CHONDROSARCOMA OF BONE

A CASE REPORT

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Chondrosarcomas are malignant tumours of bone with distinct clinical and morphological features. They represent 7.6% of primary malignant bone tumours registered by the Registry of bone sarcomas of the American College of Surgeons (O'Neal and Ackerman, 1952). Phemister (1930) was the first to emphasise that malignant cartilaginous tumours had a distinct morphological and radiological appearance, with a longer natural history and better prognosis than an osteosarcoma.

The commonest sites of chondrosarcomas are the innominate bone, ribs, femur, humerus, spine, scapula, tibia, fibula, sacrum, sternum, bones of the hands and feet, clavical, skull, and forearm. The male to female ratio is 3:2 with an age range from 10 to 80 years (Lichtenstein and Jaffe, 1943).

Chondrosarcomas of the pelvic region may attain truely fantastic size. This is favoured by the difficulties of their radical treatment in this region, the high resistance of chondrosarcomas to irradiation therapy, and the likelihood of delay in the appearance of distant or strategic extensions or metastases. Tumours arising from the innominate bone not infrequently become embedded over a considerable area forming masses of tissue 12 inches in diameter. It may involve heavily the sacrum and lumbar vertebrae. This paper records a case of such a tumour.

CASE REPORT

Clinical History: On 12.7.67, a 51 year old Chinese female saw a general practitioner with complaints of twitching pain felt in a growth arising from her left iliac region. This growth was present for the past 12 years. It started as a small nodule at the left groin near the labium majus. The nodule was firm, fixed but not tender or inflammed. It grew slowly in size, and as it did not cause symptoms and because of its embarassing location she did not reveal its presence to anyone.

Over the following years the nodule gradually grew larger and now the fear of having to undergo an operation kept her from seeking medical attention. She began to develop progressive limitation of movements in her left hip joint, and 4 days prior to seeing gethe neral practitioner, the tumour became noticeably larger, and there was twitching pain. At no time did the tumour ulcerate or turned inflammed.

She gave a history of considerable loss in weight, but there was no past history of coughing, chest pain or breathlessness. Her bowels were opened daily regularly, and she had no urinary complaints. Her menstrual history was normal and at fifty one she was still having regular monthly periods. The patient was referred to the hospital as a case of fibroma with malignant changes.

Physical Examination: She was afebrile, pale, but not icteric. No abnormalities were dectected in her respiratory and cardiovascular systems. Her abdomen was soft with a large tumour mass occupying the left iliac fossa, left inguinal region, and the upper quarter of the left thigh. The growth was globular measuring 10 inches in diameter and felt hard to palpation except for a cystic area over the antero-lateral aspect where the surface of the tumour was felt to be nodular. The overlying skin showed venous congestion, both lower limbs had pitting oedema and varicosities of the veins. The left lower limb was discoloured. She had a fixed flexion deformity of her left hip joint, with pain felt on movements. Her liver, spleen and kidneys were not palpable and a per rectum examination revealed no abnormality. A vaginal examination was not done at the time. Her skull and spine showed no deformity.

A provisional diagnosis of chondrosarcoma of the left pubic bone was made and she was operated on 20.7.67.

Laboratory Investigations: The only laboratory investigation that was not normal was an erythorcyte sedimentation rate of 56 mm. per hour.

Radiological Examination: The relevant X-rays are shown below (Figs. 1 to 10).

Surgical Findings: The tumour was encapsulated, the capsule extending downwards to its origin

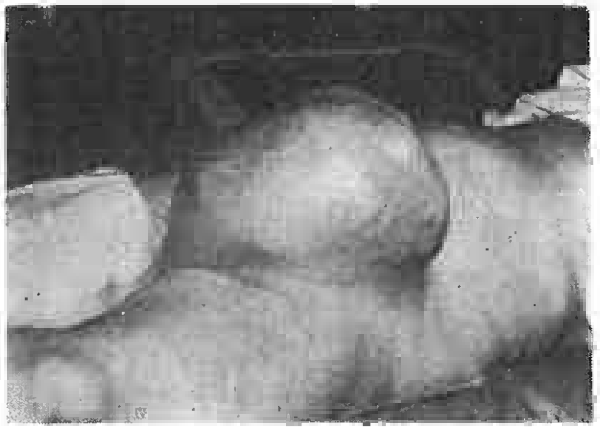

Fig. 1. Showing the globular growth measuring 10 inches in diameter.

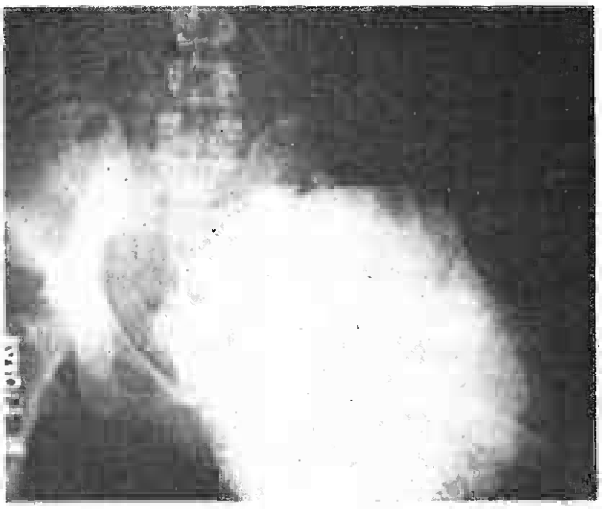

Fig. 2. Densely calcified tumour mass with blotchy calcification at the periphery.

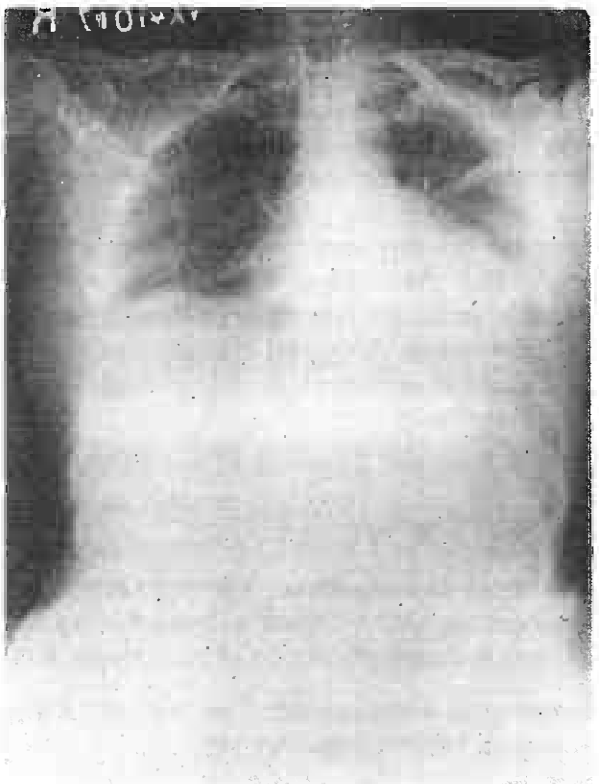

Fig. 3. Preoperative chest X-ray showing the absence of pulmonary metastases.

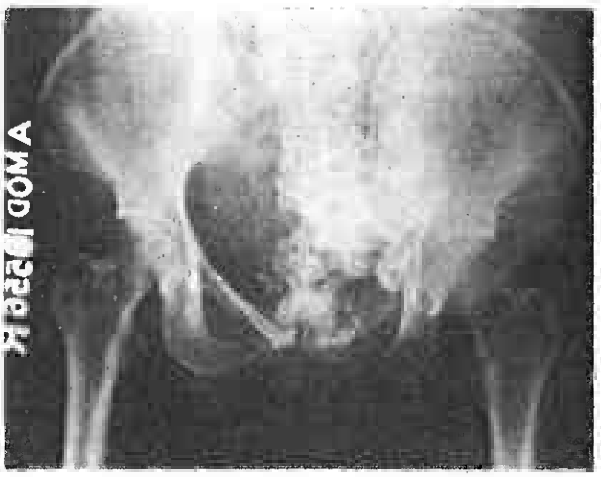

Fig. 4. Postoperative X-ray showing incomplete removal of the tumour and the absence of involvement of the L hip-joint.

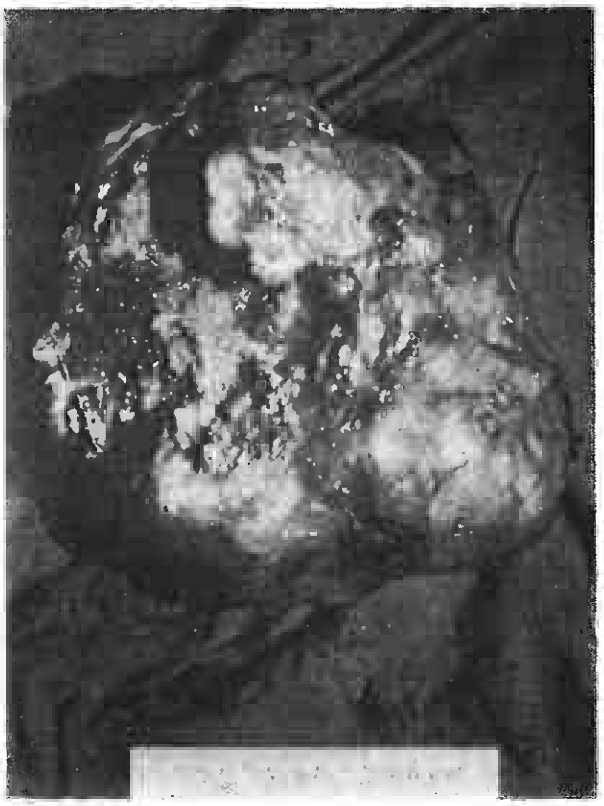

Fig. 5. Encapsulated tumour, lobulated, with areas of cartilage, calcification and a haemorrhagic area.

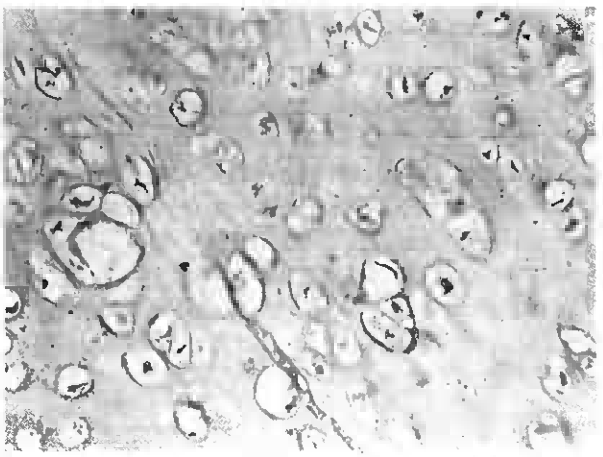

Fig. 6. Cells embedded in hyaline matrix closely packed, well differentiated.

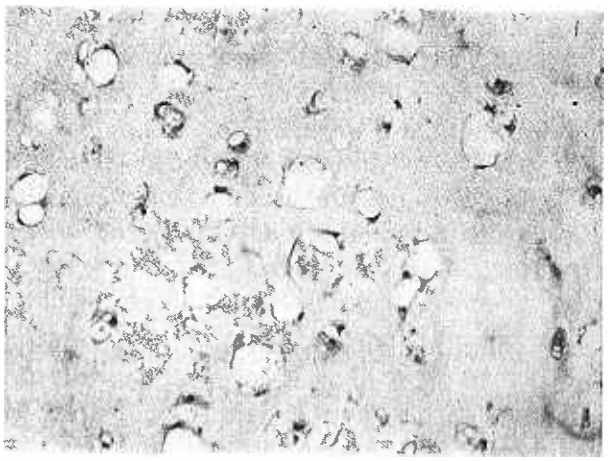

Fig. 7. No bizarre shaped nuclei, but some cells contain two to three nuclei, of varying sizes.

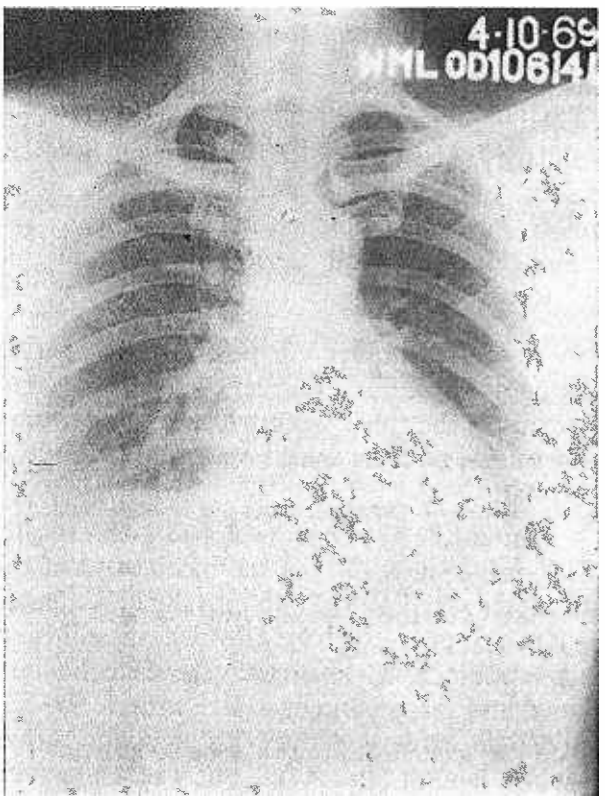

Fig. 9. Two years and three months after operation. No pulmonary metastases.

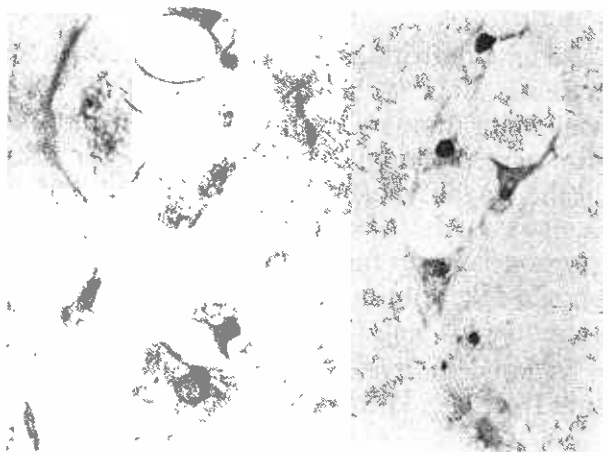

Fig. 8. A high power of Fig. 7.

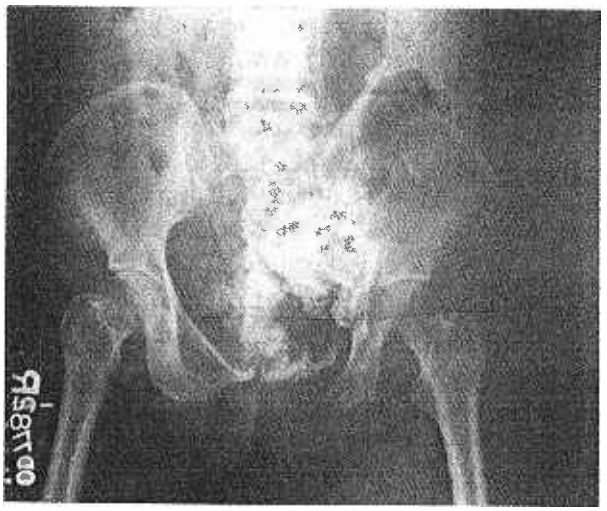

Fig. 10. Two years and three months postoperative film of the primary site of the chondrosarcoma.

at the left ilium and pubic bone. The growth was a lobulated mass measuring 10 × 6 inches, comprising of cartilage with numerous areas of calcification. Its base extended to the deeper pelvic structures, to the sacral bone, and as much as was possible was removed.

Histology: Sections of the tumour showed lobulated masses of cartilage with areas of hypercellularity. Most of the cells were well differentiated, and some contained two to three nulcei. No bizarre shaped nulcei was seen. The tumour was labelled as a well differentiated chondrosarcoma.

Progress: Her immediate postoperative period was uneventful, but a purulent discharging sinus formed on the third week which cleared within a fortnight, and she went home after 48 days in hospital.

A month later she redeveloped a chronically discharging sinus sited at the medial end of the left inguinal region with an openir g of a quarter inch in diameter, the base of which was adherent to the pubic bone. Since then the sinus has not healed and she is content to live with it. She has only slight tenderness over this area, and movements of her left hip are full. She was last seen on 4.11.69 when she was found to be in reasonably good health and she comes regularly to the outpatients' clinic.

DISCUSSION

Lichtenstein and Jaffe (1943) wrote that pain is not a marked feature of chondrosarcomas. Patients are bothered by the appearance of the tumour rather than by pain. This was found to be so in the case of F.A.Y., and she allowed her tumour to reach a massive size of ten inches in diameter before she was first seen. Even limitation of movements of her left hip joint was not sufficient reason to seek treatment, and she finally saw a doctor because of pain of four days duration. This pain was probably due to haemorrhage into a section of the tumour.

Chondrosarcomas may develop in the interior of the bone (central chondrosarcoma) or upon its surface (peripheral chondrosarcoma). In highly malignant central chondrosarcomas, especially those erupting through the bone early, pain may be very severe, and is usually proportionate to the rate of growth. Perforation of the cortex is generally agreed to be a certain sign of malignancy. The rate of growth is not of much clinical value except under exceptional circumstances, Keiller (1925). The capsule which surrounds a slowly growing neoplasm is the product of the environment, a wave of defense against the slowly increasing pressure of a foreign body. Vascularity of the tumour proper is an aid to diagnosis and if the cartilage tissue is white and does not bleed easily, it is probably not malignant. The malignant tumours on the whole will be coloured with small vessels. Benign chondromata are of the consistency of firm gelatin. Dense hyaline tumours resembling articular cartilage are usually benign, but few chondromata resemble this closely the normal structure. Mucoid degeneration and cyst formation do not of themselves indicate malignancy.

Proof of malignancy lies with the demonstration of atypical mitoses, or products of such mitoses. Earlier writers laid much stress on cellularity and appearance of the cartilage stroma—myxomatous changes being the most sinister, Keiller (1925) emphasised the importance of nuclear changes in size and number of nulcei per cell. Lichenstein and Jaffe (1943) reemphasised the importance of nuclear changes. 'A cartilage tumour is no longer to be regarded benign if, when viable non-calcifying areas are examined, it shows, even in scattered fields, *(i)* many cells with plump nuclei; *(ii)* more than an occasional cell with two such nuclei, and especially; *(iii)* giant cartilage cells with large single and multiple nuclei or with clumps of chromatin.'

Tumours with heavy calcification or ossified tumours have a better prognosis. The more malignant tumours tend to have less bone. It is now agreed that myzoid change is not significant in the diagnosis of malignancy. High cellularity is also thought to be of less significance—nuclear stypism is more important. The final diagnosis should take into account all available information and not rest on histology alone.

Chondrosarcomas are radioresistant tumours and treatment is by radical excision or amputation. Most pelvic tumours are best treated in the first place by a hind quarter amputation, for recurrence can seldom be cured by a hemipelvectomy, Barnes and Catto (1966). This is, however, not always possible as in the case presented, and a palliative resection had to be adopted. An incomplete operation greatly acclerates growth of the tumour, and recurrences are responsible for death in most unsuccessfully treated cases. This increase in spread is due to breakdown of the mechanical barriers, opening of tissue planes by the previous operation. Spread is either medullary, local extension into soft tissues, into regional veins or by im-

plantation into the tissues. Tumour cells may grow in tissues wherein they are implanted as their nutrition is not dependent on a direct blood supply. From the lower limbs and pelvis intravenous extension of the tumour can sometimes reach heart, lungs, especially in the more slowly growing tumours. Fry and Shattock (1926) reported a case where the tumour tissue extended and permeated the inferior vena cava and through to the right side of the heart, the patient dying from uremia. Pulmonary metastases are most frequent, occasionally followed by arterial emboli. Liver, cerebral and renal secondaries are sometimes reported. Cruickshank (1945) described a secondary in skin, and bony involvement was described by O'Neal and Ackerman (1952). Lymph node secondaries are extremely rare.

If left untreated more than 75% of the patients are dead in ten years, and 15% of cases will die more than ten years after the initial diagnosis, Henderson and Dahlin (1963). Patients can survive as long as 20 years after the first symptoms and it is not unusual for a patient to survive for several years after the appearance of pulmonary secondaries. Our patient has survived more than two years, and her latest radiographic films have not shown the tumour to increase appreciably in size or there to be any visable pulmonary metastases. A long follow up is therefore necessary for this patient and for all patients in whom the diagnosis of chondrosarcoma is made in view of the erratic behaviour of these tumours.

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