

Neonatal tetanus - uncommonly encountered radiological manifestations

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Neonatal tetanus is a rare, acute, occasionally fatal disease, the incidence of which has greatly diminished with routine immunisation. The radiological features are seldom encountered nowadays. Neonatal tetanus is still prevalent in some developing countries. We present a case of a neonate who developed some of the complications and radiological features described in cases of neonatal tetanus.

Tetanus is an acute, often fatal, disease caused by an exotoxin produced by the Gram-positive bacterium *Clostridium tetani*. It is characterised by generalised rigidity and convulsive spasms of the skeletal muscles. The incubation period ranges from 3 to 21 days - usually about 8 days.

Neonatal tetanus is a form of generalised tetanus that occurs without protective passive immunity. It usually occurs as a result of infection of the unhealed umbilical stump, particularly when the stump is cut with an unsterile instrument. With the advent of routine childhood immunisation, there has been a marked decrease in the incidence of tetanus. Neonatal tetanus, however, is still prevalent in some developing countries.

There are no laboratory findings characteristic of tetanus. The diagnosis is entirely clinical and does not depend on bacteriological confirmation.

Case report

The patient was a 1-week-old neonate, born in a peripheral hospital, presenting with tetanus. He was transferred to our ICU where he was ventilated for about 6 weeks. He subsequently developed some of the complications described in cases of neonatal tetanus, including rib fractures, nosocomial infections, extensive myositis ossificans, and heterotopic calcifications. These findings appear on serial chest radiographs and a computed tomography (CT) scan of the chest. Our patient had a protracted clinical course owing to persistent sepsis, respiratory complications (the commonest cause of morbidity and mortality) with the development of dense pulmonary calcification (Figs 1 and 2) and inferior vena cava thrombosis.

The patient had a favourable outcome.

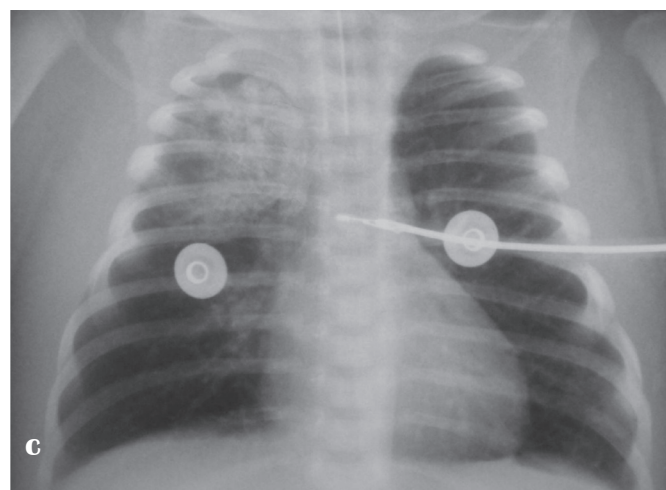
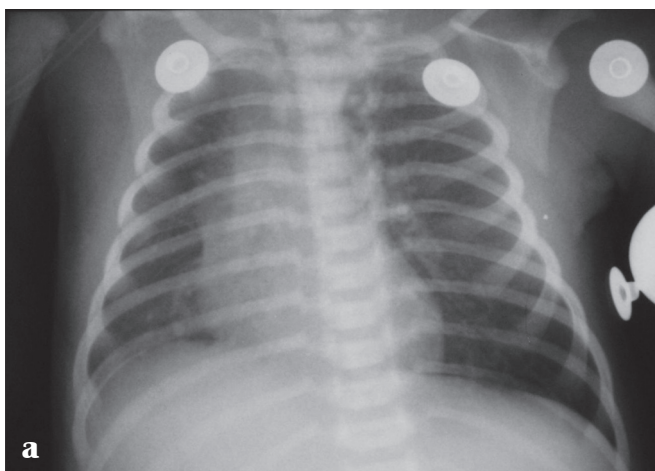
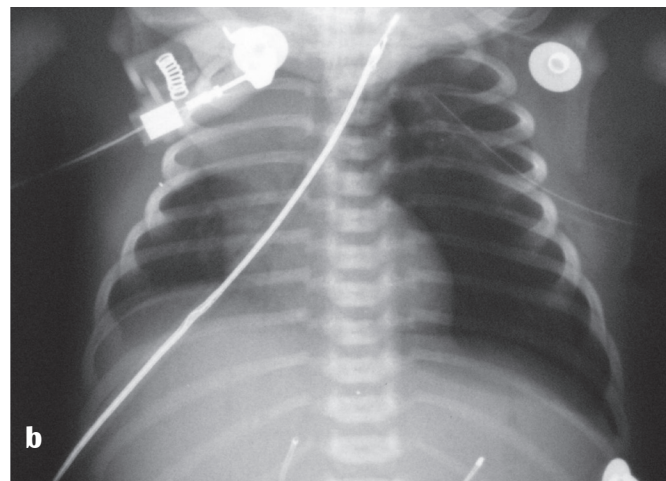


Fig. 1. Serial chest radiographs showing clear lung fields at birth (a), development of right upper lobe pneumonia (b), and the subsequent development of dense pulmonary parenchymal calcification in the right upper lobe (c).

CASE REPORT

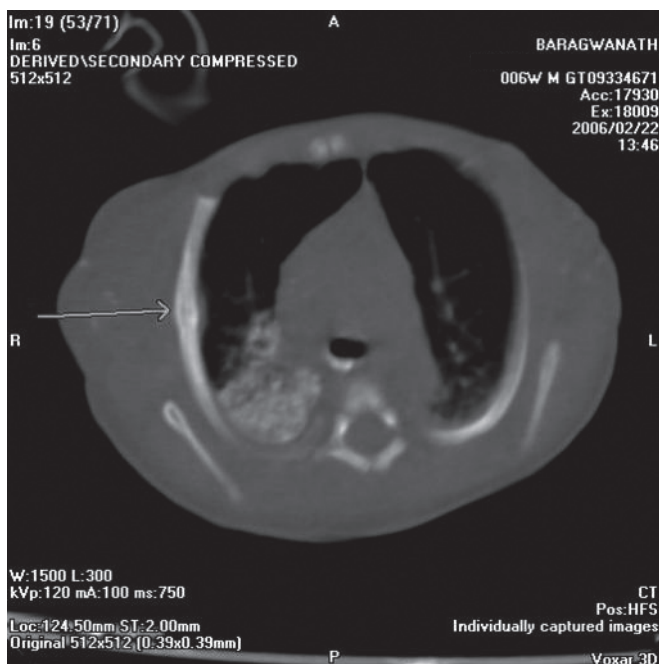


Fig. 2. CT scan of right first rib fracture. Calcifications in chest wall muscles also visible.

Discussion

The clinical picture of tetanus is entirely due to the action of the toxin on the central nervous system. The characteristic signs of the disease are rigidity and reflex spasms. Laryngospasm and/or spasm of the muscles of respiration leads to interference with breathing, therefore requiring prolonged ventilation. The condition of the lungs is therefore of clinical importance.

Nosocomial infections are a common cause of prolonged hospitalisation. Aspiration pneumonia is a common late complication of tetanus. Radiologically, it is important to differentiate atelectasis from pneumonia and initiate the correct treatment. Death results from pneumonia, aspiration, atelectasis, pulmonary oedema and asphyxia in the majority of cases, with septicaemia and cardiac arrest accounting for other deaths.¹

Pulmonary calcification has not previously been described in a case of neonatal tetanus. The dense upper lobe calcification seen in our patient (Fig. 3) probably represents dystrophic calcification deposited into pathologically abnormal tissue. The patient did have two isolated episodes of hyperphosphataemia during his ICU stay; whether this could have caused some metabolic calcification is uncertain. On further investigations, no serum mineral ion imbalances or any other metabolic abnormalities were detected.

The spasms and convulsions of tetanus may be sufficiently severe as to cause fractures of the spine and long bones. Spinal fractures are seldom of significance in the management of the acute stages of the disease. They do not affect the prognosis or lead to neurological sequelae. Spinal fractures may be multiple and almost always occur in the mid-thoracic region. Vertebral dislocation is rare but can occur, particularly in infants.¹ Other fractures may be more frequent than has previously been thought. A retrospective search of 171 neonatal tetanus patients showed 10 with bilateral acromion fractures.² Rib fractures (Fig. 2) and even femoral neck fractures can occur.

Post-tetanus myositis ossificans and heterotopic ossification following dislocation or subluxation has also been reported. The heterotopic calcification seen around the shoulder in this

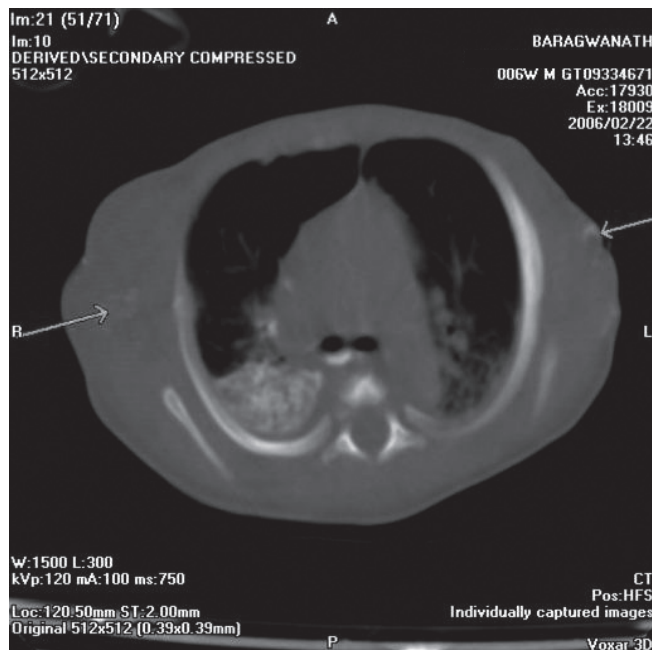


Fig. 3. CT scan of dense right upper lobe calcification. Myositis ossificans of chest wall muscles.

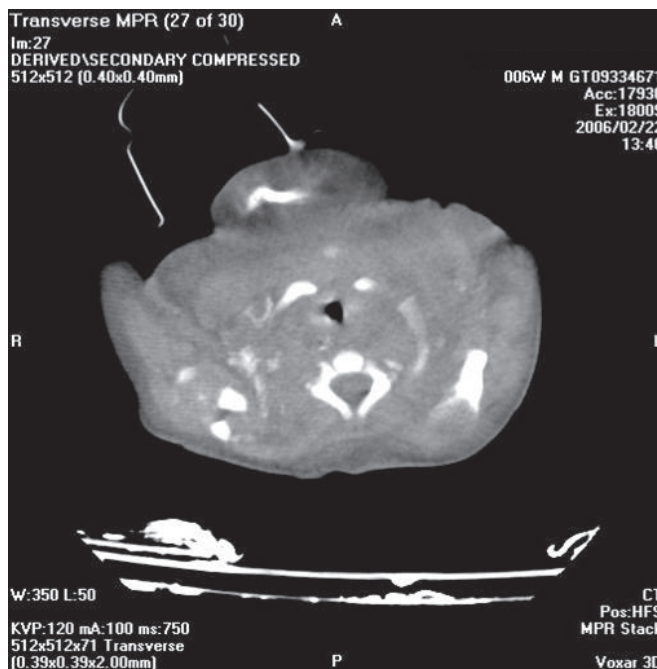


Fig. 4. CT scan of heterotopic calcification around shoulder.

case could have been a consequence of shoulder subluxation or a shoulder fracture (Fig. 4).

Conclusion

Neonatal tetanus as a clinical entity is rare. The radiological features are encountered even less frequently. Close clinico-radiological consultation is necessary in the interpretation of radiographs (particularly of the chest) and in the detection of complications associated with neonatal tetanus.

References

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2. Kalideen JM, Satyapal KS. Fractures of the acromion in tetanus neonatorum. *Clin Radiol* 1994; 49: 563-565.