Tuberculosis contacts and prophylaxis

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Every day much energy is expended sorting out the tragedy that is childhood tuberculosis (TB). Given the other challenges faced by our public health services this is energy we can ill afford. It is unlikely that we shall have a more effective TB vaccine available before 2015. In the meantime, many cases of severe and complicated paediatric TB could be prevented by an effective programme of contact screening and chemoprophylaxis. This article looks at the 'what, who and why' of TB contact investigation and TB chemoprophylaxis, including some special cases. We ask why these activities are not happening and what can be done about the situation. Lastly, some proposals for improving the situation are made.

Some definitions

Chemoprophylaxis and *preventive therapy* are regimens for preventing the development of active TB disease in those with latent TB infection. In South Africa this is often referred to as 'TB prophylaxis'. It is important to note that it is intended to prevent disease in the infected, rather than prevent infection *per se*.

A *close contact* is someone living in the same household as a source case (e.g. the child's caregiver) or someone in frequent contact with the source case.

TB contact investigation

What investigations should be done?

Children who are household contacts should be screened for symptoms of disease. Tuberculin skin tests (TSTs) are recommended where available to screen for infection. Chest radiography is recommended where available to screen for TB disease. If it is not available, simple clinical assessment is sufficient to decide whether a contact is well or symptomatic, and consequently whether they need chemoprophylaxis, full work-up for TB disease or neither. Lack of resources is not an acceptable excuse for doing no screening at all.

Who should be investigated?

The risk of TB infection is greatest in children who have had close and prolonged contact with infectious TB cases. The risk of TB disease following infection is greatest in children who are younger (under 5 years old) and who were recently exposed (less than 2 years previously).[1] Screening is therefore targeted at these groups. This does not mean that those who do not fall into these groups are not at risk. Screening should also be available for contacts of smear-negative pulmonary TB (PTB) cases.

Why should TB investigation be carried out?

The main purpose of childhood contact screening is to identify young children with undiagnosed TB disease and provide them with preventive therapy so that their disease does not progress to severe and disseminated forms.

TB prophylaxis

What should be offered?

The South African national tuberculosis programme (NTP)[2] currently recommends either a 6-month regimen of isoniazid (INH), 5 times a week, or 3 months of directly observed INH plus rifampicin (60/30), for all children who are household contacts of smear-positive PTB cases. It has been suggested that compliance with the latter regimen may be better as it is shorter.

The WHO[3] and most NTPs recommend INH, 5 mg/kg for 6 months. Follow-up should be at least 2-monthly until the treatment is complete. The American Academy of Pediatrics[4] recommended somewhat higher doses (10 - 15 mg/kg) in its 2004 position paper and recent local studies have supported this recommendation (P Donald – personal communication). The local recommendation may change.

What about the side-effects of INH?

It should be remembered that INH can and does commonly cause a number of 'minor' side-effects such as mild and transient headache, nausea and dizziness. These are unlikely to be detected in young children and infants but this does not mean they do not occur. In addition, the drug is well known to cause hepatotoxicity. Most commonly, an asymptomatic, transient elevation of transaminases may occur. Relatively rarely, a clinical hepatitis that resolves when INH is discontinued may occur. Very rarely, a fulminant hepatitis and liver failure may occur. Children at particular risk are those with pre-existing liver disease, malnourished children, and those receiving other potentially hepatotoxic drugs (e.g. anticonvulsant medications).

Who should be offered TB prophylaxis?

There is agreement that all household contacts who are less than 5 years old and all who are HIV infected regardless of age should be offered chemoprophylaxis. What is less clear is

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what to offer the child who is a close contact but aged 6 years, or who is 4 years old but only a casual contact. There should be sufficient flexibility in the NTP to allow caregivers, whether doctors or nurses, to make an assessment of the individual child's risk and an evidence-based decision regarding the need for chemoprophylaxis rather than trying to enforce a rigid and arbitrary cut-off.

Why give TB prophylaxis?

A recent Cochrane Collaboration systematic review[5] of the efficacy of INH prophylaxis in the prevention of TB confirmed that daily INH for 6 - 12 months reduces the occurrence of active TB over the follow-up period. The summary relative risk (RR) for developing TB was 0.4 (95% confidence interval (CI) 0.31 - 0.52). The review also showed that INH is efficacious in preventing extrapulmonary TB (RR 0.34) and TB-specific (but not all-cause) mortality (RR 0.29). Most of those included in the review were admittedly not infants or young children.

Special circumstances

Where the contact is HIV-infected

If the child is otherwise well, it is recommended that INH prophylaxis be considered for all ages, including those aged 5 years and older.

Contacts of infectious multidrug-resistant (MDR) TB cases

The only chemoprophylaxis regimens studied are based on INH with or without rifampicin. MDR TB is resistant to both of these by definition, so it makes little sense to use them as prophylaxis for contacts of MDR cases. Instead, careful clinical follow-up for at least 2 years is recommended. The WHO[3] does not currently recommend second-line drugs for chemoprophylaxis in such situations. The reader is also referred to the article by Schaaf[6] in this series for further information on this issue.

Baby born to mother diagnosed with infectious PTB

Once the mother has been on effective treatment for 2 - 3 weeks, she is generally no longer infectious. The risk is highest if the mother is diagnosed at the time of delivery or shortly thereafter. The baby and the placenta should be investigated for evidence of congenital TB infection. This is a difficult diagnosis to make and generally needs specialist referral. It should be emphasised that breastfeeding can be continued safely during this period, should this be the mother's choice.

Breastfeeding infant with a mother with smear-positive PTB

These infants are at very high risk of infection and disease. One of two regimens is recommended: either they should be offered 6 months of INH, followed by BCG immunisation; or 3 months of INH, then a TST and, if negative, cessation of the INH and BCG, if positive, continuation of the INH for another 3 months, after which it can be stopped and BCG given. Again, breastfeeding can be continued safely during this period.

Why doesn't it happen?

Given that we know it works, and we know how serious the consequences are of not protecting exposed infants and young children, one has to ask why so few childhood contacts in South Africa and other developing countries receive their chemoprophylaxis. The WHO[3] position paper admits: 'Close contact screening and management is recommended by most NTPs, but rarely happens in low-resource settings, where the majority of childhood TB occurs – although for the majority of child contacts assessment can be a straightforward procedure that simply requires clinical evaluation.'

Possible reasons for failure of the programme and possible obstacles to its implementation include:

- A lack of resources – a primary care clinic which is barely managing to cope with its load of acutely and chronically ill patients is unlikely to be able to commit human or physical resources to prevention.
- No provision for the management of contacts within the NTP, which understandably and rightly focuses on curing more than 85% of smear-positive patients. Exposed children are not seen as a priority within the NTP.
- Children started on INH prophylaxis are usually not registered. There may or may not be a contact book but record keeping is likely to be suboptimal, which makes efficient programme management unlikely.

Proposed solutions

Some innovative suggestions, based on experiences in other developing countries, are proposed in the WHO[3] paper. These include:

1. Separate structures for contact screening and management. These structures would work within the existing NTP.
2. Special 'contact clinics' at a set time and place each week where child contacts can be assessed.
3. The same health care worker who supervises the treatment of the source case to take responsibility for the management of the contacts of that source case. This is likely to be more convenient and acceptable for the family and lead to improved compliance.
4. Adding an information box to the reverse side of the general TB treatment card to remind TB caregivers about the necessity of contact tracing and chemoprophylaxis.
5. Each child on prophylaxis to have her/his own TB prophylaxis card.
6. A separate registration book or register for children on TB prophylaxis.

Conclusion

Tracing infants and young children who are contacts of infectious TB cases and offering them chemoprophylaxis remains a relatively cheap and effective means of preventing the serious sequelae of childhood TB. In the absence of a more effective vaccine it should be given more prominence in TB control programmes in high-burden countries, including South Africa.

References

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