CASE THREE

Short case number: 3_19_3
Category: Musculoskeletal System & Skin
Discipline: Orthopaedics
Setting: General Practice
Topic: Bony lumps_benign & Malignant

Case

Previously well, Lewis Samuels is a 14 year old boy who presents with a history of increasing pain in his left knee, his mother has noticed swelling in his knee and she thinks there may be a lump. There is no history of recent trauma.

Questions

1. What are the key features of history and examination that increase the probability that the lump is malignant?

2. What are the key pathological, clinical and radiological features of the following benign bone lesions, osteochondroma, chondroblastoma, chondromyxoid fibroma, giant cell tumour and bone cysts?

3. Briefly summarise the principles of treatment of the above benign lesions.

4. What are the key pathological, clinical and radiological features of the following malignant bone lesions; osteosarcoma, chondrosarcoma, Ewings sarcoma and metastatic bone lesions.

5. Briefly summarise the principles of treatment of the above malignant lesions.

Suggested reading:

- Solomon L, Warwick DJ, Nayagam S. Apley's Concise System of Orthopaedics and Fractures. 3rd edition. Danvers: CRC Press; 2005.

ANSWERS

Question 1
What are the key features of history and examination that increase the probability that the lump is malignant?

Most tumours cause pain, swelling and local tenderness. Occasionally a lesion is discovered accidentally during x-ray examination or as a result of a pathological fracture. It is not always easy to tell if a tumour is benign or malignant but rapid growth, warmth, tenderness and an ill-defined edge suggest malignancy.

Question 2
What are the key pathological, clinical and radiological features of the following benign bone lesions, osteochondroma, chondroblastoma, chondromyxoid fibroma, giant cell tumour and bone cysts?

Osteochondroma: What is seen on x-ray is a well-defined bony protuberance emerging from the metaphysic. It looks smaller than it feels because the cartilage cap does not show on x-ray. However large lesions undergo cartilage degeneration and calcification and then the x-ray shows the bony exostosis surrounded by blotches of calcified material.

Chondroblastoma: The characteristic x-ray appearance is of a well demarcated radiolucent area in the epiphysis.

Chondromyxoid fibroma: The characteristic x-ray appearance is of an ovoid cyst situated eccentrically in the metaphysic.

Giant Cell Tumour: Although this is a solid tumour it appears on x-ray as cystic (radiolucent) area situated at the end of a long bone. Unlike any of the other 'cystic' lesions it always extends right up to the subchondral bone plate.

Question 3
Briefly summarise the principles of treatment of the above benign lesions.

Osteochondroma: If the tumour causes symptoms, it should be excised. If, in an adult it has recently become bigger or painful, operation is urgent for these features suggest malignancy even if the histology looks benign.

Chondroblastoma: In children, the risk of damage to the metaphysis makes it risky to remove the lesion. In adults this is not a problem; however there is a high risk of recurrence after incomplete removal, and if this happens repeatedly, there may be serious damage to the joint.

Chondromyxoidfibroma: Where feasible the lesion should be excised, but often one can do more than a thorough curettage, followed by autogenous bone grafting.

Giant Cell Tumour: Well confined, slow growing lesions with benign histology can safely be treated by thorough curettage and stripping of the cavity with burrs and gouges, followed by swabbing with hydrogen peroxide or by the application of liquid nitrogen. The cavity is then packed with bone chips. More aggressive tumours should be treated by excision.

Question 4.
What are the key pathological, clinical and radiological features of the following malignant bone lesions; osteosarcoma, chondrosarcoma, Ewings sarcoma and metastatic bone lesions.

Osteosarcoma + Anything ending in "Sarcoma" = Malignant.

Pathology: Highly malignant tumour arising within the bone and spreading rapidly outwards to the periosteum and surrounding soft tissues. The histological appearances are variable. Some areas may consist of characteristic spindle cells in an osteoid matrix, others may contain cartilage cells or fibroblastic tissue with little or no osteoid.

Clinical: Occur predominantly in children and adolescents. May affect any bone, but most commonly the long bone metaphysis, especially around the knee and at the proximal end of the humerous. Pain is usually the first symptoms – worse at night and gradually increasing in severity. On examination there may be some swelling and local tenderness.

Imaging: on X-ray some tumours are entirely osteolytic, others show alternating areas of lysis and increased bone density. The tumour margins are poorly defined. Often the cortex is breached and the tumour extends into the adjacent tissues. When this happens streaks of new bone appear, radiating outwards from the cortex. Where the tumour emerges from the cortex reactive new bone forms in the angle between periostuem and cortex (Codman's triangle). While both the sunburst appearance and Codman's triangle are typical of osteosarcoma, they can also be seen in other rapidly growing tumours.

Chondrosarcoma

Pathology: Chondrosarcoma occurs either as a primary tumour or as a secondary change in a pre-existing benign chondroma or osteochondroma. Cartilage capped exostoses of the pelvis and scapula seem to be more susceptible than others to malignant change, but perhaps this is simply because at these sites the tumour can grow without being detected.

Clinical: Chondrosarcomas have their highest incidence in the fourth and fifth decades, and men are affected more often than women. The tumours are slow growing and are usually present for many months before being detected. Patients may complain of a dull ache or gradually enlarging lump.

Imaging: Primary chondrosarcomas can occur in any bone that develops in cartilage but is usually seen in the metaphysic of one of the tubular bones. X-ray shows a radiolucent area with central flecks of calcification.

Ewing's Sarcoma

Pathology: Ewing's sarcoma is believed to arise from endothelial cells in the bone marrow. It occurs most commonly between the ages of 10 and 20 years, usually in the tubular bone and especially in the tibia, fibula or clavicle.

Clinical: The patient presents with pain – often throbbing in character and swelling. Generalized illness and pyrexia, together with a warm, tender swelling and raised ESR may suggest a mistaken diagnosis of Osteomyelitis.

Imaging: X-ray usually shows an area of bone destruction which, unlike that in osteosarcoma is predominantly in the mid – diaphysis. New bone formation may extend along the shaft and sometimes it appears a fusiform layers of bone around the lesion – the so called 'onion peel' effect.

Metastatic Bone Disease

Pathology: The commonest source is carcinoma of the breast, followed by carcinoma of the prostate, kidney, lung, thyroid, and GIT tract. In about 10 percent of cases no primary tumour is found. The commonest sites for bony metastases are the vertebrae, pelvis and the proximal half of the femur and humerous. Metastases are usually osteolytic and pathological fractures are common.

Clinical: The patient is usually aged 50 – 70 years. Pain is the commonest and often only symptom. The sudden appearance of backache or thigh pain in an elderly person is always suspicious.

Imaging: On x ray examination skeletal deposits usually appear as rarefied areas in the medullar or patches of bone destruction in the cortex. Vertebral collapse is common. A radionucleotide scan is much more sensitive in picking up bony metastases.

Question 5
Briefly summarise the principles of treatment of the above malignant lesions

If there is any suspicion that the lesion could be a primary malignant tumour, the patient is admitted for detailed assessment in order to confirm the diagnosis, establish the grade of malignancy and to define precisely how far the tumour has spread. Various treatment options can then be discussed. This includes local excision, wide excision with limb sparing, amputation and different types of adjuvant therapy.

↳ Rotatiaplasty?