

## Case Report

# Disseminated tuberculosis in a Nigerian child: making a case for active contact tracing

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### ABSTRACT

Tuberculosis (TB) is a significant public health problem globally, especially in developing countries. Every day, up to 200 children (aged less than 15 years) lose their lives to tuberculosis – a preventable and curable disease. Disseminated TB is a potentially life-threatening form of TB, and it is common in infants and children. Contact tracing and the examination of household contacts, particularly of known sputum smear-positive cases, is highly effective in tuberculosis control. Unfortunately, in many high-burden countries, little effort is directed towards identifying contacts of newly diagnosed TB patients. Indeed, TB contact investigations are rarely and inconsistently carried out in resource-limited settings. This failure places children at significant risk. A case of disseminated TB in a child is herein reported, aiming to highlight the pertinent aspects of the history, clinical presentation and outcome, which ultimately underscore the need for active contact tracing. Contact tracing must be strongly advocated for, as this will go a very long way in reducing the burden of childhood TB.

**Keywords:** Disseminated, Tuberculosis, Children, Active, Contact, Tracing

### INTRODUCTION

Tuberculosis is a significant public health problem globally, especially in developing countries.<sup>1</sup> In 2012, WHO estimated that 530,000 children (<15 years) had TB (6% of the global 8.6 million), with up to 74,000 child deaths (6% of global death burden excluding TB/HIV), and over 75% of these cases were in the 22 high-burden countries (including Nigeria) that account for 80% of the world's incident TB cases.<sup>2,3</sup>

In 2014, 1.5 million people died from TB (1.1 million HIV-negative and 0.4 million HIV-positive).<sup>4</sup> These deaths comprised of 890 000 men, 480 000 women and 140 000 children.<sup>4</sup> Every day, up to 200 children (aged less than 15 years) lose their lives to tuberculosis – a preventable and curable disease.<sup>5</sup>

Disseminated TB is defined as tuberculous infection involving the blood stream, bone marrow, liver, or 2 or more non-contiguous sites, or miliary TB.<sup>1,6</sup> It is a potentially life-threatening form of TB.<sup>6,7</sup> The exact incidence of disseminated TB is unclear,<sup>6</sup> though a centre in Nigeria has reported it to constitute about 50.7% of cases of childhood TB.<sup>8</sup> However, disseminated TB is common in infants and children.<sup>9</sup>

The highest incidence of childhood TB is among contacts of adults with smear-positive TB.<sup>10</sup> It is therefore important to trace these contacts for evaluation and treatment/prevention. Contact tracing and the examination of household contacts, particularly of known sputum-positive cases, is highly effective in tuberculosis control.<sup>10,11</sup>

Unfortunately, in many high-burden countries, little effort is directed towards identifying contacts of newly diagnosed TB patients.<sup>12</sup> Indeed, TB contact investigations are rarely and inconsistently carried out in resource-limited settings.<sup>13</sup> This failure places children at significant risk.<sup>12</sup>

We herein report a case of disseminated TB in a child in Uyo, Nigeria, aiming to highlight the pertinent aspects of the history, clinical presentation and outcome, which ultimately underscore the need for active contact tracing.

## CASE REPORT

A 2-year old girl presented to the Children's Emergency Unit [CHEU] of the University of Uyo Teaching Hospital [UUTH], Uyo, Akwa Ibom State, Nigeria, on the 18th of March, 2017 with a 3-month history of difficulty in breathing, cough, swellings on the neck and the back, fever, and a one week history of inability to walk.

She was in good health until about 3 months prior to presentation, when she developed difficulty in breathing. It was gradual in onset and progressively worsened. The difficulty in breathing occurred at rest but worsened with activity. There was no history of choking during feeds, nor bluish discoloration of the lips.

The cough started at about the same time with the difficulty in breathing. It was non-paroxysmal, not worse at any time of the day; there was no post-tussive vomiting. No known aggravating or relieving factors. The cough gradually became distressing.

The fever was noticed 3 months prior to presentation, and it was of moderate grade and continuous, not worse at any time of the day, relieved temporarily by the administration of paracetamol. The patient usually has about 1-2 weeks of fever-free periods.

The swelling at her back and on the neck were noticed at about the same time (about 3 months prior to presentation). It was first noticed as a small swelling at the middle of the back, that was painful (patient cried when it was touched), and gradually increased in size. The mother took the child to a traditional bone-setter who unsuccessfully tried to reduce the swelling by massaging and scarification. The mother also noticed some swelling around the neck of the child.

The child stopped walking one week prior to presentation. This was initially preceded by an abnormal gait, before she could no longer stand nor walk. There was also a history of progressive loss of weight. The mother then took the child to a primary health center. At that facility, she was given intravenous infusions and some intravenous medications (names unknown), but with no improvement in symptoms, and was then referred to UUTH.

Other aspects of the history were not contributory.

The child was not routinely immunized, but receives immunizations any time community health workers came around the area.

She is the first and only child of a single mother who is 19 years old (The mother stopped school after senior secondary level 2 due to an unplanned pregnancy). The whereabouts of the father of the child is unknown. The mother and child live with the child's grandparents in one poorly-ventilated room. The grandfather (who lives with them in the room) is said to be ill and not ambulant, and he has suffered from chronic cough for more than 6 months. However, he is said to have recently started receiving treatment for the cough from a hospital. There have been no home visits to them by any health worker. The grandmother sustains the family by hawking dried fish.

### *Physical findings*

On physical examination she was found to be chronically ill-looking, with prominent zygomatic bones and ribs, irritable, febrile to touch with body temperature of 37.5°C, mildly pale, acyanosed, anicteric, not dehydrated. There were right sub-mandibular, matted and enlarged tender lymph nodes (measuring 4cm x 4cm). The lymph nodes were not fixed to the skin or underlying tissue. There was no pedal edema. Her weight was 8 kg (57% of expected).

### *Respiratory system*

Respiratory rate: 48/min; with intercostal recession. Central trachea, chest expansion was reduced on the right. Percussion notes were dull on the right hemithorax, and resonant on the left. Coarse basal crepitations were heard.

### *Musculo-skeletal system*

There was a non-tender gibbus over the mid-thoracic region, extending from the level of T3-T6, with areas of healed excoriations. The gibbus measured 6cm x 6cm (bony and fixed).

### *Central nervous system*

She was conscious but irritable; the neck was supple; no obvious cranial nerve deficits; no signs of meningeal irritation. The tone was normal in the upper limbs, but decreased in the lower limbs. The power was of grade 5/5 in both upper limbs, but 0/5 both lower limbs.

### *Cardio-vascular system*

*Pulse rate:* 96/minute, full volume, and regular; *Apex beat:* at the 4th intercostal space, mid-clavicular line; S<sub>1</sub>, S<sub>2</sub> only. No murmurs.

### *Digestive system*

Poor oral hygiene, moist buccal mucosa, no thrush. Abdomen: scaphoid, soft and moved with respiration; the liver was palpably enlarged by 2 cm below the right costal margin, mildly tender, with a smooth edge; the spleen was not palpably enlarged and the kidneys were not ballotable. The bowel sounds were normal.

### *Diagnosis*

1. Disseminated TB (Spine, lungs and lymph nodes), with paraplegia
2. Marasmus

### *Laboratory findings*

Full blood count: Hb: 9.6 g/dl; PCV 32%; WBC:  $18.7 \times 10^9$  (Neutrophils 44%; Lymphocytes 47%; Monocytes 9%); HIV screening: negative; Blood film: monocytic, hypochromic red blood cells, with leucocytosis, and adequate platelets.

The outlined investigations that consisted of X-ray of the chest, cervical and thoracic spines, Mantoux test, gastric aspirate for GeneXpert, urinalysis and urine m/c/s could not be done because the patient's mother had severe financial constraints.

Intravenous ceftriaxone and gentamicin were commenced. She was fed (as tolerated) with fortified pap via a naso-gastric tube.

The DOTS unit, the Orthopedic unit and the Dieticians were all invited to also review the patient.

She was commenced on anti-TB drugs, along with a plan for physiotherapy and possible application of a thoraco-lumbar jacket.

However, her clinical condition progressively deteriorated, with worsening respiratory distress (despite intranasal oxygen), and reducing level of consciousness. She died on the 9th day of admission.

## **DISCUSSION**

Disseminated TB is a potentially life-threatening/lethal condition, especially when there is a delay in diagnosis and treatment.<sup>1,7</sup> It is common among infants and children.<sup>9</sup>

Contact tracing is the process of evaluating persons who have been in contact with patients that have TB.<sup>11</sup> It is invaluable in the TB program, and has been recommended as a strategy to increase TB case finding for many years.<sup>14,15</sup> Contact tracing follows the identification of a tuberculosis index case, and it is an

important strategy for the early identification and treatment of childhood tuberculosis, and for the provision of prophylaxis for cases with a high risk of progression of disease.<sup>16</sup> This prophylaxis involves Isoniazid Preventive Therapy (IPT), and the initial targets are those at most risk of disease progression, such as young children and human immunodeficiency virus (HIV) infected individuals in contact with an infectious adult with TB.<sup>13,17</sup>

In developed countries, most cases of childhood TB are detected through contact tracing and the outcome is good.<sup>18</sup>

However, TB contact investigations are rarely and inconsistently carried out in resource-limited settings.<sup>13</sup> In most of these developing countries, it is either not conducted, or is implemented on the basis of no or poor standards, due to the absence of clear definitions of index cases, contacts and procedures. Additionally, there is no clear identification of the health personnel who should be involved.<sup>13</sup>

Contact tracing done in a timely manner would have availed the index case presented above, the opportunity of an evaluation, and the early institution of anti-TB treatment/isoniazid preventive therapy (IPT). This patient was a contact of her grand-father who had chronic cough, for which he was receiving treatment at a health facility, but there was no indication of any home visit by a health worker.

TB contacts should be investigated systematically and actively for TB infection and disease.<sup>13</sup> There are two main types of contact tracing, namely, active contact tracing and passive contract tracing.<sup>11</sup> Active contact tracing involves the regular visits by health workers to the families of patients with TB, while keeping a contact register.<sup>11</sup> In passive contact tracing, there is the health education of the TB patient at the TB clinic, which serves to encourage him or her to bring any family member with suspect symptoms to the health facility for screening.<sup>11</sup> In the index case reported, neither of these types of contact tracing appeared to have been done.

Contact tracing must be strongly advocated for, despite the limited resources in our setting, for it permits the diagnosis of TB in children who are still asymptomatic, as well as helping to identify infected subjects who may benefit from chemoprophylaxis.<sup>10</sup> This will go a very long way in reducing the burden of childhood TB.<sup>10</sup>

## **CONCLUSION**

Tuberculosis is a significant public health problem globally, especially in developing countries, with disseminated TB being common in infants and children.

Contact tracing and the examination of household contacts, particularly of known sputum-positive cases, is highly effective in tuberculosis control. However, in many high-burden countries, little effort is directed towards identifying contacts of newly diagnosed TB patients. Unfortunately, this appeared to be the case in this index pediatric patient.

Contact tracing must be strongly advocated for, as the failure to conduct proper contact tracing constitutes a missed opportunity to prevent TB transmission in children.<sup>12</sup>

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