Comparative study between the outcome of endovascular treatment of varicocele with cyanoacrylate glues and surgical varicocelectomy

Thesis

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List of Abbreviations

2-D .....Two-dimensional

ATP.....Adenosine Triphosphate

DNA .....Deoxyribonucleic acid

DNAF .....Deoxyribonucleic acid Fragmentation

FSH .....Follicle-stimulating Hormone

IBCA Isobutyl-2-Cyanaocrylate

ISV.....Internal Spermatic Vein

IUI .....Intrauterine Insemination

IVF .....In Vitro Fertilization

MIP.....Maximum Intensity Projections

MSV.....Microsurgical sub-inguinal varicocelectomy

NAC .....N-acetyl cysteine

NBCA.....N-Butyl-2- Cyanaocrylate

NBCA-MS.....Methacryloxy Sulfolane

NO .....Nitric Oxide

PP.....Pampiniform Plexus

RC .....Retroperitoneal Collaterals

ROS .....Reactive Oxygen Species

RV .....Renal Vein

STS.....Sodium Tetradecyl Sulfate

TAC .....Time-activity Curves

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Introduction

Varicocele is defined as dilatation and tortuosity of the pampiniform plexus and testicular veins in the scrotum.It is found in 6% of children, 15% of male adults, and 40% of men complaining from infertility ***(Ficarra et al., 2006).***

The pathophysiology of varicocele is different compared with that of varicose veins as the congenital absenteeism of valves within the spermatic vein is the main etiology for varicocele. In contrast, the incompetence of venous valves owing to post thrombotic syndrome caused by venous thrombosis or reflux is the primary factor for varicose veins. Other factors that play a part are the anatomical dissimilarity between the left and right testicular veins and the nutcracker phenomenon (compression of the left renal vein in between the abdominal aorta and the superior mesenteric artery) ***(Shiraishi et al., 2009).***

Varicocele is diagnosed mainly clinically and is more common on the left side. The existence of right side varicocele should alert the treating physician to exclude right renal cell carcinoma. On clinical examination, large varicoceles are characterized by the typical "bag of worms" around the testis. Ultrasonography, particularly Doppler ultrasonography, allows accurate diagnosis of varicocele, even in sub clinical varicocele ***(Kubal et al., 2004).***

Agreeing to the most recognized and used clinical classification the varicoceles can be graded as followed: visible and palpable varicose at rest (grade 3), palpable at rest but not evident (grade 2), palpable only by Valsalva maneuver (grade 1) and detectable only by ultrasound (subclinical) ***(Dubin et al., 1970).***

Despite the controversies surrounding the sonography criteria for varicocele diagnosis, almost all clinicians agree that the diagnosis can be established by measuring testicular vein enlargement of more than three mm, associated with reflux. The clinical importance of varicocele depends on the fact that it is the most correctable factor of male infertility. Several studies have attempted to show the clinical consequences of varicocele, which have demonstrated that testicular hypotrophy, disturbed spermatogenesis, altered semen parameters and consequently infertility are the collective caused by varicocele ***(Sigman et al., 1997).***

Even though the precise mechanism of testicular hypotrophy and disturbed spermatogenesis remains unclear, hormonal changes provoked by varicocele have been suggested as contributing factors. Moreover, changes in testicular temperature from the varicocele have been postulated as a cause of impaired spermatogenesis. If varicocele is left untreated, the sum of these adverse effects, notably testicular hypotrophy, can progress with age. This observation led experts in male reproductive medicine to correct the varicoceles at a younger age. Currently, young males that present positive indicators,

such as testicular discordance of more than 20%, or testicular pain, are being considered candidates for varicocele treatment ***(Diamond et al., 2011).***

A variability of treatment methods, including surgical or interventional approaches, have been used for varicocelectomy. The ultimate goal is to stop the veins from refluxing to the testis and preserving arterial and lymphatic drainage. Although the traditional surgical treatment for varicocele involves operative ligation of the spermatic vein, several less invasive operative strategies have been described. Endovascular treatment with percutaneous embolization of the internal spermatic vein has similarly gained popularity in clinical practice owing to perceived advantages of less patient suffering and speedy recovery ***(Nabi et al., 2004).***

Both surgical and endovascular methods are efficient in managing varicoceles with success rates up to 95 % for surgically managed cases ***(Lord and Burrows, 2003)*** and 60–95 %for endovascular embolization ***(Alqahtani et al,. 2002).*** Percutaneous embolization is an smart substitute to decrease the accompanying risks with surgical procedures. In addition, a pre-embolization venogram identifies all of the diseased veins and collaterals, resulting in lower recurrences.

Recurrence rates after surgical treatment range from 1 to 22% ***(Bechara et al., 2009)*** and after endovascular treatment recurrence rates range from 7 to 11 % ***(Alqahtani et al,. 2002).***