

Surgery Illustrated



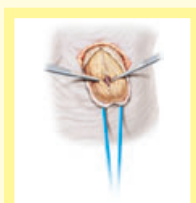
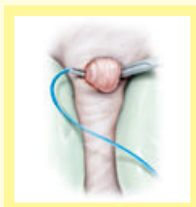
Surgical Atlas

Varicocele: antegrade scrotal sclerotherapy

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ILLUSTRATIONS by STEPHAN SPITZER, www.spitzer-illustration.com



INTRODUCTION

Antegrade scrotal sclerotherapy (ASS) was introduced in 1988 as an alternative for the treatment of the varicocele [1] and has been subsequently used in our clinic in >6000 adults and children. By contrast with retrograde sclerotherapy this procedure is feasible in almost all patients (99%) [1]. ASS is less invasive than the open surgical and laparoscopic approaches, and therefore provides a faster recovery to normal activity [2,3].

INDICATIONS AND CONTRAINDICATIONS

The treatment is indicated for: varicocele and pathological sperm counts; large varicocele in childhood; small varicocele in children with testicular hypotrophy; scrotal pain due to varicocele; bilateral varicocele; persistent varicocele after operative ligation, antegrade or retrograde sclerotherapy; and contraindicated by problems with haemostasis.

RESULTS

ASS is regularly used as an outpatient treatment under local anaesthesia, and takes 15–20 min. The treatment results in low persistence rates of 9% in adults [4,5] and 3% in children, respectively [6,7]; an improvement

in sperm count according to the WHO criteria [3,8], even in men with unobstructive azoospermia [9]; and a paternity rate of 42% [8].

EQUIPMENT AND MATERIAL

ASS is a combined radiological-surgical approach; the requirements are:

- C-arm fluoroscopy;
- a drape sheet, Mayo stand cover and surgical gowns;
- standard instruments for interventions on external genitalia;
- one vessel loop;
- a cannula (24 G);
- resorbable ligatures and sutures 3–0;
- local anaesthetic (e.g. 1% xylocaine);
- NaCl 0.9%;
- 3% or 1% polidocanol (see below);
- non-ionic contrast medium;
- swap compress and dressing.

PATIENT PREPARATION

The patient is placed supine; the scrotum is elevated and the proximal third is shaved. Peripheral venous access is helpful in case of adverse events due to the contrast medium. Except in young patients sedation is unnecessary. After disinfection and sterile dressing of the operative field, deep-

infiltration anaesthesia is induced below the level of the external inguinal ring by injecting 20 mL of a 1% xylocaine solution into the spermatic cord and the surrounding area, and another 0.5 mL into the area of the planned incision.

For the sclerosing agent we use polidocanol (Aethoxysklerol™, Kreussler, Wiesbaden, Germany), a weak acid which causes protein damage to the endothelial cells of the intima. An abacterial inflammation leads to thrombosis and subsequent closure of the vessels. The maximum tolerable dosage is 2 mg/kg body weight. In adults we

recommend 3 mL of a 3% solution, whereas in children we prefer 3 mL of a 1% solution.

ROLE OF PHLEBOGRAPHY

Antegrade phlebography enables visualization of the complex venous drainage of the pampiniform plexus in adults, as in children [10,11]. Radiation exposure is minimal and the screening time for a bilateral procedure is 3–6 s. The testicles should not be exposed. As contrast medium is used, patients should be evaluated for previous allergic reactions.

Phlebography of the internal spermatic vein before sclerotherapy is strongly recommended [7,12]. Radiological imaging ascertains that the sclerotherapy is anatomically appropriate, not only for forensic reasons. With radiological control inadvertent puncture of the testicular or cremasteric artery can be recognized before misplaced injection with the sclerosing agent. These would result in testicular atrophy or abdominal wall necrosis, respectively. Equally, sclerotherapy should be omitted if the external or internal iliac vein is traced by contrast medium after irregular cannulation of the cremasteric or deferential veins.

Figures 1 and 2

The spermatic cord along with the scrotal skin is grasped between the index finger and thumb, and a 1–2 cm long transverse incision is made in the taut scrotum 1.5–2 cm below the external inguinal ring. The subcutaneous tissue is incised until the external spermatic fascia becomes visible.

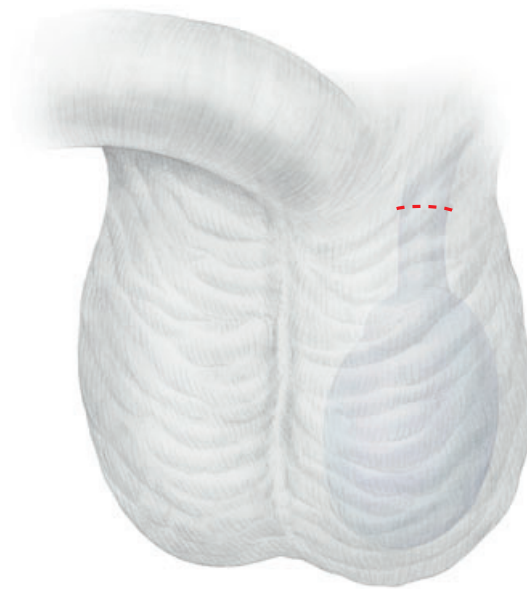
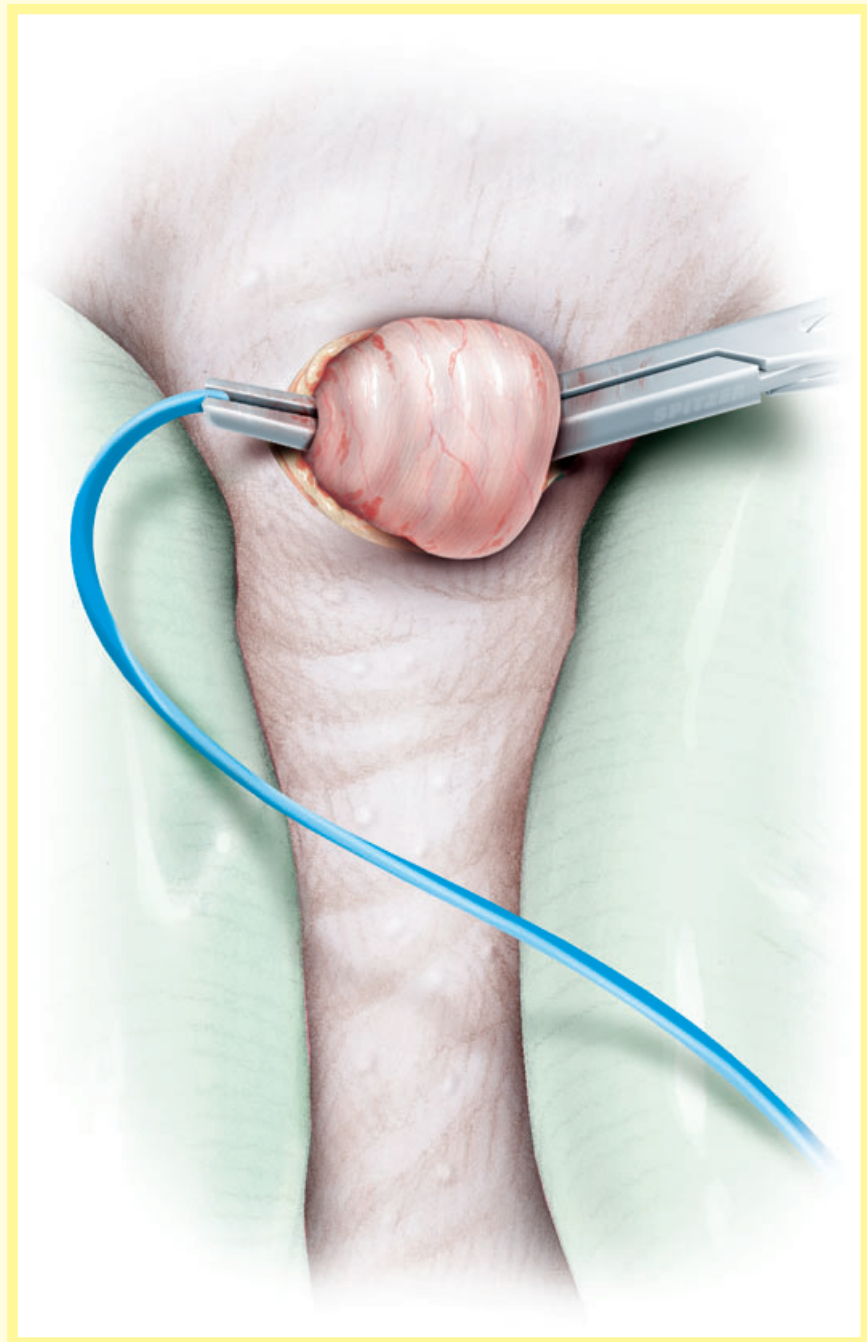
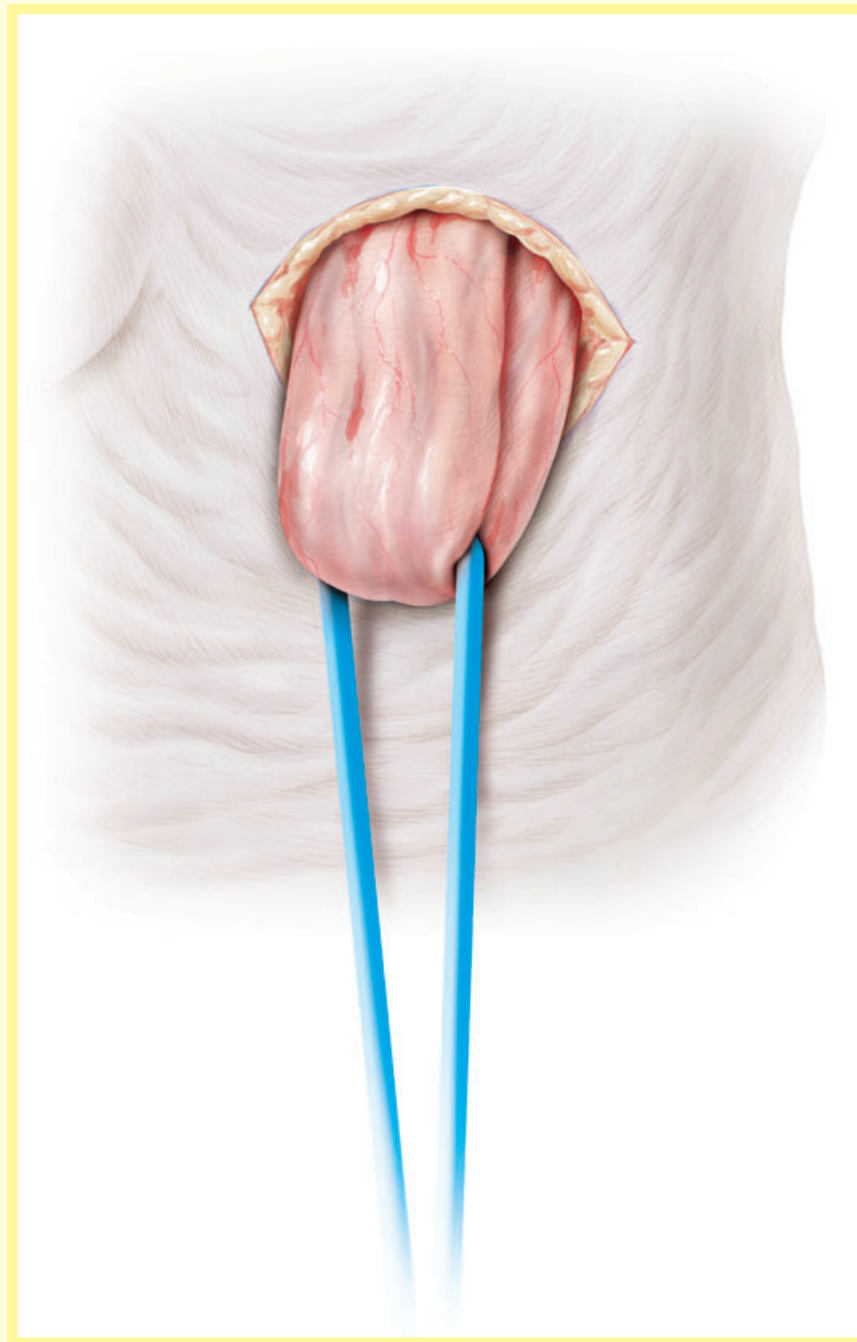




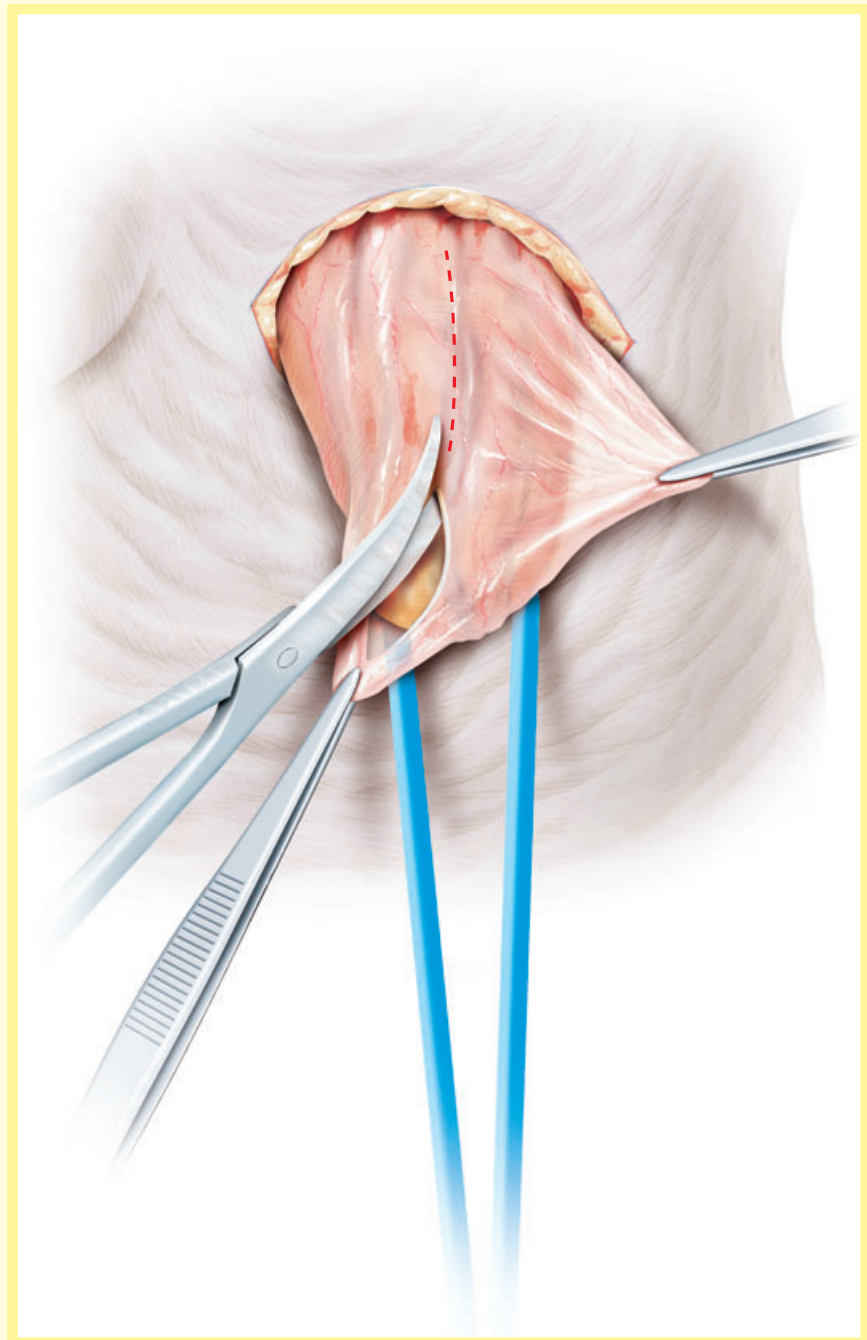
Figure 3

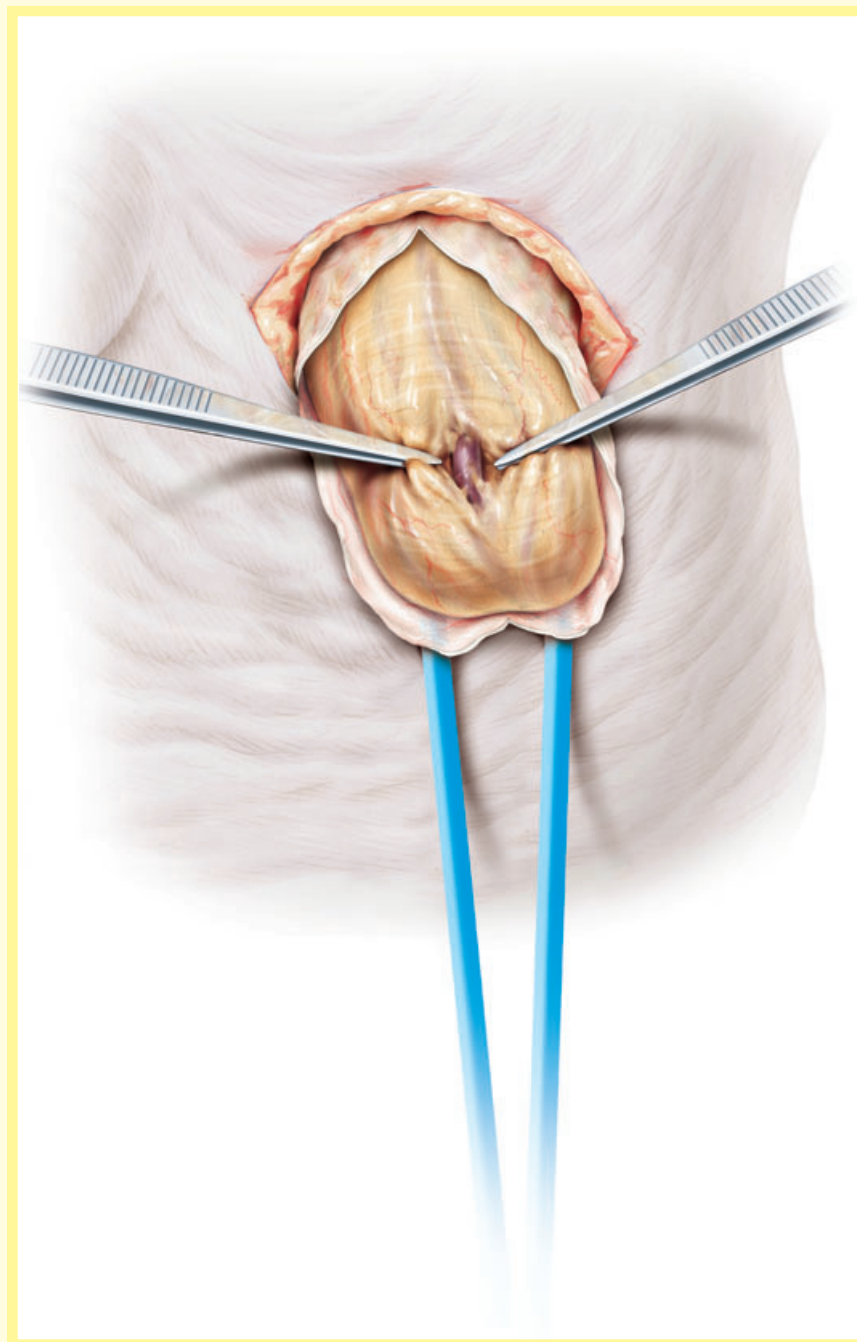
After having mobilized the spermatic cord a small clamp is drawn underneath the spermatic cord and a vessel loop is pulled through it, constantly making sure to include the spermatic duct.



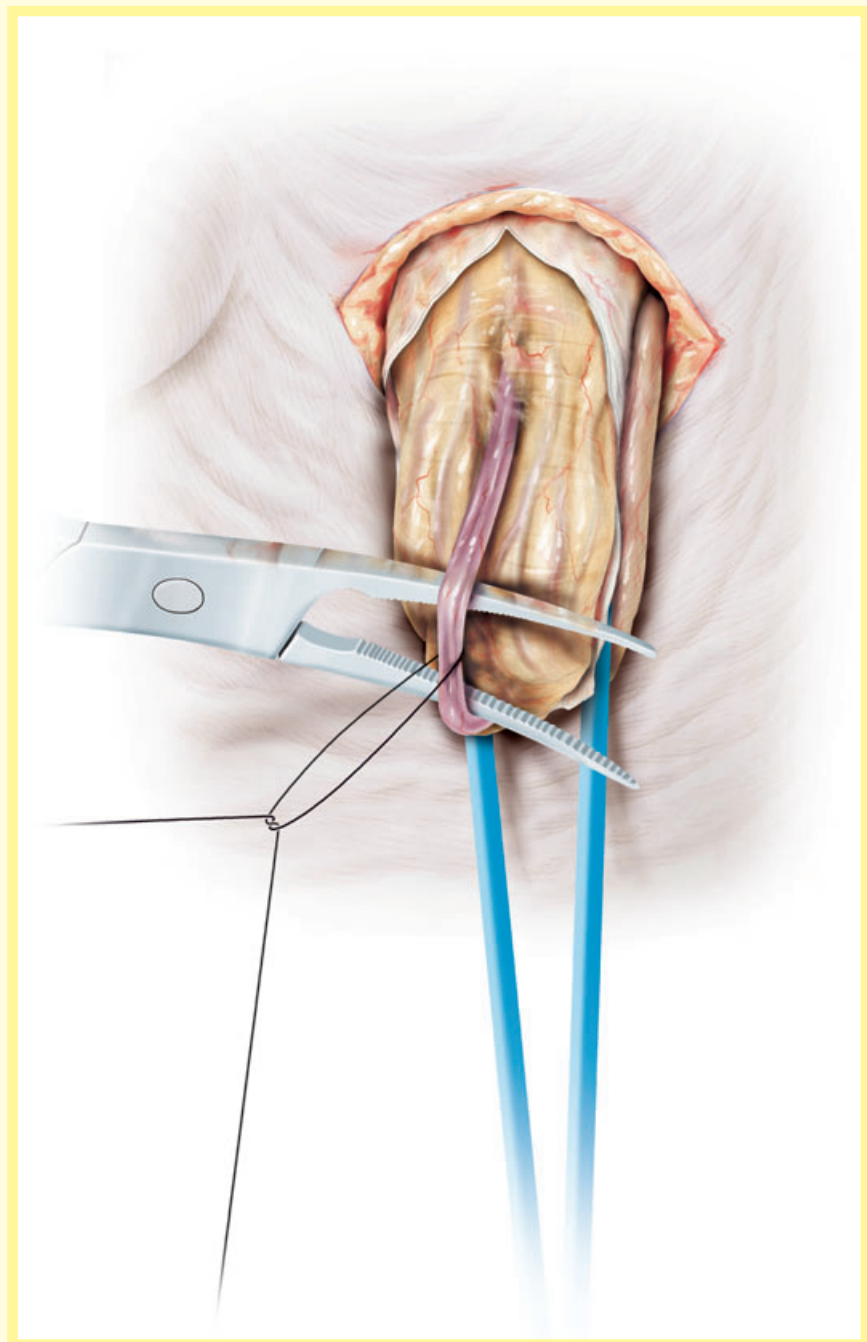
**Figures 4 and 5**

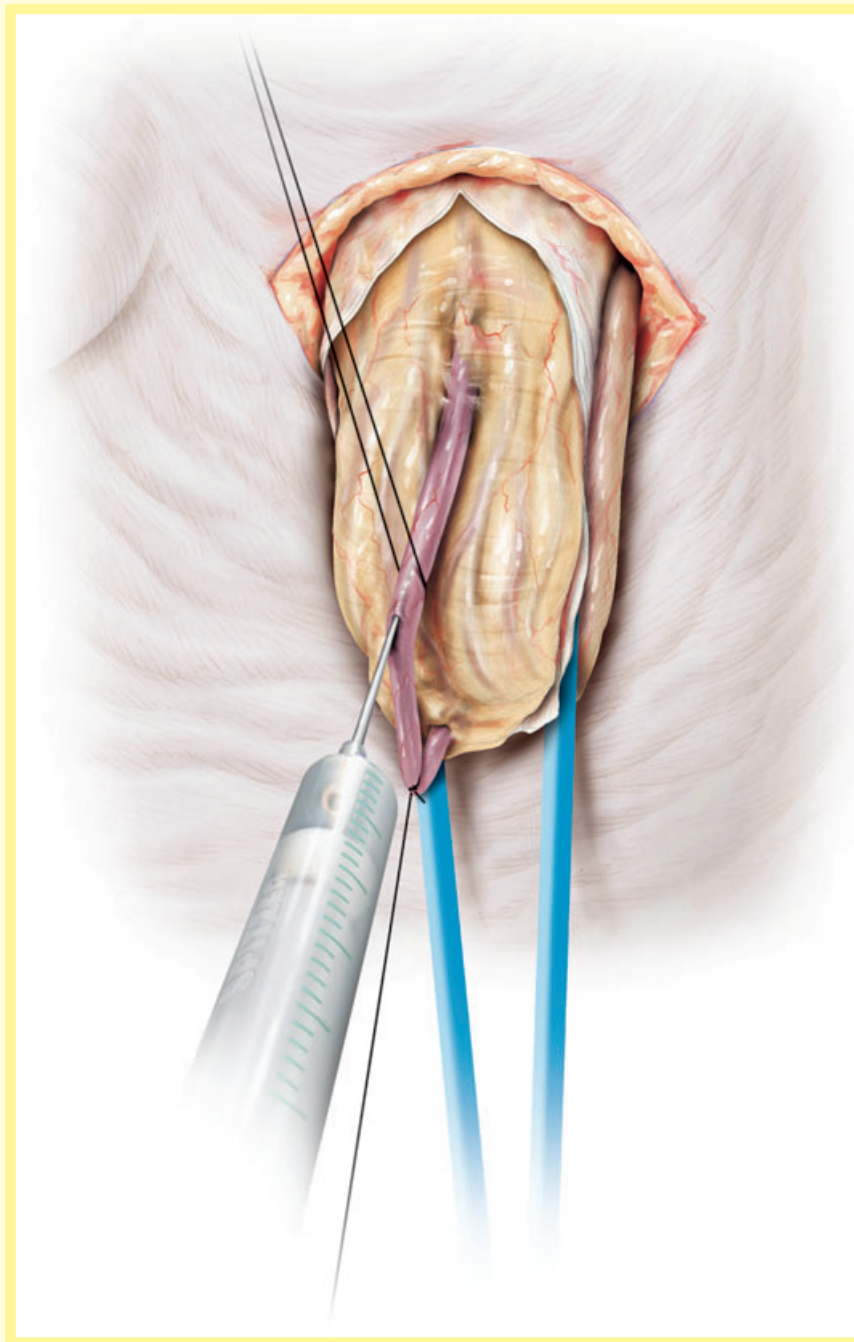
The external spermatic fascia and the cremasteric fascia is incised, and the pampiniform plexus is exposed to the surface.



**Figures 6 and 7**

A dilated and straight plexus vein is selected from among those merging into the spermatic vein. The vein is dissected and distally ligated.

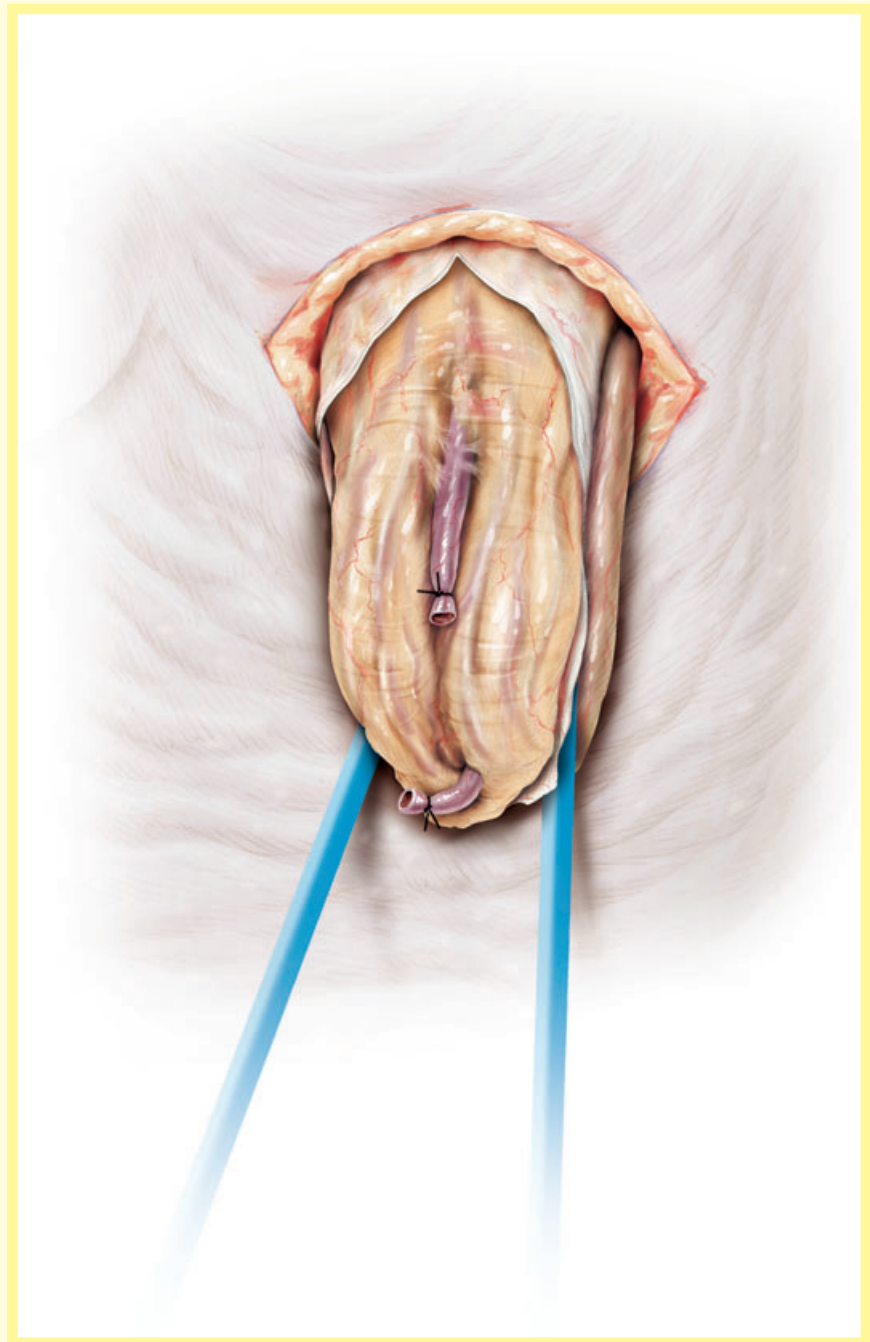


**Figure 8**

After incision, a 24 G thin-walled cannula is introduced in an antegrade fashion towards the internal spermatic vein and, with injection of a few millilitres of physiological saline, is advanced and secured with a single ligature. Then 3–5 mL of a non-ionic contrast medium is injected to trace the internal spermatic vein by fluoroscopy. After having ensured that the contrast medium is draining through the spermatic vein, the sclerosing agent is injected in an antegrade direction using an air-block technique (1 mL of air, followed by 3 mL of the sclerosing agent), during which the patient is instructed to perform the Valsalva manoeuvre. Only one injection is administered.

Figure 9

The cannula is removed and the vein is ligated proximally. The opened spermatic cord fascia is closed with a suture and the spermatic cord is repositioned after removing the rubber band. Finally, the skin is closed and the wound is dressed after 5 min of manual compression for haemostasis.



POSTOPERATIVE CARE

After 2 h of assessment the patient is sent home; we ask him not to drive a car alone and to keep calm for the rest of the day, and we recommend daily wound-cleaning. He should avoid sports for 2 or 3 weeks and have no sexual intercourse for 1 week. Constant bed rest is unnecessary. Persistence of the varicocele should be assessed after ≥ 3 months, and sperm analysed ≥ 6 months after the operation.

COMPLICATIONS

The complication rate was determined after 317 procedures [4,5] and included scrotal haematoma (2.2%), sterile epididymitis (0.3%), testicular atrophy (0.6%) and subsequent development of a partial abdominal wall necrosis (0.3%); there were no hydroceles.

SURGEON TO SURGEON

To facilitate the dissection of the pampiniform plexus and to avoid complications, detailed knowledge of the angioarchitecture of the spermatic cord is recommended [13]. The veins of the pampiniform plexus can be subdivided in two different groups. One group forms a tight plexus around the testicular artery. Another group of plexus veins is situated ventrolaterally with no close relationship to the artery, and is embedded in a yellowish fat that serves as a landmark. These veins should be chosen for dissection.

Identifying the appropriate veins can be facilitated by positioning the patient with the feet lowered and by instructing him to 'bear down'. This results in a temporary distension of the pampiniform plexus due to increased reflux.

Excessive dissection of the spermatic cord should be avoided as it can cause a thrombosis of the plexus veins [14]. If the aforementioned group of plexus veins cannot be easily detected, it might have been missed when the spermatic cord was initially mobilized but looped only partially. Thus, the manoeuvre should be repeated.

Sclerotherapy involves the distal part of the internal spermatic vein and the plexus veins. Therefore, when applying the mixture of sclerosing agent and air during the Valsalva manoeuvre, microbubbles become visible in the surrounding plexus veins. This effect is desirable and will not cause harm to the epididymis or the testicle. By contrast, the paravascular application of the sclerosing agent has to be recognized and treated immediately. Extrinsic inflammation or necrosis can occur [7,12]. Therefore, the sclerosing agent must be washed out meticulously using physiological saline. Additionally, anti-inflammatory drugs should be administered.

If an arterial branch has been incised, immediate ligation is indicated. Ligation is clinically unimportant, as the artery of the distal spermatic cord is multiply branched. By contrast, sclerotherapy should never be used as it involves all branches.

Recapitulating our personal experience, the procedure becomes more difficult after previous scrotal operations for a maldescended testis, testicular torsion or vasectomy. An alternative treatment might be more appropriate in these cases.

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