ARTHROGRAPHY OF THE ANKLE

M. Mehrez and S. El Geneidy, Cairo, U.A.R.

From Einshams University and Maady General Hospital, Cairo

The aims of this paper are to describe the arthrographic appearances of the healthy ankle and of the ankle with damaged ligaments, and to discuss the value of arthrography as a method of examination of the injured ankle. Arthrography in cases of injury about the ankle was referred to by Wolfe (1940) and Palmer (1941). Hansson (1941), Hendelberg (1946) and Berridge and Bonnin (1944) claimed that arthrography facilitated the diagnosis of

The normal arthrogram. Figure 1—Antero-posterior projection. Note the line of contrast medium in the joint, the lateral pouches and the recess between the tibia and fibula. Figure 2—Lateral projection. Note the extent of the anterior and posterior recesses. Figure 3—Oblique projection. Note the recess between the tibia and fibula.
ligamentous damage soon after injury. Freeman (1964, 1965) also stressed the value of arthrography in this respect. Arner, Ekengren, Hulting and Lindblom (1957), Broström, Liljedahl and Lindvall (1965) and Glastrup (1965) found good correlation between arthrographic appearances and findings at operation in recently injured ankles.

MATERIAL

Experimental study—Arthrography was done on the ankles of forty recently amputated legs. Four to six millilitres of 30 per cent Biligrafin were injected and radiographs were taken immediately after injection, in antero-posterior, lateral and oblique projections.

In fifteen specimens we divided the medial ligament and everted the foot after the initial radiographic examination. A further 6 to 8 millilitres of Biligrafin were then injected and further radiographs were taken. The process was repeated in another fifteen ankles after section of the lateral ligament, and in a further ten after section of the inferior tibio-fibular ligaments.

Clinical study—Arthrography was done on recently injured ankles and the findings were compared with findings at operation in sixty cases—ten cases of rupture of the medial ligament, twenty cases of tibio-fibular diastasis and thirty cases of rupture of the lateral ligament.

RESULTS

The normal arthrograph—In the antero-posterior view the contrast medium appears as a thin band between the lower surface of the tibia and the upper surface of the talus, with well rounded ends just below the tips of the malleoli. A recess extends upwards between the tibia and fibula and tails off smoothly into a small pouch (Fig. 1).

In the lateral view well rounded anterior and posterior recesses are shown. The anterior recess extends to the neck of the talus and the posterior recess lies above the posterior process of the talus (Fig. 2).

In the oblique view the recess between the tibia and fibula is shown as one to two millimetres wide and one centimetre long (Fig. 3).

Communication between the ankle and subtalair joints was found in 10 per cent of cases, and communication between the ankle and the related tendon sheaths in 12.5 per cent of cases (Figs. 4 and 5).
Figure 6—Rupture of the medial ligament. Note the diffusion of contrast medium below and medial to the medial malleolus, and the widening of the medial side of the joint. Figure 7—Rupture of the lateral ligament. Note the diffusion of the contrast medium below and lateral to the lateral malleolus.

Figure 8—Rupture of the inferior tibio-fibular ligaments. Note the wide band of contrast medium between the tibia and fibula. Figure 9—Arthrogram of ankle soon after fracture through the lateral malleolus. The recess between the tibia and fibula is normal; there is no diastasis.
The arthrograph after injury—When the medial ligament is torn the contrast medium leaks out below the tip of the medial malleolus and diffuses into the soft tissues on the medial side of the joint (Fig. 6). When the lateral ligament is torn the contrast medium leaks out of the joint below the tip of the lateral malleolus and on its anterior and lateral aspects (Fig. 7).

In the case of diastasis much contrast medium diffuses up between the tibia and fibula and anterior to the tibio-fibular ligaments (Fig. 8).

With fractures about the ankle arthrography is particularly useful in confirming or excluding associated ligamentous damage (Figs. 9 to 11).

DISCUSSION

Accurate diagnosis is very important in the treatment of injured ankles, but the standard methods of diagnosis of ligamentous injury are not always reliable or easy to apply. In particular, the evidence provided by stress radiography is often difficult to interpret, and for various causes the results are open to serious objections (Hughes 1949, Leonard 1949, Bonnin 1950, Watson-Jones 1943, Rubin and Witten 1960, Sedlin 1960). Arthrography has certain advantages: it is a reliable and, with proper precautions, a safe method; the evidence provided is usually unequivocal, and general anaesthesia is not required for its performance. It should be done soon after injury, otherwise difficulty may be experienced in interpretation of the findings.

SUMMARY

1. The appearance of arthrographs of healthy and of injured ankles are described on the basis of experimental and clinical studies.
2. Arthrographic appearances have been correlated with findings at operation.
3. Arthrography is a valuable method of investigation for the accurate diagnosis of injuries about the ankle.
REFERENCES


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