Current Practice

JOINTS AND THEIR DISEASES

Arthritis of the Hip

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British Medical Journal, 1969, 2, 741-744

Arthritis of the hip can be one of the most disabling and troublesome of joint afflictions. Though quite common, it often presents difficulties in diagnosis and considerable problems in treatment often follow.

Symptoms of Hip Disease

Pain.—Confusion over hip pain is twofold. Pain in the region of the hip does not necessarily arise in the joint itself, and, conversely, pain arising in the joint is not necessarily felt in the region of the hip. Hip disease can cause pain in the buttock, but pain at this site is far more commonly referred from the spine, when it characteristically spreads down the back or outer side of the thigh. True hip pain is usually felt on the outer side or front of the joint and in the groin, and radiates down the front of the thigh to the knee and occasionally to the shin. Sometimes pain in the knee is the patient's presenting or only complaint. Such pain is often indicated with a characteristic rubbing gesture over the front of the thigh just above the patella, an uncommon spot for pain from a knee disorder. Questioning often elicits the information that the pain spreads up the limb to the groin—again unlike a true knee-joint pain. Any patient complaining of knee pain but showing no local abnormality on examination should have the corresponding hip closely examined.

The pain of arthritis of the hip invariably bears a relation to walking and weight-bearing, though this can also be a feature of pain of spinal origin. True hip pain is not usually affected by attempts at bending or lifting, nor is it made worse by coughing or sneezing.

Limp.—The limp of arthritis of the hip is caused by the pain, the limitation of movement, and the secondary deformities, particularly shortening.

Stiffness.—Squatting and kneeling are first affected, and later there is difficulty in reaching the feet or toe-nails and difficulty with shoes and stockings. The patient is unable to sit forward in a chair without slipping the affected leg off the side to lower the knee. When both hips are involved stiffness is more of a problem, there being difficulty in separating the legs, and, in advanced cases, difficulty in negotiating steps and stairs.

Clinical Examination of the Hip

This favourite test for examination candidates presents little difficulty if approached methodically, but it has many traps for the unwary. The value of the information that may be obtained fully justifies the trouble taken. The hips cannot be efficiently examined without full exposure of the lower limbs and lower trunk, though a modesty towel over the pubis confers worthwhile advantages in improved patient co-operation. The examination follows traditional lines.

Inspection.—In what position does the leg lie? Is the hip held flexed for greater comfort? Are the toes pointing outwards from excessive lateral rotation at the hip? Is there any apparent shortening?

Look for muscle wasting, which accompanies any hip disorder of more than a few weeks' duration. It is particularly well seen in the thighs, and is best recognized by inspection from the end of the couch rather than the side. Viewed from one side the nearer thigh usually looks thinner than the opposite, which presents the broad adductor surface. If in doubt measure the circumferences 6 in. (15 cm.) above the upper border of each patella. The demonstrable absence of any muscle wasting is an important positive point in excluding any serious or prolonged hip disorder, particularly when the complaints are great and the objective signs few.

Scars, surgical or otherwise, are usually relevant as signs of past hip disease. The discovery of such a clue is the main reason for rolling the patient over to allow inspection of the buttock. Change in skin colour is exceptional if one excludes the erythema *ab igne* at the site of the pain. Visible swelling from hip disease is also uncommon, except when tuberculosis causes a cold abscess.

Palpation.—Relatively little is to be learnt from palpation of a deep joint such as the hip. The examining finger cannot feel for individual structures with the precision available when examining, for example, the knee. Tenderness over the joint capsule is nevertheless an important sign in infective arthritis, and doubly valuable if tenderness over the anterior and painful aspect is accompanied by tenderness over the posterior capsule, where spontaneous pain is much less evident. Palpation of the bony landmarks is traditional but relatively uninformative in arthritis of the hip except in so far as it is used to show the position of the pelvis relative to the legs.

Movements of the Hip.—Two rules are urged, "good leg before bad" and "active movements before passive." The first ensures the patient's understanding of what is required; the second avoids the tactical error of incautious movement of a perhaps intensely painful joint.

The movements to be tested are those between the leg and the pelvis. It is essential in testing flexion and sideways motion at the hip to watch for simultaneous similar movement of the pelvis on the lumbar spine. When testing hip flexion the examiner's hand rests on the patient's iliac crest, the thumb on the anterior superior iliac spine, and the finger tips spread out along the crest behind (Fig. 1). As either hip then flexes any movement of the pelvis in the same direction is instantly evident, and the range of true hip motion can be accurately measured. Similarly, on testing abduction and adduction the examiner, having placed the leg at the extreme of the range of motion, must, by palpating both anterior superior spines, determine the relation of the leg to the pelvis for each movement. In children it is possible to palpate both sides of the pelvis with one hand and position the limb with the other, but in adults both hands are needed to check on the lie of the pelvis

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(Fig. 2). Abduction of the two hips may conveniently be measured in one move if the patient separates the legs to their full extent while the examiner's hands indicate the position of the pelvis. Each anterior superior iliac spine is marked with a thumb or finger tip.

FIG. 1.—Estimating hip flexion. The hip is flexed from the fully extended position until the examiner's left hand feeling the iliac crest detects movement of the pelvis. The result is expressed in degrees measured from the fully extended position. FIG. 2.—Estimating hip abduction and adduction. With the legs at the extreme of each motion the examiner, marking each anterior superior iliac spine with a thumb, mentally constructs a line vertical to the transverse axis of the pelvis against which the position of each leg is assessed. FIG. 3.—Measuring internal rotation of the hips. With the knees together and feet as far apart as possible the angle of each shin to the vertical is estimated. FIG. 4.—Revealing fixed flexion of the hip. The opposite hip is flexed until the lumbar lordosis is completely flattened. The angle through which the affected leg rises is measured.

Rotation of the hips can be estimated by rolling the thigh in and out and using the patella as a rather blunt pointer to the arc of rotation. A more satisfactory method involves flexing the knee to 90° and using the line of the shin as the pointer. If with the knees together the feet are separated as far as possible the extent of internal rotation is clearly visible from the foot of the couch (Fig. 3). The range of external rotation is demonstrated if, with the knees still flexed, the feet are kept together and the knees allowed to fall apart. The angle between the line of the shin and the vertical is measured on each side. The measurement of rotation in this way is swift and accurate and can indeed be done even without the patient being undressed. As loss of rotation is usually an early sign in arthritis of the hip, the demonstration of a normal painless range by this manoeuvre is a practical method of provisionally excluding this disease.

The hip does not normally extend beyond the position in which the leg is in a straight line with the trunk. If there is loss of extension the hip lies in a partly flexed position. This, if not excessive, is concealed by the patient, who lowers his leg to the couch by rotating the pelvis around its coronal axis. Such a movement causes increased lordosis in the lumbar spine. Concealed fixed flexion of this type may be shown up by flexing the other hip, no matter how stiff or normal it is, until the lumbar lordosis is fully flattened. The leg under examination will rise from the couch as this is done if there is any loss of extension (Fig. 4). This test, Thomas's test for fixed flexion, can be of more than academic value when dealing with a very painful joint, particularly in a child. The examiner may, by moving the normal limb only, be able to show that the painful hip is in fact lying in full extension and is therefore probably not, for example, acutely infected.

Shortening.—Apparent shortening of the leg is of greater practical importance than true, the latter often being quite unnoticed by the patient. Apparent shortening is measured with legs parallel, as when standing, and may be determined by simple inspection of the discrepancy at the heels or, more formally, by measuring from a central point such as the umbilicus to the tip of each medial malleolus. It is caused

by a fixed adduction deformity of the hip so that when standing the diseased side of the pelvis has to be raised higher than the other to bring the leg to the vertical. The true length of the leg, measured between the anterior superior spine and the medial malleolus, remains unchanged. True shortening occurs only with destructive types of arthritis. For accuracy this length should be measured with each leg in the same position relative to the pelvis. The distinction between true and apparent shortening is of limited diagnostic value in arthritis of the hip but is of considerable practical value in treatment. Apparent shortening can be corrected by release of the adduction contracture.

Wider Examination.—The examination is not complete without including the abdomen, pelvis, groin, and spine. Disorders of the spine around the thoraco-lumbar level can cause pain referred to the groin—as also may renal disease—but hip movements are not affected. Inflammatory disease in the iliac fossa, such as diverticulitis, appendicitis, or actinomycosis, can cause pain at or just above the groin; and, if the posterior abdominal wall and iliacus are involved, it may be associated with painful loss of hip extension, other movements remaining unaffected.

Diagnosis and Management

Acute Infective Arthritis.—The patient is febrile and has hip pain and pronounced limitation of all movements. Infective arthritis is common in infancy, when the systemic features may be surprisingly mild. The infant stops kicking with the affected leg and shows signs of pain on attempted hip motion. The ease with which the disorder is overlooked explains its evil reputation for joint destruction. The hip must be aspirated, usually under a general anaesthetic and certainly with full aseptic ritual, and if the diagnosis is confirmed surgical drainage is required urgently. Antibiotics alone are not reliable, as they cannot remove the tense exudate in the joint cavity. Important and sometimes difficult differential diagnoses are from acute osteomyelitis and from acute rheumatic fever.

Tuberculous Arthritis.—The gradual onset of pain and stiffness with a limp in a child or young adult with perhaps general symptoms of lassitude and loss of weight should suggest the diagnosis. Early radiographs may be normal, and, as prompt diagnosis is essential, a biopsy may be indicated. With timely orthopaedic care the prognosis is good. Tuberculosis in the hip region is occasionally confined to the bursa over the greater trochanter, and this form is particularly amenable to surgical eradication. In late cases the hip is often ankylosed by fibrous tissue, sometimes in a position of adduction and flexion, and with some true shortening. A raise to the shoe may be needed, 0.75 in. (2 cm.) less at the toe than the heel, the actual height being best judged by a trial with wooden blocks or books of known thickness. A fibrous ankylosis is often unsatisfactory, with intermittent pain, increasing deformity, and risk of re-activation. An arthrodesis in good position is much to be preferred.

Transient Synovitis.—A short-lasting benign inflammation of the hip is common in childhood. Hip pain, a limp, and mild restriction of movements develop. Radiographs and the results of tests are normal. The diagnosis is reached by exclusion. The trouble subsides in a few days with simple rest in bed.

Perthes's Disease.—Spontaneous infarction of the femoral-head epiphysis causes the gradual onset of a painful limp in a child, usually between 4 and 10 years old. There may be mild restriction of hip motion, but physical signs are sometimes practically absent. Radiographs show a dense epiphysis that later fragments as revascularization occurs. The radiographic signs lag behind the symptoms and may not be evident when the child is first seen. Repeat radiography in two or three months' time is indicated. Orthopaedic management aimed at protecting the hip from weight-bearing stresses is indicated,

though even with treatment the prognosis is uncertain. Osteoarthritis may follow in early adult life.

Slipped Upper Femoral Epiphysis.—Pain in the hip or groin spreading to the knee in an adolescent suggests insidious displacement of the upper femoral epiphysis. In late cases the leg lies in external rotation, and both internal rotation and abduction are limited. Early diagnosis by lateral radiographs of the femoral neck is vital and allows prompt surgical treatment.

Snapping Hip.—A loud snapping noise on hip movement develops on the outer side of the joint. This is not a sign of arthritis but is caused by the fascia lata slipping over the greater trochanter. It is painless, of no serious significance, and subsides in time. No treatment is needed.

Congenital Dislocation of the Hip and Acetabular Dysplasia. Dislocation of the hip, if overlooked at birth, presents later as a cause of a painless limp unlikely to be confused with any type of hip arthritis. There is true shortening of the leg. Hip movements are full except for abduction, which is much restricted. A similar picture is presented by hip dislocation of infective or paralytic origin and by infantile coxa vara. Orthopaedic advice is needed for all. The acetabulum of a congenitally dislocated hip is shallow, but with reduction of the dislocation it grows to a more normal shape. The earlier treatment is begun the better the restoration, but persistent acetabular dysplasia has been a common sequel and causes a disabling arthritis in early adult life. Treatment is then not easy, particularly when the dysplasia affects both hips. The answer must lie in prevention, by prompt and efficient treatment of congenital dislocation of the hip immediately after birth.

Osteoarthritis.—Hip pain in later adult life is usually caused by osteoarthritis. The diagnosis requires radiological confirmation, but the significance of any osteoarthritic changes evident on x-ray has to be decided on clinical grounds. There are in some cases few or no symptoms, particularly in the early stages. Pain, however, is usual and can become quite disabling, not only severely limiting activity but also, when constantly present at rest, preventing sleep or ease of any sort. Both hips may be affected, and there may be secondary pains in the back.

The differential diagnosis includes other types of arthritis, including Charcot's arthropathy, and other hip disorders such as avascular necrosis of the femoral head (spontaneous or as a late complication of a fractured neck of femur). Hip pain in the elderly can result from an incomplete fracture of the femoral neck, which may become complete if unprotected weight-bearing is allowed to continue. Radiographs are essential and must include lateral views of the femoral neck. Bone disease such as Paget's disease, bone abscess, or tumour causes pain that tends to be most troublesome at night and not noticeably worse with use. Metastases are common around the hip and are often in the early stages not detectable radiologically. Intermittent claudication in the buttock or thigh is less common than in the calf, but it is suggested by a typical history and absent peripheral pulses. Irritation of the lateral cutaneous nerve of the thigh as it passes through the outer end of the inguinal ligament (meralgia paraesthetica) causes painful paraesthesiae and sensory loss in its distribution.

Management of Osteoarthritis

Valuable palliation is possible if the load on the hip can be reduced by adjustment of the patient's mode of life, and, when needed, by loss of weight. The load can be appreciably decreased by the use of a walking-stick in the opposite hand. While excessive use is harmful, excessive rest is also to be avoided as causing only increased stiffness and loss of muscle power. A golden mean must be sought, the joint being used to just short

of the limits imposed by pain. In the severely handicapped, when sticks or crutches are not enough, a walking frame may enable the patient to keep about. An occupational therapist would advise on the various appliances to overcome the difficulties of dressing and toilet. Adjustment of the height of the shoes may be indicated.

Physiotherapy has little lasting influence on the course of the disease, though some benefit arises from non-weight-bearing exercises giving improved muscle power, reduced stiffness, and the theoretical benefit of movement on the nutrition of the articular cartilage. The value of passive therapy with diathermy and similar apparatus has never been put on a firm scientific basis. The comfort some patients derive may be helpful in making subsequent exercises easier.

Other non-surgical treatment includes radiotherapy, which still has its advocates when pain is severe and operation refused. Intra-articular injections of steroids are technically difficult in the hip, are not free from risk, and are of very questionable value.

For many patients the treatment will be surgical. The logic of invoking surgery only when simpler methods have failed is no longer wholly acceptable. In many cases of primary osteoarthritis of the hip the symptoms and the progress of the disease can be reversed by subtrochanteric osteotomy, a relatively small operation that preserves hip motion. When osteotomy is successful the relief of pain is lasting and is often associated with regression of the radiographic signs of arthritis. While the pain is usually reduced by osteotomy, the relief may not be adequate when the arthritis is advanced. The operation also does nothing to restore movement already lost. It therefore seems correct to advise relatively young and active patients to undergo this operation while the disease is still in its early stages. Time should not be wasted on palliative treatment. Other lesser surgical procedures are available, including psoas tenotomy and the "hanging hip" operation, capsulectomy, and neurectomy, but they are of less well established value. When the arthritis is advanced the surgical choice is between arthroplasty and the less popular arthrodesis, which, for all its reliability and durability, does involve sacrifice of the remaining hip motion. The arthroplasties now being developed involve prosthetic replacement of both the upper end of the femur and the acetabulum. Convalescence is rapid and early function frequently excellent, but the results of, for example, 20 years of wear are not yet known. The indications are that they will last, but they should still be applied with caution to younger subjects.

Other Conditions

Rheumatoid Arthritis.—Involvement of the hips can be an important part of the problem in patients with extensive rheumatoid arthritis. In nursing, care should be taken to prevent flexion or adduction deformity by exercises and by correct positioning in bed and chair. Surgery can help by adductor or psoas tenotomy to correct fixed deformity. In the reconstructive surgery of rheumatoid arthritis arthroplasty of one or both hips can be of very great help in restoring the patient's mobility so long as the function of knees and feet is, or can be made, adequate. A similar but less common problem arises in ankylosing spondylitis when this condition extends to involve the hip joints. Treatment is by exercises to maintain hip mobility and by a careful watch for the development of any fixed deformity. Indications for arthroplasty include severe hip pain and ankylosis of both hips.

Avascular Necrosis of the Femoral Head.—Collapse of the femoral head from infarction is a well-known late sequel of a fractured true neck of femur. Pain and stiffness develop in the hip usually between one and five years after the fracture has united. Avascular necrosis also occurs spontaneously in, among other conditions, caisson disease, the haemoglobinopathies, chronic alcoholism, and in patients on steroids.

Osteochondritis dissecans of the femoral head is a related condition. Symptoms are often mild and palliative treatment sufficient. True osteoarthritis develops later, but it is a serious sequel only in younger subjects. Surgery is indicated only when the symptoms are intolerable.

Neuropathic Arthritis.—This complication of tabes dorsalis may be closely mimicked by the arthropathy that occasionally complicates treatment with steroids. The normal warning of pain being absent, injury to the joint should be carefully avoided and adequate local rest given should any damage occur. Spontaneous fractures are common. The response to surgery, particularly to metal implants, is bad. In late cases a weight-relieving calliper may be helpful.

TODAY'S DRUGS

Digitalis and the Cardiac Glycosides

With the help of expert contributors we print in this section notes on drugs in current use.

Despite advances in almost every sphere of therapeutics, digitalis remains one of the most useful drugs we possess in the treatment of heart disease. No substitute has yet been synthesized, but the use of pure glycosides, such as digoxin and digitoxin, is preferable to that of crude preparations of digitalis.

Preparations

Digoxin is the most important and widely used digitalis preparation, and, like *lanatoside-C*, its glycoside precursor, it is derived from the white foxglove, *Digitalis lanata*. Both are pure glycosides. *Digitoxin* is also a pure glycoside and is derived from *Digitalis purpurea*; its onset of action is slower than that of either digoxin or lanatoside-C and it tends to accumulate in the body.

Prepared digitalis is a crude mixture of glycosides derived from powdered leaves of the foxglove. It requires biological standardization, and consequently the amount of active material may vary from one batch of tablets to another. For this reason the pure glycosides should be prescribed whenever possible.

Ouabain (strophanthin-G) is a pure glycoside extracted from *Strophanthus gratus* or other vegetable sources. It has a more rapid action than digoxin and may be useful when a rapid effect is required.

Pharmacology

Mechanism of Action

Digitalis acts mainly on the heart and affects its excitability, rate of conduction, and force of contraction. These actions have been reviewed by McMichael.¹

The cellular mechanism of the cardiac glycosides, however, is complex and remains incompletely understood. They have a highly specific action of inhibiting the enzymes responsible for maintaining the distribution of sodium and potassium in the intracellular and extracellular fluid. This inhibition results in an increase in sodium concentration and a fall in potassium concentration within cells. They also increase the rate of entry of calcium into myocardial cells. A plausible theory to account for the action of digitalis is that a rise of intracellular sodium may facilitate the entry of calcium, since there is good evidence that contractile force depends on the quantity of calcium available for release.

The effects of digitalis on ionic movements are not restricted to the heart but take place in all tissues, the effect on the myocardium being related to its high degree of ionic exchange.

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There is no evidence that cardiac glycosides are concentrated in cardiac muscle.² The influence of digitalis on ionic movements has been reviewed by Glynn³ and by Weatherall.⁴

Cardiovascular Effects

The most important effect of digitalis is to increase the force of myocardial contraction without a corresponding increase in myocardial consumption of oxygen. This results in an increase in cardiac output and a diminution in heart size. Digitalis increases the ability of the heart to perform work at a given filling pressure. The clinical effect of these actions on a patient in cardiac failure is a fall in the raised venous pressure and improvement in the other signs. Rather surprisingly, digitalis and the other cardiac glycosides have virtually no action on the normal heart.

Digitalis reduces the heart rate. This is best seen in patients with atrial fibrillation and a rapid ventricular rate. There are two mechanisms responsible for the effect. The initial slowing which occurs soon after digitalis has been given is due to vagal stimulation. This action can be abolished by atropine. With continued administration, digitalis directly depresses the rate at which impulses can pass through the conducting tissues. This effect is slower in onset and is not blocked by atropine, which explains why the drug reduces the ventricular rate more gradually in patients in sinus rhythm. If treatment with digitalis is continued for long periods in high dosage, depression of the conducting tissue may result in profound bradycardia, partial or complete heart block, or even cardiac arrest. Another important effect of digitalis is that, while the conducting tissues are progressively depressed, those of the atria and ventricles become more excitable, possibly owing to depletion of potassium. This increase in excitability results in atrial and ventricular ectopic beats, coupled beats, and eventually atrial or ventricular tachycardia.

Digitalis also promotes a diuresis in patients with cardiac failure. For many years this was considered to be a direct effect on the kidney, since a diuresis is the most prominent action of the drug in oedematous patients with heart failure. It is now known that the diuresis which occurs in these patients is predominantly due to an improvement in the circulation and an increase in renal blood flow; digitalis does not cause a diuresis in normal persons nor in patients with heart failure without considerable fluid retention.

Therapeutic Indications

Heart Failure

The outstanding indication for the use of digitalis and other cardiac glycosides is in the treatment and prevention of heart failure. Digitalis is effective whether the failure is predomi-