CASE REPORT

Tuberculous suprasternal notch abscess in a child

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SUMMARY

Tuberculosis has been declared a 'Global Emergency' by the WHO. Owing to the magnitude of the problem, knowledge of unusual presentations at rare sites can help identify the disease early and achieve good to fair results. We present one such rare case of a child with an anterior midline swelling. An anterior midline swelling in a child raises multiple diagnostic possibilities. Although cervical lymphadenitis is a common cause of neck swelling, tuberculous suprasternal notch abscess, secondary to lymphadenitis, has rarely been described. Radiological investigations revealed necrotic tissue in the base of the suprasternal notch. The diagnosis was made using needle aspiration and cytology, which was suggestive of tuberculous lymphadenitis for the neck swelling. Antituberculous therapy gave good results, with complete healing of the ulcer and resolution of the abscess.

CASE PRESENTATION

A 6-year-old boy presented to the paediatric orthopaedics outpatient department, with a gradually progressive swelling over the suprasternal notch for the past 1 month. The swelling was globular in shape, spontaneous in onset and localised in the suprasternal notch (figure 1A, B). There were no other constitutional symptoms, and there was no history of contact with a case of tuberculosis. Immunisation of the child was complete for his age, and he had been immunised with BCG, as was apparent from the scar on the lateral aspect of his left arm.

On general physical examination, there was pallor but no generalised lymphadenopathy and no cervical lymphadenopathy in particular. On local examination of the swelling, it was found to be globular in shape, 2 cm in diameter, located in the suprasternal space just above the notch and deep to the subcutaneous plane but superficial to the trachea. There was no local rise in temperature, and the swelling was non-tender. The swelling was fluctuant and cystic in nature, with indistinct margins. There was no discharging sinus at presentation. The suprasternal swelling did not move with deglutition and was free from the thyroid mass. There was no difficulty in respiration or stridor. The ear, nose and throat examination was within normal limits.

The patient had a haemoglobin of 10.2 g/dL and an erythrocyte sedimentation rate (ESR) of 55 mm/h. The Mantoux test was strongly positive in the child (induration equal to 22 mm). A plain chest radiograph revealed a lesion in the mediastinal area but did not show any abnormality in the sternum, clavicle and bilateral sternoclavicular joints. Ultrasound showed the swelling to be free from thyroid and

dirty yellow coloured, thick pus aspirated from the swelling was sent for culture and sensitivity, Gram and acid-fast bacilli (AFB) stain along with PCR for *Mycobacterium tuberculosis*. A CT of the chest and MRI of the neck, cervical and dorsal spine were planned to look for the source of the abscess and possible track of the abscess.

On the scheduled day of the CT and MRI, the abscess spontaneously burst open forming a sinus in the suprasternal space. The CT scan revealed a healed fibrotic band in the anterior basal segment of the right lower lobe, with multiple pre-tracheal, paratracheal and mediastinal subcentimetric lymph nodes (figure 2). The MRI study revealed no lesion in the thyroid and no other associated mediastinal lesion. There was a hyperintense lesion on the T2-weighted image abutting the superior border of the manubrium sterni, with internal necrotic foci (figure 3).

The presence of a midline neck swelling raises multiple diagnostic possibilities for the clinician, such as a thyroglossal duct cyst, dermoid cyst, infective lymphadenitis and thyroid swelling. Owing to the chronic and cystic nature of the swelling, fine-needle aspiration and cytology (FNAC) were performed. Since the radiological investigations (including the ultrasound and MRI) did not show any connection to the thyroid, thyroid as a primary source of the swelling was ruled out. The aspiration of thick, yellow coloured fluid and the presence of necrotic tissue at the base of the suprasternal space suggested an infective aetiology. The final clue to the source of infection came from the histopathological examination of the aspirated fluid.

The FNAC of the swelling revealed the presence of Langerhans' giant cells along with an epithelioid granuloma that was suggestive of tuberculous lymphadenitis (figure 4). The PCR for *M. tuberculosis* of the aspirate was also positive. As the vital anatomical structures were in close proximity to the suprasternal notch, medical management was kept as the first line of treatment. Moreover, the child did not have any pressure-related symptoms due to the abscess. In view of this, surgical exploration of the abscess was not undertaken, and on the basis of histopathology and other corroborative findings, the patient was started on antituberculous therapy (ATT). He was first started on isoniazid (H), rifampicin (R), pyrazinamide (Z) and ethambutol (E) along with pyridoxine for 2 months, followed by H and R for a duration of 4 months. The dose of ATT was adjusted according to the weight of the child.

On follow-up, the sinus had enlarged to form an ulcer 2 cm in diameter. In the presence of unusual sites and presentations, immunodeficiency should

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Figure 1 (A) Front view of the child, showing a swelling in the suprasternal notch. (B) Side view of the child, showing visible swelling in the suprasternal notch inferior to the thyroid.

be ruled out. Hence, the patient was investigated for HIV-1 after counselling. This result turned out to be negative, and the routine course of ATT was continued. The base of the ulcer was covered with red granulation tissue and showed signs of progressive healing on ATT. The lesion was totally healed at the end of the third month of ATT (figure 5). The ESR reduced to 15 on treatment with ATT.

GLOBAL HEALTH PROBLEM LIST

- ▶ Tuberculosis is making a global comeback due to an increase in the number of immunodeficient people and other factors such as large-scale population migration.
- ▶ People at extremes of age, such as children and the geriatric population, are more at risk for this disease.
- ▶ An increasing number of patients are now being diagnosed with an extrapulmonary form of tuberculosis that is hard to diagnose and may need prolongation of medical therapy.

GLOBAL HEALTH PROBLEM ANALYSIS

Tuberculosis (TB) has been labelled as the ‘second great imitator’, second only to syphilis, due to its multiple presentations and the involvement of pulmonary as well as extrapulmonary sites.¹ The incidence of extrapulmonary tuberculosis (EPTB) has been constant as compared to the pulmonary forms.² Moreover, EPTB can have different clinical presentations, and the diagnosis is difficult when compared to pulmonary tuberculosis. Epidemiologically, tuberculosis has traditionally been labelled as

a disease of the developing world, but large-scale population migration as well as an ageing population has helped the disease to make its presence felt even in developed countries.³

As far as population demographics are concerned, TB has classically affected patients with reduced immunity, putting the paediatric population at greater risk.⁴ The incidence of EPTB in children has been continually rising around the world.⁵ Considering that the incidence of TB as well as EPTB in the paediatric population has been increasing, the treating clinician should be aware of all the rare presentations of the disease.

Tuberculosis is no more an endemic disease of the developing world, as more and more cases are now being reported from developed countries.³ The trend of tuberculosis in the USA and the UK had a gradual but steady decline in incidence rate until the 1980s.^{6,7} However, the trend has been diverging between the two countries over the past 20 years. Even though the USA has showed a constant decline over the years, in the UK, TB rates have increased from 10 (in 1992) to 12.3 per

Figure 2 CT scan of the chest showing fibrosis in the right basal lobe (white solid arrow).

Figure 3 MRI of the neck showing a breach in the skin (solid white arrow), through which the abscess drained out. There is visible necrotic tissue at the base of the suprasternal space (solid yellow arrow).

Figure 4 Photomicrograph of the aspirate showing a Langerhans'-type giant cell in the middle and the typical epithelioid granuloma on the background picture of the lymph node.

100 000 in 2013.⁶ The reasons for this change in trend can be attributed to the overall increase in number of tuberculosis cases and also to reactivation of TB in the immigrant population. The number of cases of TB in the native UK population has remained unchanged from 2000 to 2011, and the number of cases in the immigrant population has increased by a startling 80% in the same period.⁸

The number of foreign-born UK patients suffering from EPTB increased by almost twofold from 2001 to 2011.⁸ EPTB cases usually pose a diagnostic dilemma due to their uncharacteristic presentation.⁹ This diagnostic dilemma combination with the lack of awareness in physicians can add to the delay in diagnosis and, in turn, have a bearing on the outcomes of treatment.

Figure 5 Clinical photograph of the child, showing the scar healed by secondary intention in the suprasternal notch at the end of 3 months of treatment.

The recent rise in cases of TB can be attributed to an increase in the number of patients with immunodeficiency (HIV etc), large-scale population migration and an ageing population, among other reasons.³ An estimated 1.3 million cases of tuberculosis and 450 000 associated deaths occur annually among children.¹⁰ There has been a recent increase in the number of paediatric patients with TB worldwide. EPTB cases account for one-third of these instances.¹⁰ Children have been shown to be at higher risk, and they also tend to develop a more severe variety of EPTB.¹¹

The presence of a midline neck swelling raises multiple diagnostic possibilities for the paediatric surgeon. A midline swelling in the neck of a paediatric patient can be divided into developmental, inflammatory/infective and neoplastic. The differential diagnoses include conditions such as dermoid cysts, branchial cysts, vascular malformations, reactive and infective lymphadenitis, etc.¹² When indicated, an ultrasound is the preferred first line of investigation. A child with a neck swelling that is not responding to 4–6 weeks of antibiotics should be further investigated with invasive procedures, including FNAC or excisional biopsy.¹²

The case reported here is of a paediatric patient who was diagnosed by positive histopathological examination. In the present case, a detailed MRI of the neck and soft tissues including spine revealed no abnormality other than the presence of necrotic tissue at the base of the suprasternal space. Moreover, a chest CT showed no signs of an active chest infection. The patient did not have any constitutional symptoms but presented with only a gradually progressive swelling in the neck. The purified protein derivative (PPD) test was strongly positive, and the histopathological examination of the FNAC aspirate had the presence of Langerhans'-type giant cells and epithelioid granuloma, which was suggestive of TB. The ulcer in this patient responded well to antituberculous therapy, and it healed at the end of an intensive phase of treatment (2 months).

The suprasternal space is a space between the two layers of the investing layer of the deep cervical fascia of the neck. Just above the manubrium sterni, the investing layer divides into a superficial and a deep layer, which is attached to the anterior and the posterior border of the manubrium sterni. The usual contents of this space are areolar tissue, the lower parts of the anterior jugular veins and the jugular venous arch, the sternal heads of the sternocleidomastoid muscles and, sometimes, a lymph node. The lymph node present in this area is quite consistent.

Tuberculous lymphadenitis is the most usual form of EPTB.⁹ In the neck, it usually presents with a swelling and is mostly not associated with constitutional symptoms unless coupled with pulmonary TB. Although tuberculous lymphadenitis is one of the most common forms of extrapulmonary TB, it is extremely uncommon in the suprasternal space.

Suprasternal notch abscess has been rarely and sparingly reported in the literature. Khalil *et al*,¹³ in their series of three cases, reported a single case of a 6-year-old child. In all of the three patients, no MRI was performed to look for the radiological correlation of the source of the abscess. Asayama *et al*¹⁴ reported a single case of suprasternal notch abscess that was diagnosed with a positive culture growth. The lesion in their case was found to be invading the thyroid gland. The case reported here had a pretreatment MRI as well as an available photomicrograph correlating with the diagnosis of tuberculous lymphadenitis. The unusual location of the lesion along with the MRI scan showing the sinus track make the case unique.

Whenever a midline anterior neck swelling is present, along with an elevated ESR and a strongly positive PPD, tuberculous lymphadenitis should be considered as a part of the differential diagnosis. Owing to the paucibacillary nature of the disease, the AFB stain and the culture may not always be positive. The histopathology, hence, may come to the rescue of the treating physician. FNAC is a safe, comfortable, minimally painful and rapid out-patient procedure for obtaining the material for histopathological diagnosis.

The management of a tubercular suprasternal abscess in a paediatric patient usually consists of ATT. There has been a single case reported in the English literature of a tubercular suprasternal notch abscess in a paediatric patient. That case, reported by Khalil *et al*,¹³ of a 6-year-old girl, was also managed with FNAC and ATT. Care must be taken to avoid damage to the critical bony structures and the great vessels, due to their proximity. Usually, once the diagnosis is achieved using FNAC, medical management in the form of ATT gives excellent results and avoids any need for surgical exploration in this precarious area. In some cases, if there are symptoms associated with mass effect due to the abscess or difficulty in obtaining the diagnosis, excision biopsy may, very rarely, be indicated.

Learning points

- ▶ Tuberculous suprasternal notch abscess in a child is an exceedingly rare entity.
- ▶ Knowledge of unusual presentations of this impending global pandemic, tuberculosis, can help in early identification of the disease.
- ▶ Early diagnosis (by keeping a high index of suspicion) and adequate treatment are needed to achieve a favourable result.
- ▶ In the presence of an unexplained indolent mass, a tissue diagnosis is a must. Since infection is a common cause, one should get cultures including mycobacterial studies.

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