MYOSITIS OSSIFICANS COMPLICATING ANTERIOR POLIOMYELITIS

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Heterotopic calcification and ossification have been discovered and described in practically every tissue of the body, except in the sphincters and in other smooth muscle. The occurrence of heterotopic ossification as a complication of traumatic paraplegia was noted by Déjérine (1919) and has subsequently been reported by many observers (Geldmacher 1925, Hanke 1943, Frejka 1929, Miller and O’Neill 1949, Abramson 1949). It has also been observed in neurological disorders such as tabes, syringomyelia and spastic paraplegia (Brailsford 1941). We have recently encountered three cases of intramuscular ossification occurring in the convalescent stage of anterior poliomyelitis. It is a complication which, so far as we are aware, has not previously been reported.

CASE REPORTS

Case 1—A twenty-eight-year-old schoolmaster contracted acute poliomyelitis in August 1950 and was admitted to a general hospital. His paralysis involved all the extremities, the abdominal wall, the spine and the thorax; a respirator was necessary for nine weeks. His general condition was so precarious and muscle irritability so pronounced that, for the first month, no passive movements were attempted beyond the usual nursing necessities. Ten weeks after the onset he was transferred to the Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry.

At that time his general condition was poor and there was marked muscle wasting. He had a severe flaccid paralysis of all four limbs and trunk. None of the muscles controlling the hip, shoulder, knee and ankle was assessed at more than grade 2. There was an adduction, medial rotation deformity of both shoulders, and only 20 to 25 degrees of passive abduction, with a few degrees of lateral rotation, could be obtained. The hips allowed 30 degrees of flexion and the knees 45 degrees of flexion without appreciable discomfort.

Fig. 1  Fig. 2
Case 1—Right shoulder (Fig. 1) and left shoulder (Fig. 2) showing well marked ossification in the soft tissues fourteen weeks after the onset of poliomyelitis.
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Treatment—The lower limbs were rested in plaster splints and the upper limbs in slings. A programme of gentle, graduated passive mobilisation of all the joints, with daily immersion in warm baths, was started.

Progress—Two weeks after admission he complained of pain in the thighs and knees on passive movement to 45 degrees, and of discomfort in the shoulders. Within three days marked oedema had developed in the right leg, from groin to ankle; and there were tenderness and slight palpable thickening of the left thigh muscles. The skin over the right leg was tense, tender and shiny. Within a further two weeks the oedema had progressed to brawny induration and then to board-like hardness of the subcutaneous tissues. Radiographs showed well marked ossification in the soft tissues (Figs. 1 to 4).

Case 1—Right and left thighs fourteen weeks after the onset of poliomyelitis. Note the extensive ossification in the soft tissues, especially on the right side (Fig. 3).

Case 2—A woman of thirty-two years contracted poliomyelitis in September 1950. Both lower limbs were severely affected, the abdominal muscles to a much lesser extent. She was transferred to the Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry, one month after the onset. At that time both lower limbs were completely paralysed. The hips and knees allowed 90 degrees of painless passive flexion, passive exercises having been begun within a few days of the onset of her illness.

Progress—Two months after admission it was noted that the range of movement in the knees was decreasing. Palpation of the thighs revealed bony hard swellings, about three inches in diameter, situated just above and medial to the patella. There was then no complaint of pain; but movement of the joints beyond 65 degrees later gave rise to discomfort. Radiographs showed well marked ossification in both lower thighs (Fig. 5).
Case 3—A thirty-four-year-old farmer was admitted to the Robert Jones and Agnes Hunt Orthopaedic Hospital in October 1950, four weeks after the onset of poliomyelitis with widespread paralysis of all four limbs, the central and lateral abdominal muscles, and the spinal groups; there had also been retention of urine. On examination there was almost complete flaccid paralysis of all four limbs. The hips allowed 30 degrees of passive flexion and the knees 20 degrees. There was a 25 degrees flexion deformity of both knees. He was placed in a plaster shell and turned frequently for treatment of a pressure sore. He was given daily warm baths, and graduated active and passive exercises were begun.

Progress—Eight weeks after admission he complained of pain in the medial aspect of the left knee on passive flexion beyond 45 degrees. In view of our previous cases, all the major joints were examined radiographically. There was ectopic ossification in the lower left thigh (Fig. 6), and a calcified area adjacent to the medial femoral condyle resembling the "Pellegrini-Stieda" lesion, but there was no history of previous injury.

The blood serum of all three patients showed normal calcium, phosphorus and phosphatase levels. Blood counts and urine analyses gave normal results. The pain, which was a feature of the first and third cases, soon subsided, but the range of movement in the affected joints remained markedly restricted. The "board-like" consistency of the thigh muscles in the first case has become stony hard, and is easily felt on the antero-medial and lateral aspects. The palpable swellings in the second patient have decreased in size, and recently the range of passive flexion in the knees has increased to about 110 degrees.

After our experience with these cases, twenty other convalescent poliomyelitis patients were investigated clinically and radiologically. No similar changes were found.

DISCUSSION

The mechanism of ossification in soft tissues has not been explained. In traumatic paraplegia, Déjérine (1919) ascribed it to metaplasia, holding that all primitive connective tissue is capable of differentiating, under suitable conditions, into fibrous tissue, tendon,
cartilage or bone. In this metaplasia, she stressed the importance of local oedema and the consequent change in the chemistry of the tissue fluids. Wells (1925) postulated that with tissue degeneration, calcification would depend upon increased alkalinity. Weinmann and Sicher (1947) put forward similar views. Leriche and Policard (1926) believed that certain conditions were necessary for heterotopic bone formation, namely: 1) primitive connective tissue cells, stimulated to activity by haemorrhage, rheumatic or purulent inflammation, or trophic changes from cord lesions; 2) local increase in lime salts in the tissues, from absorption of adjacent bone. This hypothesis could well be applied to our cases. In our patients, as in Stanger's cases in paraplegics (1947), ossification occurred early in the disease. It is possible that at this stage, when tissue atrophy and degeneration are taking place, conditions are suitable for metaplastic ossification, given the added stimulus of trauma. If this speculation is correct, it is difficult to explain why the complication is seemingly so uncommon. One explanation may be the diversity of factors concerned in such bone formation: trauma; tissue breakdown; calcium, phosphorous and phosphatase concentration; local pH and metabolic changes in the tissue fluids—all these may play a part. The more factors necessary, the less likely are they to be present simultaneously, and so to predispose to bone formation.

Our purpose in presenting this paper is not to suggest a new theory about the causes of metastatic ossification, but merely to record its occurrence in anterior poliomyelitis and to suggest that it may be more common than is generally realised.

SUMMARY
1. Three cases of poliomyelitis complicated by myositis ossificans are reported.
2. A search of the literature has failed to reveal any similar reported cases.
3. The cause is still obscure.

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REFERENCES