REPAIR OF CALCANEAL TENDON RUPTURES

A SAFE TECHNIQUE

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A new method of repair of the calcaneal tendon, which uses a small transverse skin incision, is described. In 41 patients, there was only one minor wound problem and the clinical results were satisfactory.

Surgical repair of rupture of the calcaneal tendon may be followed by problems of wound healing (Lawrence, Cave and O'Connor 1955; Arner and Lindholm 1959). Conservative treatment can produce good results but may leave some tendon lengthening with calf weakness on Cybex testing (Inglis et al. 1976). To minimise healing problems an operative repair has been devised which uses a minimal transverse incision.

TECHNIQUE OF OPERATION

The patient is prone on the operating table with the leg exsanguinated. A 3 to 4 cm transverse incision is made in the skin just distal to the palpable gap in the tendon (Fig. 1), care being taken to avoid the posterior tibial vessels and the sural nerve. The paratenon is then opened longitudinally and Alliss forceps are used to grasp the tattered proximal end of the tendon. Sustained gentle traction then pulls this down into view. A Bunnell-type suture of heavy Dexon (No. 2) is then placed in the tendon (Fig. 2).

The distal end of the ruptured tendon is brought into the wound using Alliss forceps and full plantar flexion of the ankle. Long needles (4 in, 10 cm) are used to pass the Dexon through the distal tendon and out through the heel pad (Fig. 3). With full plantar flexion and gentle traction on the suture, the two 'mop ends' of the tendon are then opposed under direct vision, so that the tendon can be adjusted to its correct length.

The wound is closed, using fine interrupted catgut sutures for the paratenon and interrupted prolene or nylon sutures for the skin. The Dexon stay sutures are passed through a felt pad and tied over buttons (Fig. 4). The wound is dressed and a well-padded below-knee cast is applied with the foot just short of a full equinus position.

Postoperative management. At three to five days, the

wound is inspected and a more firmly-fitting equinus cast applied. The patient is then allowed up non-weightbearing on crutches. For elderly patients, a Böhler iron may be fitted to the cast to allow partial weight-bearing.

The cast is finally removed at six to eight weeks; the Dexon suture is cut short, allowing its ends to retract subcutaneously. A one inch (2.5 cm) heel raise is advised for four weeks. Physiotherapy is then begun in patients who have gross ankle or subtalar stiffness.

PATIENTS

Of 51 consecutive patients seen at the Norfolk and Norwich Hospital between 1980 and 1984, 10 were excluded from the series, either because the treatment did not exactly follow the described technique or because they were lost to follow-up, leaving 41 cases. Four consultant surgeons and 10 junior surgeons performed the operations, 27 on the left side and 14 on the right. There were 22 men and 19 women, whose ages ranged from 24 to 81 years, with an average of 48.5 years (Fig. 5). Most of the patients were engaged in sport when tendon rupture occurred. All 41 patients were reviewed personally at an average of 16.4 months (range eight to 40 months) after the injury.

RESULTS

All the tendons healed primarily with no problems. The range of ankle movement was normal in all but three of the patients, most of the tendons having healed without lengthening. Calf power, assessed by standing on tip-toe and repeating toe raises on the injured leg, were satisfactory in all but two. These two patients were the oldest in the series, aged 77 and 81 years respectively. Four of the patients had collagen diseases: two had rheumatoid arthritis, one had temporal arteritis and one had systemic lupus erythematosus.

Complications. One patient had re-rupture of the tendon, caused by tripping whilst running five months after repair. There was only one wound problem, due to a technical error. The Bunnell suture was brought out proximally at the base of the tendon rather than through

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Fig. 1

Fig. 2

Fig. 3

Fig. 4

Technique of operation (see text).

Fig. 5

Age distribution of 41 patients with rupture of the calcaneal tendon.

the heel pad; an 8 mm superficial ulcer healed in eight weeks without surgical treatment.

DISCUSSION

The pathology of subcutaneous rupture of the calcaneal tendon has been well documented (McMaster 1933; Christensen 1953; Arner, Lindholm and Orell 1958/59; Håstad, Larsson and Lindholm 1958/59; Arner and Lindholm 1959; Davidsson and Salo 1969). Angiography has shown that the blood supply of the tendon is poorest 2 to 6 cm from the os calcis (Lagergren and Lindholm 1958/59), and isotope studies indicate that this supply is decreased after the third decade (Håstad et al. 1958/59). This may explain the high incidence of calcaneal tendon ruptures in patients over the age of 30.

Haertsch (1981) performed detailed studies on the blood supply of the leg and demonstrated that the classic longitudinal incision for calcaneal tendon repair is through poorly-perfused skin; the blood supply enters from the medial and lateral subfascial perforating vessels. For this reason we developed a method which uses a transverse incision. Ma and Griffith (1977) describe an elegant percutaneous method of repair, but this has the disadvantage that the tendon ends cannot be opposed under direct vision. Consequently it is difficult to check tendon length and tension. DiStefano and Nixon (1972) used a pull-out wire but they approached the tendon through a longitudinal lateral incision.

Conclusions. The new technique minimises wound healing problems by using a small horizontal incision, which causes minimal disruption to the blood supply of the skin. The scar is small and cosmetically acceptable, lying in the skin creases of the heel. Adhesions between the skin and the paratenon and tendon repair are avoided because they lie at different levels after the operation.

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