

Criteria for the notification of childhood tuberculosis in a high-incidence area of the western Cape Province

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Summary

The medical records of 124 children notified from Ravensmead Clinic, Parow, as having tuberculosis during 1987 were reviewed in order to determine the strength of the evidence on which the diagnosis was made. Arranging the diagnostic criteria in a hierarchical manner, as suggested by the World Health Organisation, the cases were categorised as suspect, probable or confirmed. Twenty-five were suspect cases (20%), 89 probable cases (72%) and the remaining 10 confirmed cases (8%). These findings indicated that notifications from the clinic were being made in accordance with internationally accepted practice. The use of the WHO approach for the categorisation of childhood tuberculosis cases is recommended for both clinical and epidemiological purposes.

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Attention has recently been drawn to the fact that notifications of primary tuberculosis from the Western Cape Health Region constitute 89% of all notifications in this category in the RSA. In contrast, the Western Cape Health Region reported only 24% of the RSA's pulmonary tuberculosis in 1986.¹ Children comprise 27% of all tuberculosis notifications from the Western Cape Health Region and changes in childhood notifications may thus have a major impact on the total notification rate for the region. In the interest of effective tuberculosis control in the western Cape it is important to know how much reliance can be placed on these figures.

Pulmonary tuberculosis in childhood is responsible for a wide spectrum of manifestations, ranging from widespread bronchopneumonia with cavitation to mild hilar adenopathy or a normal chest radiograph.² In contrast with adults, however, it is in only a minority of childhood cases that the diagnosis is incontrovertibly proven by culture of *Mycobacterium tuberculosis* from gastric aspirate or another source.³ Since young children, particularly those under 2 years of age, are prone to develop disseminated disease after tuberculous infection,⁴ the clinician may feel compelled to initiate antituberculosis therapy upon grounds that, to the uninitiated, may appear somewhat flimsy. Recently a plea was made for the use of a uniform set of diagnostic criteria for childhood tuberculosis.⁵

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In this study all notifications of tuberculosis in children < 14 years of age originating from Ravensmead Clinic, Parow, in 1987 were retrospectively reviewed; we report on the criteria supporting the diagnosis of tuberculosis in these children. Taking into account the uncertainty inherent in diagnosing tuberculosis in childhood, we have also used these criteria to classify the cases as suspect, probable or confirmed in a manner similar to that recommended by the World Health Organisation⁶ and applied recently in modified form by workers in Kenya.⁷

Patients and methods

A list of all notifications of tuberculosis in children < 14 years of age for the Ravensmead area during 1987 was obtained from the Western Cape Regional Services Council. The clinic records of the children were studied to establish the criteria for diagnosis. Note was taken of the children's age, sex and mass at the time of notification, the results of tuberculin testing, and of culture of gastric aspirate or other material, and the results of chest radiographs and whether these were full-size or miniature. A history of contact with an adult receiving treatment for pulmonary tuberculosis was also noted.

Applying an hierarchical approach similar to that recommended by the WHO and modified by Cundall *et al.*⁷ we have used the diagnostic criteria to classify the cases as suspect, probable and confirmed. *Suspect cases* were those with a suspicious chest radiograph — usually a miniature — where some doubt was expressed as to the radiological findings or the quality of the plate and no other findings were noted in the patient's record to support a diagnosis of tuberculosis. *Probable cases* were those with a suspicious chest radiograph together with weight loss or failure to gain in weight or a history of contact with an adult case of pulmonary tuberculosis or with a grade III or IV positive Heaf test. Children with a good quality chest radiograph alone — usually full size — with changes probably due to tuberculosis, such as hilar or paratracheal adenopathy or a miliary picture, were also included in this group. *Confirmed cases* were those having a positive culture on gastric aspirate for *M. tuberculosis*.

This study was approved by the Ethical Committee of the Faculty of Medicine of the University of Stellenbosch.

Results

During 1987, 135 cases of tuberculosis in children were notified from the Ravensmead area. Of these, the clinic records of 124 children (92%) were available for evaluation. The male:female ratio of the children was 1.03. Forty-six per cent of the children were < 2 years of age, 34% were aged 2-4 years and the remaining 20% were ≥ 5 years. Eleven children (9%) had been notified as having pulmonary tuberculosis and the remainder as having primary tuberculosis.

The report on a chest radiograph by the clinic medical officer was available in all 124 children. In 41 cases (33%) this was a full-size plate and in the remaining 83 cases a miniature.

TABLE I. CRITERIA FOR THE NOTIFICATION OF CHILDHOOD TUBERCULOSIS AT RAVENSMEAD CLINIC, 1987

Group	'Suspicious' chest radiograph	Weight loss or failure to gain	Adult pulmonary tuberculosis contact	Heaf test grade III or IV	'Diagnostic' chest radiograph	Culture positive	Total
Suspect (20%)	25	0	0	0	0	0	25 (20%)
Probable (72%)	5	5	0	0	0	0	5 (4%)
	34	1	34	0	0	0	34 (27%)
	9	0	5	9	0	0	9 (7%)
Confirmed (18%)*	0	4	20	6	41	0	41 (33%)
	2	0	7	0	7	10	10 (8%)

* Includes 1 normal full-size radiograph in a child with confirmed tuberculosis.

Lymphadenopathy was noted in 92 children (70 miniature plates and 22 full-size), lymphadenopathy and pulmonary infiltration in 27 children (13 miniature and 14 full-size plates) and pulmonary infiltration alone in 4 full-size plates. One full-size chest radiograph was considered normal.

A tuberculin test (almost exclusively the Heaf test) had been carried out and read in 91 children (73%) and was positive grade III or IV in only 15 cases (16%). A grade I or II result was obtained in a further 42 children (34%).

Sixty-six of the children (53%) were noted to be living in the same household as an adult who was being treated for tuberculosis.

Forty-nine children (40%) had a mass for age of less than the 3rd percentile at the time of notification while 10 (8%) had lost weight or were not gaining adequately.

There was no difference in diagnostic criteria between those children notified as having pulmonary tuberculosis and those notified as having primary tuberculosis.

The diagnostic criteria are summarised in Table I and the children categorised as suspect, probable or confirmed cases, taking into account the reliability and diagnostic importance of the evidence. Twenty-five children (20%) were diagnosed solely on the basis of a suspicious chest radiograph. Of the 89 children (72%) with probable tuberculosis, 41 had a chest radiograph considered diagnostic of tuberculosis, and 48 children had a suspicious chest radiograph together with a grade III or IV Heaf test in 9 cases, a history of contact in 34 cases and weight loss or failure to gain weight in 5 cases. In 10 patients (8%), who were referred from tertiary care institutions, the diagnosis was confirmed by culture of *M. tuberculosis* from a gastric aspirate.

Discussion

The lack of definitive diagnostic tests for childhood tuberculosis creates a dilemma for both the clinician and the epidemiologist. The absence of a 'gold standard' necessitates the use of a combination of symptoms, signs and special investigations to arrive at the diagnosis. The WHO approach uses such a set of clinical characteristics arranged in an hierarchical fashion, which reflects the level of certainty with which the diagnosis is made. Applying a modified form of this categorisation to the Ravensmead cases we found 80% of the notifications to be 'probable' or 'confirmed' tuberculosis. In the remaining 20% the diagnosis was based solely on a suspicious chest radiograph — usually a miniature plate. These findings indicate that notifications of childhood tuberculosis from the Ravensmead Clinic are being made in accordance with internationally accepted practice. If these findings can be applied to other clinics in the western Cape then over-notification of childhood tuberculosis within the region is unlikely to be taking place.

The notification forms currently in use in South Africa do not permit evaluation of the criteria used in the diagnosis of

childhood tuberculosis. This allows varying case definitions to be applied in the notification process and makes inter-regional epidemiological comparisons hazardous. For such comparisons and an evaluation of long-term trends, reliance should be placed instead on better verifiable conditions such as tuberculous meningitis⁸ or on the annual risk of infection.⁹

The adoption of an approach similar to that of the WHO to the notification of childhood tuberculosis, and the inclusion of diagnostic criteria on the notification form, would better reflect the reliability of the available diagnostic evidence and promote the use of a standard case definition for both epidemiological and clinical purposes. It would have the additional advantage of assigning priority to certain patients with a view to contact tracing.

Hilar adenopathy remains a major radiological criterion for the diagnosis of childhood tuberculosis. It may, at times, be difficult to detect on a full-size chest radiograph and even more difficult to distinguish with certainty on a miniature radiograph. It is distressing that clinic staff must in many instances still rely on miniature chest radiographs for children. The local authority is aware of this problem and steps are being taken to make better quality chest radiographs of children available.

Finally, a disappointingly small number of children had a grade III or IV Heaf test. Because of the prominent role of tuberculin testing in the diagnosis of childhood tuberculosis the reasons for this poor tuberculin sensitivity in a number of undoubted cases of tuberculosis require further investigation.

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