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Simultaneous Microsurgical Spermatic Vein Ligation and Sclerotherapy

A Combined Procedure for the Treatment of Recurrent or Persistent Varicocele

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Key Words

Varicocele · Microsurgery · Sclerotherapy

Abstract

Objectives: Microsurgical ligation as well as antegrade sclerotherapy have been established in varicocele treatment. The aim of this study was to evaluate whether a combination of microsurgery and sclerotherapy can provide a safe and effective treatment of varicocele recurrence or persistence.

Methods: Nine patients with recurrent or persistent varicoceles were operated by means of the combination method. Under microscopic control varix veins were ligated selectively preserving lymphatics and arteries. Ectopic veins as a possible source for varicocele persistence or recurrence were also ligated. Finally, an intraoperative venography with subsequent sclerotherapy was performed through one of the dissected veins.

Results: Despite difficult anatomical situations after previous surgical interventions, the operations were performed successfully without any complications. Clinical controls showed varicocele disappearance without damage of the testis. No varicocele recurrence or persistence was observed.

Conclusions: This method combines the advantages of both methods. Precision of the microsurgical technique is combined with velocity of sclerotherapy. Thus, it may represent an interesting alternative to conventional operation methods especially in the treatment of recurrent or persistent varicoceles.

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Introduction

Varicoceles are observed in approximately 15% of the general population due to retrograde blood flow through the spermatic vein into the pampiniform plexus [1]. The reflux usually results from nonexistent or insufficient valves of the spermatic vein. Progressive deterioration of testicular function leading to reduced semen quality is clearly associated with varicocele. In adolescent boys, varicocele has been shown to retard growth of the ipsilateral testis as a risk factor for future infertility [2]. Furthermore, varicoceles can lead to scrotal discomfort or chronic pain syndrome [3]. The traditional treatment of varicocele repair has been high retroperitoneal ligation of the spermatic veins. Ante- and retrograde sclerotherapy of the spermatic vein have also been established as minimally invasive procedures which can be performed under local anesthesia. These techniques, however, have significant recurrence rates up to 15% due to the persistence of parallel collaterals or aberrant spermatic veins [4, 5]. Varicocelectomy can also be performed through an inguinal approach. The problem in conventional inguinal varicocele repair, however, is the identification and preservation of the spermatic artery and lymphatics. Deterioration of these anatomical structures can lead to testicular atrophy or hydrocele formation [6]. Microsurgical techniques have therefore been established in inguinal or subinguinal varicocele ligation. Microsurgical varicocelectomy has been shown to result in fewer recurrences as well as postoperative complications [1, 7–9] and therefore represents an applicable method in the treatment of recurrent or persistent varicoceles [10]. Especially in varicocele recurrence and persistence even microsurgical preparation may be difficult due to scar formation after previous operations. In many cases, preparation of smaller vessels may be difficult or even impossible. It was the aim of this study to establish a combination of microsurgical varicocelectomy and sclerotherapy as a time-effective and safe surgical alternative to 'classical' microsurgery in the treatment of recurrent or persistent varicocele.

Materials and Methods

Nine patients underwent microsurgical varicocele repair combined with antegrade sclerotherapy because of recurrent or persistent varicoceles. Seven patients had been operated with a conventional retroperitoneal approach, one individual with antegrade and the other one with retrograde sclerotherapy. Indications for surgery were infertility because of poor semen quality in 7 cases as well as chronic testicular pain in 2 cases. All patients were examined in a warm room in the supine and upright positions with and without Valsalva maneuver. Clinical examination showed a grade 2–3 varicocele in all cases. Furthermore, Doppler and duplex examinations were performed preoperatively. Presence of a kidney tumor as a reason for secondary varicocele was ruled out by renal ultrasound. Under general anesthesia, a 2-cm incision was made over the external inguinal ring. Scarpa's fascia was incised and the spermatic cord exposed. The testis was delivered, and all dilated gubernacular as well as atypical spermatic veins were coagulated or ligated. This technical modification provided direct visual access to all possible avenues of testicular venous drainage [11]. The testis was returned to the scrotum and a Penrose drain placed under the spermatic cord provided support. External and internal spermatic fascias were opened using the operating microscope (Wild, Hersbruck, Germany) under 10–20× magnification. By means of a Doppler probe (Preissler Medizintechnik, Kaufbeuren, Germany) which was used in all patients the branches of the testicular artery were identified. Dilated internal spermatic veins as well as dilated veins of the vas deferens were carefully dissected and divided. Each vessel was investigated with the Doppler probe before dissection. Lymphatics as well as nerve branches were preserved. In contrast to 'classical' microsurgical varicocelectomy smaller spermatic veins were left intact. Having dissected nearly all veins one of the dilated vessels was cannulated with a 20-gauge Venflon® sheath for intraoperative venography by injection of 5 ml of nonionic contrast medium. Having ensured that the contrast medium wars draining through the spermatic vein 1 ml of air followed by 2-ml of ethoxysclerol (Kreussler, Wiesbaden, Germany) were injected with a 2-ml syringe during the Valsalva maneuver created by high-pressure ventilation. Hospital discharge was the first day after operation. Postoperative clinical controls were performed at intervals of 3–6 months starting 4 weeks postoperatively. Patients were investigated clinically for varicocele recurrence and persistence and for changes in testicular volume. Additionally, Doppler and duplex sonography of the testis and the spermatic cord were performed to demonstrate testicular blood supply and varicocele disappearance.

Results

All patients were operated without complications with an operative time ranging between 30 and 50 min (mean 42 ± 5.3 min). Especially in patients who had undergone sclerotherapy anatomical preparation was difficult because of scar formation within the spermatic cord. There were no intraoperative complications. In all patients dilated veins were found within the spermatic cord. In 2 patients, additional atypical dilated external spermatic veins were seen as the possible source of varicocele persistence or recurrence. These veins were found at the entrance to the inguinal canal. In 1 patient with varicocele persistence after frustrating retrograde embolization, a vascular malformation with multiple anastomoses between spermatic and renal vein was seen. Treatment of one single varix vein with 2 ml of the sclerosing agent seemed to be sufficient for additional sclerotherapy. 1–3 spermatic arteries were found and preserved by means of the Doppler probe. With intraoperative

venography spermatic veins could be identified and embolized easily. In 1 individual who had previously undergone inguinal varicocelectomy no dilated internal spermatic vein could be found by means of venography. In this case, a conventional microsurgical varicocele ligation without sclerotherapy was performed and the patient was excluded from the study. All patients were discharged within 1 day after operation. All patients were available for follow-up which ranged between 3 and 20 months (mean 14 months). Postoperative controls demonstrated disappearance of the varicocele with excellent perfusion of the testis as shown by Doppler and duplex sonography. Neither testicular atrophy nor hydrocele formation was observed.

Discussion

Varicocele is the presence of abnormally enlarged testicular veins in the scrotum. Varicoceles can lead to impairment of male fertility by alterations of scrotal temperature and testicular blood flow. The incidence of palpable varicocele in infertile men is about 35% compared to 10–20% in the general population [12]. Varicocele repair leads to improvement in semen quality in approximately 70% even in patients with azoospermia and severe oligoasthenospermia [13]. In these patients modest improvements may have a significant impact on fertility options. Hormone analysis shows significant improvement of Sertoli and Leydig cell function after varicocelectomy [14]. Various surgical techniques have been established in varicocele treatment. The most frequently used method is ligation of the spermatic vein at various points along its course by open or laparoscopic surgery. However, intraoperative identification and preservation of the spermatic artery and of lymph vessels may be difficult. Deterioration of the spermatic artery can lead to testicular atrophy and even azoospermia especially in bilateral operations. Lymph vessel damage can result in postoperative hydrocele formation in 7–33% [6]. Antegrade sclerotherapy has been developed as a minimally invasive, fast and cost-effective alternative to conventional surgical methods of varicocelectomy. Calculation of cost factors show that antegrade scrotal sclerotherapy is the most economically effective surgical technique of varicocele treatment [4, 5, 15]. Studies comparing antegrade sclerotherapy with high ligation methods found identical success rates [16]. Antegrade sclerotherapy is performed by injection of a sclerosing agent into a dilated vein of the pampiniform plexus by scrotal access. Varicocele persistence is described in 9–18% [4, 5] due to parallel collaterals of the spermatic vein or insufficient deferential or cremasteric veins. Significant complications and even testicular atrophy due to injury of the spermatic artery may occur [17]. Recently, microsurgery has been established in varicocele treatment. Using the operative microscope, preservation of spermatic arteries and lymphatics is achieved reliably without significant complications [1, 18]. Furthermore, the inguinal approach allows a delineation and ligation even of ectopic varix veins draining into deep pelvic vessels. Thus, microsurgical varicocelectomy has minimal recurrence rates of less than 3% [7–9] and represents an applicable method in the treatment of varicocele recurrence or persistence. Surgical repair of recurrent or persistent varicocele demands ligation of nearly all veins of the spermatic cord. Thus, even experienced surgeons need at least 45 min for conventional microsurgical varicocelectomy [7]. In recurrent or persistent varicocele operation time may be even longer because of anatomical abnormalities or scar formation. Some authors prefer retrograde venography and sclerotherapy for treatment of postsurgical recurrent varicocele. Clinical studies, however, demonstrate only limited success rates of retrograde embolization of 78–85% [18, 19] in these cases. Our results demonstrate that microsurgical varicocele ligation can be combined effectively with antegrade sclerotherapy. By means of the combined method, a safe ligation even of ectopic varix veins which were found in 2 of 9 patients is possible. In comparison to classical microsurgical varicocelectomy, operation time is shortened by use of simultaneous sclerotherapy, because ligation of all small branches of the spermatic vein is not necessary. A combination method of microsurgery and sclerotherapy was already described by Marmar and co-workers in 1985 [20, 21]. Contrary to our technique, they used this method for primary varicocele repair. In our opinion, however, this procedure is too time and cost intensive for the treatment of unoperated cases but should be considered as an alternative to conventional operation methods in the treatment of recurrent or persistent varicoceles.

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