

Varicocele surgery or embolization: Which is better?

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Abstract

Introduction: Varicocele remains the most commonly identified correctable cause of male factor infertility. Surgical correction is the most commonly performed technique to treat varicoceles with a technical failure rate of less than 5%. An attractive alternative to surgery is the selective catheterization and embolization of the gonadal vein. This data are limited by small series.

Methods: We reviewed a total of 158 patients. These patients underwent embolization for clinical varicoceles and male factor infertility between 2004 and 2008. Of these, 56% underwent attempted bilateral embolization, 43% unilateral left-sided embolization and 1.3% unilateral right-sided embolization.

Results: Of these patients who underwent attempted bilateral embolization, 19.3% did not experience a successful obliteration of the right gonadal vein and 2.3% (2/88) experienced a failure rate in the embolization of the left gonadal vein. Of the 2 attempts at unilateral right-sided embolization, there were no failures. Of the 68 unilateral left-sided embolization attempts, there was a 4.4% failure rate. Of all of the right-sided embolization attempts, 18.9% failed, while 3.2% of the left-sided attempts failed.

Conclusion: This review represents the largest contemporary series of varicocele embolization outcomes currently in the literature. Our 19.3% technical failure rate for bilateral varicocele embolization is higher than the current published rate of 13% and is largely related to failure to successfully occlude the right gonadal vein. This supports our belief that bilateral varicoceles are best managed with a primary microsurgical approach, where technical failure rates are expected to be less than 5% based on published data. Men with unilateral left-sided varicoceles should be offered both options as they have similar failure rates, but with embolization offering some clear advantages to the patient.

Introduction

Varicocele remains the most commonly identified and correctable cause of male factor infertility with prevalence rates of 25.4% to 81% in infertile men. Most varicoceles are left-sided with only 1% being right-sided and up to 30%

being bilateral.¹⁻⁴ In North America, surgical correction is the most commonly employed technique for varicocele repair. A wide variety of surgical techniques have been described and reviewed in the literature, including high inguinal, inguinal, subinguinal, laparoscopic and microscopic approaches. The quoted failure or recurrence rates range from 1.05% for microscopic varicocele repair to 14.97% for high inguinal approaches.⁵ An attractive alternative to surgical varicocele repair is the selective catheterization and embolization of the gonadal veins using sclerosing agents, tissue adhesives or detachable metallic coils. This radiologic approach is minimally invasive and has a quicker recovery time as well as several other advantages. Embolization can be performed under local anesthesia, thus eliminating the risks associated with general anesthesia; this approach also allows excellent real-time delineation of venous anatomy and confirmation of venous occlusion using venography at the time of varicocele repair. As embolization is purely intravascular it minimizes or eliminates the risks of arterial and deferential injury compared to surgical techniques, which has obvious implications in the management of the infertile male.

The early descriptions of varicocele embolization in the literature demonstrated high technical failure rates that may have reflected the learning curve associated with these new techniques and the lack of procedure specific equipment.^{5,6} With increased technical experience and improvements in angiographic equipment, contrast media, and thrombogenic material, the technical failure rates of varicocele embolization continue to improve but remain higher than those quoted for surgical repair. Importantly, the improvements seen in semen parameters and fertility rates appear to be independent of the type of repair as long as the repair is technically successful. This makes success and failure rates of the individual techniques very important in the management of the infertile male.

To date no studies have directly compared the various techniques used for varicocele repair and this is unlikely to be done in the future, especially in a randomized man-

ner. A recent meta-analysis, however, examined the various techniques for varicocele repair including angioembolization.⁵ Over a 20-year period the authors identified 3319 men who underwent surgical varicocele repair and 314 men who underwent varicocele embolization for clinical varicoceles and male factor infertility. There were 108 failures or recurrences in the surgical group, for an overall surgical failure rate of 3.25%; there were 41 technical failures in the varicocele embolization group, for an overall failure rate of 13.05%.⁵ These figures are often used to justify surgical correction over the embolization of varicoceles in the management of infertile men. There is however no large contemporary series comparing these two approaches for varicocele management in the infertile male.

Our objective was to review the failure rates of varicocele embolization done for male factor infertility at the University of Toronto, Toronto, Ontario, and to examine how these rates compare with those published for varicocele embolization and surgical varicocele repair.

Methods

Retrospective review of the University of Toronto varicocele database. All of the patients in the database had clinical varicocele(s) confirmed by scrotal ultrasonography, documented male factor infertility, and abnormal semen analyses. Patients with ultrasound evidence of a contralateral varicocele were offered bilateral varicocele embolization as per interventional radiology protocol.

Results

A total of 158 patients were identified between 2004 and 2008 that had undergone unilateral or bilateral varicocele embolization for male factor infertility. All men had clinical varicoceles, confirmation of varicoceles by ultrasound, documented male factor infertility and abnormal semen analyses. The mean patient age was 38 years, with a mean duration of infertility of 3 years.

In total, 88 men (56%) underwent attempted bilateral varicocele embolization, 68 men (43%) underwent attempted unilateral left varicocele embolization, and 2 men (1.3%) underwent attempted right varicocele embolization.

Of the 88 bilateral attempts, there was an overall technical failure rate of 21.6% (19/88), with a 19.3% (17/88) failure rate in right-sided attempts and a 2.3% (2/88) failure rate in left-sided attempts. Of the 68 unilateral left sided attempts, there was a 4.4% (3/68) failure rate, and of the 2 unilateral right sided attempts there were no failures (0/2).

There was a 18.9% (17/90) failure rate for all right-sided embolization attempts, and a 3.2% (5/156) failure rate for all left-sided embolization attempts, with an overall failure rate of 13.9% (22/158).

Discussion

This review represents the largest contemporary series of varicocele embolization outcomes currently available in the literature. Our overall technical failure rate for varicocele embolization of 13.9% is consistent with the published meta-analysis rate of 13.05%.⁵ However, the high technical failure rate seen in our series with right-sided embolization attempts of 19% has not been previously addressed in the published literature and is something that can have significant implications for the infertile male seeking to optimize his semen parameters and fertility potential. The overall failure rate of 3.2% for left-sided embolization attempts is comparable to the 3.25% published rate of failure for surgical varicocele repair; this result suggests that these two options are equally effective, although embolization offers some advantages in terms of recovery time and safety. These data appear to support our belief that men with bilateral varicoceles and male factor infertility are best managed with surgical varicocele repair, as the failure rates are equal from side to side at roughly 3%, compared to the 19% failure rate seen during bilateral varicocele embolization. The management of unilateral varicoceles however appears less straightforward, with both embolization and surgery offering similar failure rates but embolization offering substantial advantages. Embolization has been demonstrated to pose no risk for postoperative hydrocele formation compared to the 8.24% rate in surgical approaches. Embolization is also not associated with testicular loss secondary to inadvertent arterial injury, which is a risk with the surgical approaches with a poorly described rate in the literature of 1%;⁷ however, there have been case reports of renal loss as a result of coil migration.⁶ The recovery period following varicocele embolization is typically 48 to 72 hours compared to 1 to 2 weeks following surgical repair.⁸ The risks of surgical repair appear to be higher than that of varicocele embolization with no real advantage in terms of success rates, suggesting that embolization may be the better choice for unilateral varicoceles in the infertile male.

Conclusion

We believe that these data support our contention that bilateral varicoceles are best managed with a microsurgical approach as the failure rates are significantly lower when compared to embolization. The same conclusion however cannot be reached for unilateral left-sided varicoceles as the failure rates are equivalent. In fact embolization may be the preferred approach in men with unilateral left-sided varicoceles as this approach offers many benefits in terms of patient safety and morbidity. Although in our study, the two attempts at embolization in men with unilateral right-sided varicoceles were successful, the overall failure rate for all

right-sided attempts was very high suggesting that, in rare cases of unilateral right-sided varicocele, a microsurgical approach may be preferred.

Competing interests: None declared.

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