PSEUDOMALIGNANT OSSEOUS TUMOUR OF SOFT TISSUE


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The condition discussed in this paper was first described by Fine and Stout (1956) in a review of sixteen cases of ossifying tumours of soft tissue. Twelve of these cases were osteosarcoma, but four were benign and showed a periphery of mature bone on section. They considered that these possessed sufficiently characteristic features for the condition to be recognised as an entity, and called it pseudomalignant osseous tumour of soft tissue. Ackerman (1958) in a study of twenty-six cases of ectopic ossification described five cases similar to those reported by Fine and Stout, but included them in the general category of "so-called" myositis ossificans.

CASE REPORT

A boy of sixteen presented with a painful swelling in the back of the right thigh. Pain had been present for six weeks, and he first noticed the lump three weeks later. It had enlarged. He gave no history of injury. On examination, a firm round swelling two inches in diameter was found about three inches below the right gluteal fold. It was not tender, and was thought to be in the hamstring muscles. The overlying skin was warm and the superficial veins were dilated. Radiography showed no abnormality of the femur and no soft-tissue calcification of the thigh. The erythrocyte sedimentation rate was 22 millimetres in the first hour, and the white blood count was normal. The mass was explored through a short transverse incision and was found to be an encapsulated tumour in the hamstring muscle. A biopsy specimen was taken. The histological appearance was thought to be that of a fibrosarcoma, or an osteosarcoma of soft tissue.

The boy was transferred to St Bartholomew's Hospital. On his admission the biopsy wound was healed and the underlying tumour had increased to an oval mass measuring some three inches by six inches (Fig. 1). The inguinal glands were not enlarged but a radiograph of the thigh now showed irregular calcification of the tumour (Fig. 2).

Operation—One month after the biopsy operation the back of the right thigh was explored through a vertical incision. A hard mass was found in the long head of the biceps femoris muscle. It was not attached to any other structure. The long head of biceps was excised. Healing of the wound was uneventful and he regained full active flexion of the knee. He remains well and there has been no recurrence.

Pathological examination—The intact specimen consisted of a mass of muscle, $10 \times 6 \times 4$ centimetres, within which a round hard mass 4 centimetres in diameter could be felt. The specimen was divided longitudinally and a 3 millimetres thick slab was cut from the exposed surface of one half: a fine detail radiograph was taken of the slab which was then used for the preparation of histological sections. Further macroscopic examination of the specimen showed that the round mass was very firm with a rough granular surface of greyish white colour. It appeared to be encapsulated and the surrounding muscle was in most places slightly mobile over it (Fig. 3). The slab radiograph revealed a wide band of mineralised tissue with a bony pattern in the periphery of the tumour. The limits of the tumour were clearly shown and lobular extensions from the main mass were evident (Fig. 4).

Histological section showed that the tumour was composed in essence of a central region of very cellular spindle tissue and of a surrounding zone of bony tissue in a trabecular arrangement with loose vascular fibrous tissue between bone spicules (Fig. 5). At the junction between these two tissues there was a change in the pattern of the spindle-cell tissue with formation of small islands of loose fibrous tissue, mainly around blood vessels, with separate
strands and cords of spindle cells. In this tissue spicules of newly formed bone were present (Fig. 6). There was a gradual merging with the more mature outer bony tissue. Here and there at the surface there was new bone formation taking place beneath the encapsulating fibrous tissue. In most regions of the tumour osteoblasts were prominent on the bone surfaces; whereas bone resorption was not obvious. The bony tissue was nearly all of woven type, although a few of the broader trabeculae had a lamellar structure (Fig. 7). The lobular extensions of the tumour were composed mainly of the spindle-cell tissue but the same changes leading to the formation of bone were evident within them. At all sites the spindle cells were of uniform appearance, with few mitoses in evidence (Fig. 8).

The tumour tissue did not invade the surrounding muscle, which showed atrophy and fibrosis due to compression. This fibrous tissue merged with and formed part of the encapsulating tissue when it was present. At the surface of the newly forming lobules there was no obvious encapsulation and only a transition from the tumour tissue to the fibrous tissue of the muscle without any clear cut demarcation; but despite this there were extremely few incorporated muscle fibres, which were present only at the surface. No muscle fibres were evident in other parts of the lesion.

The uniformity of the spindle cells and the pattern of tissue growth called for a diagnosis of pseudomalignant osseous tumour of soft tissue.

**DISCUSSION**

The absence of any history of injury, the rapid growth of the tumour and the peripheral arrangement of mature bone are features which at first sight appear to merit this condition being recognised as a distinct entity. Jaffe (1958) took this view, and indeed considered that if the tumour were not excised it might eventually become malignant. Myositis ossificans
Traumatica has been regarded as ossification of a subperiosteal haematoma, and therefore not lying in muscle at all, but similar lesions occur in muscle remote from bone (Ackerman 1958, Mercer and Duthie 1964). Such lesions in the course of their development are identical in their cellular pattern to the tumour described in this report. There are no absolute pathological criteria for separating pseudomalignant osseous tumour of soft tissue from myositis ossificans, and it is difficult to resolve the relationship between the two conditions.

It is important to distinguish it from osteosarcoma of soft tissue because it is benign and local excision is curative. The short history, and the rapid growth of the tumour suggest a malignant condition, and clinical examination merely reveals a mass. In a mature tumour radiography will show calcification or ossification, but in the case reported here there was no radiographic abnormality before the first biopsy. The diagnosis is made by exploration and biopsy of the mass. The biopsy specimen must be large because the histology varies in different parts of the tumour. Excision biopsy of the tumour and the block of tissue in which it lies is the best procedure.

The central area of the tumour shows uniform spindle cells and mitotic figures. This highly cellular tissue is surrounded by a zone of osteoid tissue which in turn is surrounded
Fig. 5
Low power photomicrograph of the tumour showing a central cellular region surrounded by a zone of bony tissue. (× 2.)

Fig. 6
High power photomicrograph of the intermediary zone of the tumour showing vascular fibrous tissue and spicules of newly formed bone. (× 85.)
by a layer of mature bone. This characteristic "zone phenomenon" (Ackerman 1958) is very different from the haphazard arrangement of the cells in a malignant tumour. If the whole specimen of a pseudomalignant osseous tumour can be examined there is no possibility of confusing it with an osteosarcoma.

SUMMARY

1. A case of pseudomalignant osseous tumour of soft tissue is reported.
2. The relationship between this condition and myositis ossificans is discussed and the importance of differentiating it from osteosarcoma is stressed.

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REFERENCES