

EMBOLIZATION OF TESTICULAR VEIN FOR TREATMENT OF RECURRENT VARICOCELE

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ABSTRACT

Objectives: To assess the efficacy of embolization of testicular vein for the treatment of recurrent varicocele.

Methods: Between January 2002 and December 2005, a total of 64 patients with a mean age of 28 (18-40 years) were treated by embolization of testicular vein for management of recurrent varicocele at Prince Hussein Bin Abdullah II Center in King Hussein Medical Center. Indication for treatment was as either infertility or presence of dragging pain in the left testicle.

Results: Embolization was accomplished successfully in 53 patients (82.8%), whereas it was difficult in eleven patients because of venous spasm and anomalous collaterals which could not be cannulated. One patient required transfusion of blood due to bleeding from the internal spermatic vein.

Conclusion: Embolization technique for internal spermatic vein for treatment of recurrent varicocele is a safe technique with low morbidity. It is also minimally invasive with high success rate.

Key words: Varicocele, Embolization, Fertility, Testicular vein

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Introduction

Varicocele is a meshwork of distended blood vessels of pampiniform plexus and the internal spermatic vein in the scrotum, usually in the left side due to dilatation of the spermatic vein.⁽¹⁾

The internal spermatic vein together with external spermatic vein and vas deferens veins comprise the deep venous system of testicle, the veins form extensive network within the testicle. This includes the pampiniform plexus that is drained through the internal spermatic vein as well as the cremasteric plexus that discharges through the external iliac vein and also into the femoral vein. The vas deferens vein drains into the internal iliac vein. All the three deep veins pass through the inguinal canal.⁽²⁾

The right internal spermatic vein flows mostly into the inferior vena cava, the left internal spermatic vein flows in almost right angle into the left kidney.

Varicocele is etiologically based on the absence of confluence valves as well as collaterals that bypass the valve. This leads to the venous reflux through the internal spermatic vein into the plexus pampiniform. This causes different changes in the vein plexus that could be the cause for the disruption of spermatogenesis. Patients with varicocele show frequently an oligo-teratoasthenozoospermia.⁽²⁾

The prevalence of varicocele in male population is 15% (55% are mild, 35% are moderate and 15% are severe form). Men with infertility have a prevalence of about 40%. The highest incidence is at 15 years. Varicocele is observed in the left side in about 80-

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98%, in the right side in about 10% and bilateral in 10%.

Not all men with varicocele consult a doctor; however, the main reasons for seeking medical advice are pain in the testicle or groin, very big dilatation of spermatic cord vein, and infertility.⁽⁷⁾

Methods

Between January 2002 and December 2005, a total of 64 patients, mean age 28 (17-40), have been treated by embolization of the testicular vein for the treatment of varicocele at Prince Hussein Bin Abdullah II Center in King Hussein Medical Center.

Among these patients, 52 had a history of surgical high ligation varicocele under general anesthesia but varicocele recurred. Of the 64 patients, sixty patients had varicocele on the left side and four had bilateral varicocele.

The criteria of recurrence depended on clinical examination and ultrasound for all patients at least six months after the first surgery. Indication of treatment was classified as either due to infertility or because of symptoms such as dragging pain in the left testicle. Amongst patients with subfertility, semen analysis results before and at least three months after treatment were available in 46 patients. Differences in sperm analysis parameters were assessed and compared.

Embolization was carried out by an interventional radiologist under local anesthesia in an angiography suite. The patient was positioned flat supine on the angiography operating table, using the Seldinger technique. Usually, a vascular introducer sheath size 5fr was used, but occasionally a renal guiding catheter was used in order to have extra support for the copra guide wire to negotiate the testicular vein. A guide wire was inserted into the right femoral vein, over which a vascular catheter was advanced into the renal vein under fluoroscopic control using an image intensifier, intermittent screening with gonadal shielding and restricted field of view. The venous anatomy and reflux into the internal spermatic vein were delineated; the guide wire was steered into the internal spermatic vein and advanced retrogradely to the level of the inguinal ligament.

After ensuring correct positioning, individual coils were released from their cartridges (up to about five coils size 5x5mm followed by 4x3mm) to form a ball which was placed up to the level of the third lumbar vertebra and was interspersed with 1ml of

3% sodium tetradecyl sulphate (STD) as a sclerosant to obliterate the lumen of the vein.

Venogram was done pre embolization to assess the anatomy of the testicular vein as most of the recurrences are due to accessory veins or collaterals. If a single vein was found, embolization at the level of the superficial inguinal ring was done. If multiple veins were found (they usually form a common vein) embolization at the site of communication was carried out. Venogram was repeated after completion of the procedure to ensure complete obliteration of veins. The technique duration was about 35 minutes including a total screening time of 3-4 minutes. After the procedure, patients were laid flat for three hours before mobilizing and going home. Precautions were taken to prevent bleeding at the femoral puncture site and at the site of the coiling. No other specific precautions to be taken by patients were needed after the procedure. Patients regained their activity the second day post procedure.

The patients were followed in the out patient clinic for six months. They were examined two weeks after surgery and three months later when they were examined again and seminal fluid analysis was done. Ultrasound was done if indicated.

Results

Embolization was accomplished successfully in 53 patients (82.8%), including four men with bilateral varicocele. Four attempts were necessary in three patients early in the series because there were technical difficulties. Bilateral varicocele was treated successfully in these patients. One patient who had a successful embolization subsequently underwent venography to evaluate recurrence; further embolization was not technically possible as the internal spermatic vein was shown to be occluded.

Embolization was difficult in four patients, including one with bilateral varicocele. Among these, two failures were caused by venous spasm and the procedure was not repeated. Three were associated with anomalous collateral veins at the renal hilum; one was associated with lumbar collaterals and another with small collaterals that could not be cannulated; and one was abandoned because of a vasovagal attack during the procedure.

After embolization sperm count and motility were improved. Patients undergoing embolization had lower recovery time (3-10 days, median 7 days)

compared to ligation (14-30 days, median 21 days). The analgesic requirements varied from nil to seven days.

All patients who underwent the technique were back to work within 10 days except one patient who experienced significant bleeding from an internal spermatic vein injury which required blood transfusion.

Discussion

Embolization of the internal spermatic vein offers several advantages over surgical ligation for the treatment of varicocele.⁽⁴⁾ It is carried out under local anesthesia as an out-patient procedure, whereas ligation involves brief hospital admission for a short period of time and requires general anesthesia. Laparoscopic ligation offers no advantage with respect to this requirement, although post operative discomfort may be reduced compared with surgical ligation. In contrast, percutaneous embolization is considered less invasive.⁽⁵⁾ Both morbidity and analgesic need are less in embolization compared with other treatment modalities, and patients return to work earlier.

Varicocele is characterized by retrograde flow of blood in the internal spermatic vein mainly due to valvular incompetence, however, venous reflux can occur despite competent valves by collaterals retrograde reflux, these collaterals can easily be identified by venography and their embolization ensured to prevent reflux.⁽⁶⁾

Venography offers the opportunity to define the venous anatomy and evaluate reflux into spermatic vein before treatment. Multiple contributing vessels may be identified and occluded. Embolization technique is an established, highly effective and minimally invasive procedure. Coils and sclerosant are used in combination to occlude the veins. Detachable balloons have also been used. Currently, it is known that if the varicocele arises due to incompetent valves, embolization will be highly effective in treatment, but if varicocele is due to collaterals, recurrence may occur because it is not always easy to identify all the collaterals or to embolize them.⁽³⁾

Recurrence of varicocele may occur in up to 10% of the cases whether treated by embolization or ligation technique. Late failure may occur and it is usually due to opening of persistent small venous collaterals draining into the internal spermatic vein

which are not always easily detected during the operation.

Successful embolization depends on experience and venous anatomy. The present success rate (82.8%) for the treatment of recurrent varicocele post high ligation in Prince Hussein Bin Abdullah II Center is comparable with that reported by international studies. Wunch *et al* reported their success rate to be 87%⁽²⁾ and Punekar *et al* reported an 85% success rate⁽⁴⁾ while Mickevicius *et al* reported a recurrence rate of 21.9%.⁽⁵⁾

Only one major complication which was bleeding due to internal spermatic vein injury was encountered in this study and was managed conservatively. Patients should be warned that they may experience testicular swelling post embolization which is usually transient; also they may experience testicular pain which is usually transient and can be managed with mild analgesic drugs.⁽⁸⁾

Other complications include infection at the site of the puncture and hematoma at the groin access. Hydrocele may develop with any of the available techniques for varicocele treatment. Radiological complication related to contrast media, migration of coils may occur but are rare.

Conclusion

Embolization technique for internal spermatic vein for treatment of recurrent varicocele is a safe technique which has low morbidity. It is also a minimally invasive technique with high success rate.

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