

CASE REPORT

A case of myositis ossificans as a complication of tetanus treated by surgical excision

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Myositis ossificans is a heterotopic ossification of skeletal muscles which is commonly seen after trauma. However, it is rarely seen as a complication of tetanus. We report a case of myositis ossificans following tetanus in a female adult patient presenting with ankylosis of both elbows in extension.

INTRODUCTION

Tetanus is an acute, sometimes fatal, disease caused by exotoxins produced by *Clostridium tetani*, which is characterised by generalised rigidity and convulsive spasm of skeletal muscles. The widely known orthopaedic complications are fractures of the long bones, glenohumeral joint dislocation and flexion contractures. There are very few reports about myositis ossificans occurring as a complication of tetanus (4, 5, 9, 13).

CASE REPORT

A 45-year-old female patient was admitted to our hospital with respiratory problems. Physical examination showed stiffness in the rectus abdominus and a partial lockjaw. The patient reported an injury to the plantar surface of the right foot caused by a nail while walking barefoot in her garden twenty days previously. In view of these clinical findings and of the history, anti-tetanus treatment was started.

Despite immediate administration of antitetanus serum, crystalline penicillin and muscle relaxants, the respiratory problems became worse due to muscular rigidity and complete lockjaw. At this point

she was transferred to the intensive care unit where more aggressive anticonvulsant and muscle relaxant drugs were administered. Tracheostomy was performed.

The patient's vital functions returned to normal after one month. Six weeks after admission she complained of swelling and pain at the posterior aspect of both elbows accompanied by progressive loss of mobility. Plain radiographs of both elbows showed myositis ossificans of the triceps brachii muscles. She was treated with 50 mg daily indomethacin, physical therapy and called for monthly follow-up evaluations which included a physical examination, plain radiographs, and an interview.

Six months later, there was radiographic evidence of maturation of the heterotopic bone ; clinical examination showed ankylosis of both forearms in extension (fig 1). An operative intervention was planned on the basis of these clinical and radiographic findings. We performed excision of the heterotopic bone of both elbows through a medial approach. A rehabilitation program was immediately started and 50 mg daily indomethacin was

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Fig. 1. — AP and lateral radiographs of left (top) and right elbows before surgery. Note the ankylosis of both elbows in extension.

given for two weeks after the operation. At her last follow-up, six years after surgery, she did not complain of any symptoms referable to the elbows. The radiographs did not show any significant evidence of myositis ossificans (fig 2a,b) and she had a functional range of motion of both elbows (fig 3).

DISCUSSION

Although myositis ossificans is common after trauma, it is rarely seen as a complication of tetanus (5, 9, 13). Gunn and Young (4) were the first to report this kind of a complication.

As seen in our case, myositis ossificans usually occurs about six weeks after the onset of tetanus



Fig. 2A. — AP radiographs of right and left elbows taken at six years after the operation.



Fig. 2B. — Lateral radiographs of right and left elbows taken at six years after the operation.

with pain, swelling and warmth around the affected area accompanied by progressive loss of active and passive joint motion. The elbow appears to be the most common localisation; both elbows were affected in our patient.

The mechanism of ossification and calcification in this process is somewhat unclear and may be similar to that seen in the more common myositis ossificans following trauma (5, 9). It is believed that a haematoma caused by severe spasm or stretching may form in and around the muscle and lead to ossification. This heterotopic ossification may be caused by either a fibroblastic metaplasia or invasion of the haematoma by osteoblasts migrating from the damaged periosteum (5, 8). The mass



Fig. 3. — After a 6-year follow-up period after the operation there was a functional range of motion of both elbows

gradually becomes more and more dense and in the end it may differentiate into cortex and medulla (9).

Besides prophylactic measures, the treatment of heterotopic ossification is surgical excision of the ossification in cases where it is limiting the function of the extremity. There is insufficient evidence to support the theory that treatment initiated after the process has begun can limit the development of heterotopic bone (3, 10). In our patient indeed, the physical therapy and non-steroid anti-inflammatory treatment we administered after the diagnosis were not effective.

To prevent the development of heterotopic ossification following total hip arthroplasty operations and the recurrence of heterotopic ossification after their surgical excision, nonsteroid anti-inflammatory agents and low-dose radiotherapy have proved to provide effective prophylaxis (1, 2, 6). However, in the case of patients with tetanus, where myositis ossificans is a very rare complication, it may be inappropriate to use these agents as prophylaxis owing to their side effects. The appropriate approach is to avoid aggressive physical therapy especially in the initial period (5, 9), and to apply more gentle active and passive range of motion exercises.

If heterotopic ossification is limiting function, the treatment is surgical excision. The subsequent behaviour of the heterotopic bone occurring as a complication of tetanus is similar to that seen in traumatic myositis ossificans and any interference in the active stage is likely to make it worsen (9). The important point concerning the timing of surgery is that maturation of the heterotopic bone must be achieved (10). In the absence of an associated injury of the central nervous system, a well-defined trabecular pattern on standard radiographs, which usually is visible by six to eight months after the injury, remains the best indication that the heterotopic bone is mature (10, 12) because levels of serum alkaline phosphatase may decrease before maturation and activity on bone scans can persist long after maturation is well established (11). Recurrence after resection of radiographically mature bone is uncommon even without the use of prophylaxis (7).

In our patient, maturation of the heterotopic ossification was noted on radiographs after six months follow-up and we performed surgical excision at that moment. In the post-operative period, we performed physical therapy and 50 mg indomethacin

was administered daily for 2 weeks as prophylaxis against recurrence of the ossification.

There is no detailed information available about the long-term surgical results and recurrence rates of this complication of tetanus. The six-year follow-up period in our case seems to be the longest one reported so far. In our case, a well-timed surgical intervention resulted in good long-term clinical and radiological results with no recurrence.

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