurs in infants and young children and is due to a viral infection. The management is largely supportive but hospitalization is required for young infants and when there is respiratory distress.

(3) **Foreign Body** - This diagnosis is regrettably missed not infrequently. The presenting features may suggest ARI but there is usually a history of obstruction. The child prefers to sit with the mouth open and not to swallow. This is an emergency requiring tracheostomy and systemic chloramphenicol. Intensive care is essential.

Globally: \( \frac{1}{3} \) of 15 million childhood deaths are due to pneumonia

Pertussis is often missed because of the atypical presentation - ie the absence of the whoop and relatively short cough paroxysm. Careful examination may reveal small subconjunctival haemorrhages or blood-streaked sputum. The full blood count may show an absolute lymphocytosis. Whereas the majority of patients are diagnosed at a stage when antibiotics are of no value, it is important to ensure that all young infant contacts are given erythromycin prophylactically.

The approach to the child with a chronic cough

(Chronlc = > 3 weeks)

The following points in the history are helpful:
- Predominantly nocturnal and following exertion - suggests respiratory allergy - asthma.
- Progressively worse and paroxysmal in nature - suggests pertussis.
- Onset in early infancy with acute exacerbations - underlying lung pathology.

The most important but most neglected sign is tachypnoea

The child with respiratory allergy/asthma often is physically well but has allergic rhinitis ("sinusitis"). Examination may reveal wheezing particularly following exertion. Response to \( \beta_2 \) adrenergic drug (eg salbutamol) is almost diagnostic. Thorough evaluation and careful follow-up are essential.

Parents should understand the natural history of ARI, and be aware of any deviation from this course.

Conclusion

The prevalence of ARI is similar in all population groups but the morbidity and mortality is high in disadvantaged communities and in young infants. The management of children with upper ARI should be in the hands of the parents as we, the medical practitioners, probably do more harm than good. The parents must be empowered to make the correct decisions with the knowledge of the features of lower ARI and of the natural history of ARI.

References