

CONDITIONS AFFECTING THE HIP

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Common hip pathologies in the paediatric age group and secondary to trauma are covered in Chapters 29, 32 and 44. This chapter focuses on the acquired pathological conditions in the adult. Friedrich Trendelenburg, 1844–1924, Professor of Surgery successively at Rostock (1875–1882), Bonn (1882–1895) and Leipzig (1895–1911), Germany. The Trendelenburg position was first described in 1885. A caisson is a watertight chamber used to protect construction workers during the building of underwater structures by means of pressurised air introduction. Philippe Charles Ernest Gaucher, 1854–1918, physician, Hôpital St Louis, Paris, France, described familial splenic anaemia in 1882. Georg Clemens Perthes, 1869–1927, Professor of Surgery, Tübingen, Germany, described osteochondritis of the femoral capital epiphysis in 1910. Avascular necrosis (AVN), or osteonecrosis of the femoral head, occurs because of an interruption in the blood supply to the femoral head, leading to bone death. This results in collapse of the femoral head initially, and eventually secondary osteoarthritis (OA). AVN can be primary (idiopathic) or secondary to other pathology (Table 39.1).

muscle force Biomechanical schematic representation of loads pivoted on a beam. The hip joint is the fulcrum. $W = 3W$ Abductor $\times 3x$ muscle force $4W$ TABLE 39.1 Aetiology of avascular necrosis of the femoral head. Steroids Alcohol excess Idiopathic (see Perthes' disease; see Chapter 44) Sickle cell disease Haemoglobinopathies Caisson disease ('the bends' in divers) Hyperlipidaemia Systemic lupus erythematosus Gaucher's disease Chronic liver disease Antiphospholipid antibody syndrome Radiotherapy Chemotherapy Human immunodeficiency virus Hypercoagulable states (protein C and protein S deficiency) Joint reaction force Abductor W Body weight Body weight Figure 39.2 Load on the hip joint when a subject weighing W stands on one leg. Hopping increases the load from $4W$ to $10W$.

Clinical features AVN usually affects men aged 35–45 and is bilateral in over 50% of patients. The patient is frequently asymptomatic in the early stages. As the disease progresses the patient may complain of an ache in the groin and walk with a limp. Clinical examination in the early stages is usually normal but may reveal a positive Thomas's test and limitation in the range of movement as the disease progresses. Investigations A weight-bearing anteroposterior (AP) radiograph of the pelvis along with a lateral radiograph will show the classical features of AVN, including increased sclerosis in the early stages and the crescent sign indicating subchondral bone resorption. Hugh Owen Thomas, 1834–1891, general practitioner, Liverpool, UK. He is regarded as the founder of orthopaedic surgery although never holding a hospital appointment, preferring to treat patients in

their own homes. He introduced the Thomas splint in 1875. R Paul Ficat , 1917–1986, Professor of Clinical Orthopaedic Surgery and Traumatologist Marvin E Steinberg , contemporary , Professor of Orthopedic Surgery , Philadelphia, PA, USA. indicating the onset of arthritis (Figure 39.3), and flattening, indicating a segmental head collapse. However, radiographs may be normal in the early stages of the disease and, therefore, the most sensitive and specific way of investigating these patients is with magnetic resonance imaging (MRI). MRI allows accurate assessment of the extent of involvement of the femoral head and can also identify associated bone marrow changes which helps in early diagnosis and the prediction of changes. The prognosis (Figure 39.4). In 1985, Ficat classified the disease into five stages. In 1995, Steinberg modified this classification into seven stages (0–VI) based upon both radiograph and MRI appearance (Table 39.2). Stages I–IV are further divided according to the extent of femoral head involvement (A; mild, B; moderate and C; severe). Management Conservative treatment in well-established cases usually leads to poorer outcomes and is therefore not recommended. The choice of surgical treatment depends upon whether the femoral head has collapsed or not. In the pre-collapse stage the principle is to preserve and preferably encourage revascularisation of the femoral head, whereas in the collapse stage the aim is to bring the undamaged parts of the femoral head into the load-bearing zone of the hip joint. The surgical treatment for the pre-collapse stage consists, which is aimed at relieving the includes core decompression intravascular congestion in the femoral head and thereby - pain. This can be achieved with or without bone grafting with bone-marrow-derived cell therapies; a or combined vascularised bone graft can also be used to stimulate bone formation and support the femoral head. Once the femoral head has collapsed, either a femoral osteotomy (which aims to transfer the weight-bearing area of the femoral head and thereby protect the collapsed segment) or a joint replacement (if degenerative changes have set in) is the preferred option (see Primary total hip replacement). y , Université Paul Sabatier, Toulouse, France.

Figure 39.3 Radiological appearance of avascular necrosis of the femoral head of the left hip. There is evidence of femoral head sclerosis (dashed line and arrow) as a consequence of avascular necrosis. (a) (b)

Figure 39.4 Magnetic resonance imaging scan of the hip joint showing avascular necrosis (arrows). (a) Coronal view; (b) sagittal view.

Summary box 39.3 AVN of the femoral head

necrosis of the femoral head based on the type of radiological change on radiographs and magnetic resonance imaging (MRI). Stage Description 0 Normal or non-diagnostic radiograph, bone scan or MRI I Normal radiograph, abnormal MRI or bone scan II Sclerosis and cysts III Subchondral collapse, crescent sign IV Flattening of the head, normal acetabulum V Acetabular involvement VI Obliteration of joint space Patients can be asymptomatic in the early stages and therefore a high index of suspicion is necessary for initial diagnosis MRI scan is required for early diagnosis Treatment is based on whether the patient presents before or after the femoral head has collapsed In the pre-collapse stage treatment focuses on revascularisation of the femoral head In the collapsed stage, the aim is to reorient the damaged area of the femoral head or replace the joint if degenerative changes have set in Prognosis is dependent upon the extent of femoral head involvement

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