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TECHNICAL NOTE

Single side hole irrigation – a simple method of catheter irrigation of the tendon sheath

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Treatment of septic flexor tenosynovitis at the hand requires significant hospital resources in terms of operative time and subsequent management of tendon irrigation. Delayed recovery or treatment failure may require re-irrigation and drainage. This may be due to failure to adequately irrigate the entire flexor sheath. We describe a method of closed tendon sheath irrigation which is simple to use and ensures that the complete tendon sheath is adequately irrigated. Unwieldy continuous irrigation is avoided and patient inconvenience is kept to a minimum.

Keywords : tendon sheath ; irrigation ; flexor tendon ; hand.

INTRODUCTION

Today early diagnosis and aggressive treatment of septic flexor tenosynovitis generally has a good outcome. Surgical drainage, when required, has evolved from open aggressive debridement of the flexor tendon sheath to the contemporary approach of limited skin and sheath incisions combined with catheter irrigation of the tendon sheath (*2, 3*). Several techniques in flexor tendon sheath irrigation have been devised. However, if the flow of fluid from the irrigation catheter is not directed to all areas of the flexor tendon sheath, the lavage and dilution of the infective material may be inadequate. In addition, difficulty in passage of the irrigation catheter may cause unnecessary damage to the delicate flexor tendon sheath causing adhesion formation and post-operative stiffness.

We describe a technique which has the advantage of easy passage of the catheter with a method which ensures that all areas of the flexor tendon sheath system are equally and adequately irrigated. Continuous irrigation which may cause oedema and skin maceration is avoided.

SURGICAL TECHNIQUE

The procedure is carried out under tourniquet control although the hand is not exsanguinated. A transverse incision is made over the A1 pulley and the flexor tendon sheath is incised. The presence of either purulence or cloudy serosanginous fluid confirms the diagnosis, although if any doubt remains it is prudent to irrigate the flexor tendon sheath while awaiting definitive microbiological examination of the fluid obtained. An oblique or transverse incision is made at the level of the distal interphalangeal joint at the level of the A5 pulley. A

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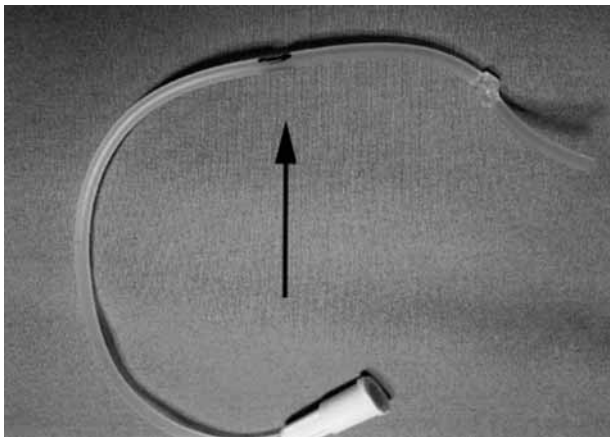

Fig. 1. — 25G catheter with side hole (marked with black ink)

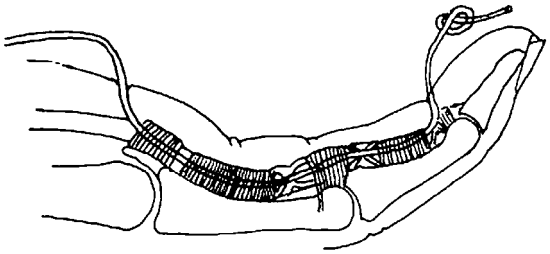

Fig. 2. — Diagram of catheter position during irrigation. The catheter has been passed into the flexor tendon sheath. In this drawing the side hole is just distal to the A2 pulley.

24-gauge stainless steel wire is twisted to a two-ply wire with a distal loop, which is inserted under the A5 pulley and guided under the flexor tendon sheath and retrieved proximal to the A1 pulley. A prolene suture is tied to the 25G catheter or paediatric feeding tube and then passed through the wire loop and then withdrawn to pass the catheter under the flexor tendon sheath. The catheter is tied at one end and a single side hole in the wall of the catheter is made (fig 1). Intraoperatively the catheter is moved proximally and distally while irrigating with saline solution until there is equal efflux from proximal and distal incisions (fig 2). The hand is then wrapped in a bulky dressing and elevated. Post-operatively irrigation is performed twice daily with adjustment of the catheter to ensure that all areas of the flexor tendon sheath are adequately

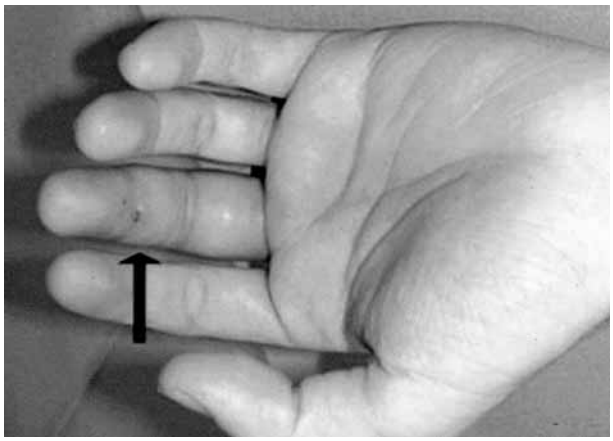

Fig. 3. — Patient with flexor tenosynovitis of the left middle finger secondary to a deep diathermy burn at the level of the distal interphalangeal joint.

irrigated. Ten ml of saline is used for each of these irrigations.

ILLUSTRATIVE CASE

A 45-year-old surgeon sustained a deep diathermy burn on the volar surface of his left middle finger at the level of the distal interphalangeal joint. Over the following 72 hours he developed classic signs of septic flexor tenosynovitis (fig 3). Under regional anaesthesia the A1 pulley was incised with release of pus confirming the diagnosis. The single side hole technique was used and the flexor tendon sheath was thoroughly irrigated (fig 4). Intravenous antibiotics were administered. The catheter was irrigated at twelve hours intervals for two days when the patient was discharged on oral antibiotics. The infection resolved rapidly and the patient had regained full range of motion at three weeks follow-up.

DISCUSSION

In the pre-antibiotic era septic flexor tenosynovitis was a grave surgical emergency treated by widespread incision and drainage which may have eradicated infection but at the risk of extensive adhesions and loss of motion. During the Second World War, Dickson-Wright (*1*) described a less invasive

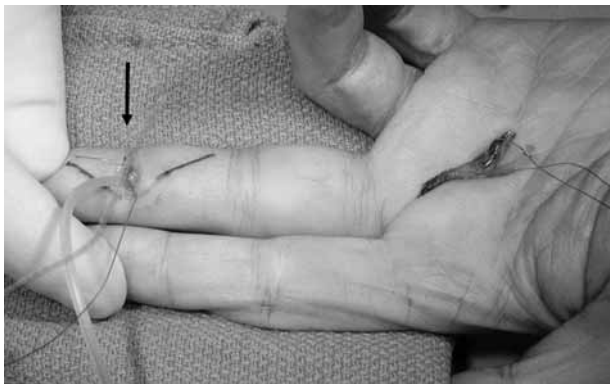

Fig. 4. — After confirming diagnosis the wire suture loop is passed under the flexor tendon sheath from the distal incision at the A5 pulley under the flexor tendon sheath to be retrieved via the proximal incision at the level of the A1 pulley. A prolene suture is passed through this wire loop which is then withdrawn through the flexor tendon sheath. The prolene suture is then tied to the irrigation catheter and then tensioned to guide the catheter under the sheath.

technique which was further refined by Unonius *et al* (*6*), who used small incisions for sheath exposure and irrigation with a needle. Neviaser (*5*) described through-and-through saline irrigation using an indwelling catheter and a small Penrose drain in a series of twenty patients with good results. This method involved the sheath being flushed manually with 50 cc of saline every two hours over a forty-eight hour period. Nemoto *et al* (*4*) have described a method which involves the placement of both an inlet and outlet tube. The system is connected to a continual infusion of antibiotic solution at a rate of 1500-2000 ml per day. This avoids the need for manual irrigation at two-hour intervals and the patient can mobilise. However continuous infusion of large amounts of fluid may lead to oedema and is inconvenient to patients.

We have found that the use of the wire loop allows atraumatic passage of the irrigation catheter. The catheter is generally passed on the first attempt even by more junior staff. The advantage of the single side hole technique is that the fluid is directed sequentially to defined areas of the flexor tendon sheath rather than taking the path of least resistance which is the case with other closed irrigation techniques. The use of twice daily irrigation of a small amount of fluid ensures that the hand does not become oedematous or macerated. In addition the patient can mobilise normally without any cumbersome attachments. The single side hole irrigation technique allows the surgeon to be confident that the entire flexor sheath is being irrigated, if efflux is seen from both incisions. Irrigating fluid cannot "escape" by the path of least resistance, in effect short circuiting the irrigation process and leaving an non-irrigated area which could delay or prevent recovery.

Appropriate management of septic flexor tenosynovitis is demanding in terms of operative time and postoperative management. This technique is simple to perform and minimises time spent with irrigation and dressing changes. Patient inconvenience is minimised without compromising eradication of infection.

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