Osteochondroma

Definition
Benign developmental aberration characterised by a cartilage capped exostosis.

Aetiology
Arises from the herniation and separation of a segment of epiphyseal growth plate cartilage through the periosteal bone cuff that normally surrounds the plate.

Can arise after radiotherapy.

Epidemiology
Usually presents in the first two decades of life, 48% in the second decade (Mayo).
M>F 1.5:1 (Dahlin 2:1)
8% of tumours in Mayo series but actual incidence much higher because many are asymptomatic.

Gross pathology
Base of lesion has a rim of cortical bone with central cancellous bone continuous with the underlying normal shaft.
The cartilage cap varies considerably in thickness but is normally 2-3mm in thickness.
Secondary chondrosarcomas are usually at least 2cm in thickness. A cartilage cap in excess of one cm thickness or 5cm diameter is suggestive of malignancy.
Cystic change within the cartilage cap is cause for concern.
The cartilage cap thins as the patient ages.

Histology
Towards the base of the lesion the chondrocytes line up in columns simulating the appearance of the epiphyseal plate, and there is maturation into trabecular appearing bone.
Spindle cell differentiation should suggest the diagnosis of parosteal osteosarcoma.

Clinical
Presents as pain or a mass.
There can be a clicking or inflammation of tendons running over the mass.
May be an overlying bursa, which can be confused with a secondary chondrosarcoma.
Usually occurs in long bones, particularly around the knee (distal femur, proximal tibia and the proximal humerus). Can occur in any bone that undergoes enchondral ossification.
Uncommon in the bones of the hand.
Usually occurs in the metaphysis.
After adolescence and closure of the growth plate there is usually no further growth.
Further growth at this stage could herald malignant change and the lesion should be excised.
Malignant change probably occurs in 1%.

Radiology
Flattened (sessile) or stalk like (exostosis) protuberance in a juxta-epiphyseal location (i.e. in the metaphysis)
The protuberance normally points away from the joint.
The cortex of the osteochondroma is contiguous with the normal cortex, and the medulla is contiguous with the medulla of the host bone.

Extensive calcification with radiolucent irregularities of the cap implies possibly malignant change.

Treatment
Surgical excision flush with the host bone is indicated if the lesion is painful, unsightly, producing disability or may be undergoing malignant change.

Recurrence occurs in only around 2% and suggests that the original tumor was a chondroma.

Multiple osteochondromas (hereditary multiple osteocartilaginous exostoses, diaphyseal aclasis)

Rare.
Autosomal dominant. Associated with mutations in EXT1 and EXT2, which leads to a maldistribution of Indian hedgehog in the extracellular matrix.

Usually associated with short stature.

Clinically multiple osteochondromas.

Lesions are radiologically, grossly and microscopically similar to solitary osteochondromas.

A good sign is defects of tubulation of the long bones, particularly around the femoral neck.

THERE IS A MUCH HIGHER RATE OF MALIGNANT TRANSFORMATION – AROUND 2-5%
The presence of a thick, active cartilage cap on an exostosis in a skeletally mature individual alerts one to the possibility of malignant transformation.

Epiphyseal osteochondroma – dysplasia epiphysealis hemimelica – Trevor's disease

Very rare
Non familial developmental disorder
Benign
Manifests in young children
Unilateral enlargement of an epiphysis
Most commonly affects lower femur, upper tibia and talus
If affecting the proximal femoral epiphysis can be confused with Perthes disease
Can cause varus or valgus deformity
Histology: resembles an osteochondroma, with a cartilage cap of disorganised cartilage
Treat by surgical excision