Original article

Comparing between varicocele surgery and embolization , our experience in King Hussein medical center

Mohannad Al-Naser[1], Sizeph Haddad[1] , Firas Khori[2] , Ashraf Al – Majali[3] , Abdelhakeem Ni'mate[3] , Rami Gsous[3] , Mohammad faisal mousa [3], Mohammad ahmad al-qudah [3], Anas Al-rabadi[3] , Ghaith Gsous [4]

1- consultant radiology , Royal Medical Services , Jordan .

2- consultant urology , royal medical services , Jordan

3- Specialist urology , Royal Medical Services , Jordan .

4-5th year resident general surgery , Royal medical services

Corresponding author: Ghaith Isam Gsous. Email: gaithgsous@hotmail.com

Abstract

ObjectiveOur objective was to compare between endovascular varicocele embolization Vs varicocele surgery , for the treatment of varicocele . varicocele is considered the most common surgical cause of male infertility .

Methods : Retrospective review of the prince Hussein Medical Center varicocele database . We reviewed a total of 265 patients , All of the patients in the database had clinical varicoceles confirmed by scrotal ultrasonography , a total 45 patients underwent unilateral varicocele embolization, and a total 220 patients underwent bilateral and unilateral varicocele surgery in Prince Hussein Center of Urology and Organ transplantation , between January 2015 and March 2017 . Patients have been followed up at the urology outpatient clinic , and by their semen fluid analysis to assess the results .

Results : In patients who underwent varicocele embolization , the failure rate was 3 % , and the recurrence rate were 3 % , sperm motility improved in all patients , with no complications related to the procedure . In the other hand , in patients who underwent varicocele surgery , the recurrence rate was 7 % , sperm motility improved in all patients too , and there are no documented complications in all patients **.**

Conclusion : Both methods , have similar result regarding semen fluid analysis improvement , and recurrence rate (in the international studies . recurrence rate between 5 and 10 %) . but the surgical option is is less than embolization .

Key words : *infertility* , *varicocele* , *embolization* .

Introduction

Infertility : is inability of female to get pregnant after regular unprotected sexual relationship for a period of time , or can be defined as : biological inability of female to have a conception [1] [2] [3] .

There are many causes of infertility , some related to female and others causes referred to male, and some causes could be combined or unexplained. Sexually transmitted disease , like Chlamydia trachomatis , and Neisseria gonorrhea could increase the risk of infertility . genetics causes, like Robertsonian translocation in one of partners, may cause recurrent abortions or infertility [1] [2] [4] [5] .

Causes related to female like ovulation problems (polycystic ovarian syndrome , it is the most common cause of anovulatory infertility) , tubal blockage , pelvic inflammatory disease caused by infections like tuberculosis , age - related factors , uterine problems , previous tubal ligation , endometriosis ,and advanced maternal age [3] .

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Causes for male infertility , problem in semen quality it is the main cause. Infertility can be caused by endocrine problems, medications, radiation, and infection, which leads to decrease number of sperm, or affect it is quality . Other causes may include: testicular pathology, hormonal abnormality , or blockage of the vas defference or other parts of man's duct system. primary ciliary dyskinesia can cause a viable, but immotile sperm which lead to infertility [1] [2] [3] [4] [6] .

Unexplained infertility has a 20 % of causes of infertility in United States [3] .

Varicocele , One of the most common causes of male infertility and low sperm quality , It is an abnormal dilatation of the pampiniform venous plexus in the scrotum ,varicocele surgery improve fertility in large group of patients , almost 1 of 7 patients had this surgery [3] [7] .

When we talk about varicocele , we have to review the blood supply of testis . The testis mainly supplied by testicular artery which arise from abdominal part of aorta , and supplied also by artery of the vas and cremasteric artery. venous drainage going by pampiniform plexus to testicular vein , the right vein is drained to inferior vena cava , and the left vein is drained to left renal artery [2] [5] .

American urological society recommends that, varicocele treatment should be offered to the male partner of a couple, when ALL of the following are present:

- 1 - Varicocele is palpable .
- 2 - The couple has documented infertility .
- 3 - The female has normal fertility or correctable infertility .
- 4 - The male has one or more abnormal semen parameters .

Indication in single adult :

- 1 - Presence of significant testicular asymmetry .
- 2 – Pain .
- 3 - Abnormal semen analysis .

There are many options for varicocele treatment . Open surgery with different approaches , as high or low ligation of testicular veins, and it could be done using laparoscopic surgery . [1] [2] [4]

Other form of treatment is testicular vein embolization, which is done by interventional radiologist. This is performed by passing a wire through a peripheral vein and then into the testicular veins , using the small flexible catheter, we can obstruct the testicular veins , this will prevent the intra abdominal pressure to be transmitted to the testis . [8] [9]

Varicocele recurrence also is one of the problems that faces urologist after surgery, which is most commonly happened , due to branches from internal spermatic veins, which are missed during the surgery . Treatment of such cases should be offered for patients who still clinically symptomatic or still infertile , but still there is no evidence of the ideal method of treatment to varicocele recurrence . [7]

In this article , we will discuss the difference between two methods of treatment, surgical ligation of varicocele and radiological embolization of varicocele, depending on our experience at our center of urology and organ transplant, and we will suggest a treatment option for varicocele recurrence

Method

A retrospective study was carried out at King Hussein Medical Center, between January 2015 to March 2017, 45 patients underwent unilateral varicocele embolization, and 220 patients underwent bilateral and unilateral varicocele surgery at Prince Hussein Center of Urology and Organ transplantation. Patients have been followed up at the clinic, and by seminal fluid analysis to assess the results

Results

The failure rate in patients who underwent varicocele embolization were 4 % , and recurrence rate were 4 % , sperm motility improved in all patients , and no complication has been occurred. In the other hand ,in patients who underwent varicocele surgery, the recurrence rate were 7 % , and sperm motility improved in all patients too , there were no complications in all patients .

	Open approach	Varicocele embolization
recurrence	7 % over 220 patients	4 % over 45 patients
Sperm motility	++	++
Cost	+	++++
complication	Wound infection in 2 patients	Faiulare in 3 patients for embolization
Hospital stay	Day case, back to work in 24 hours , back to intercourse in 2 weeks .	Day case, back to work in 1 week , back to intercourse in 4 weeks .

On the next two pictures, we show one of our cases, who back to male 25 years old presented to clinic, so he was referred to interventional radiology department, and underwent varicocele embolization; the result is shown on picture 2 .

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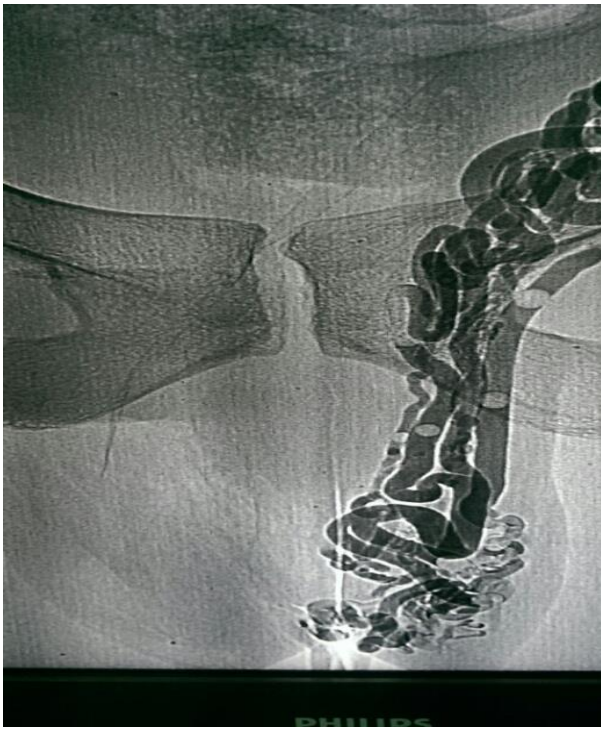
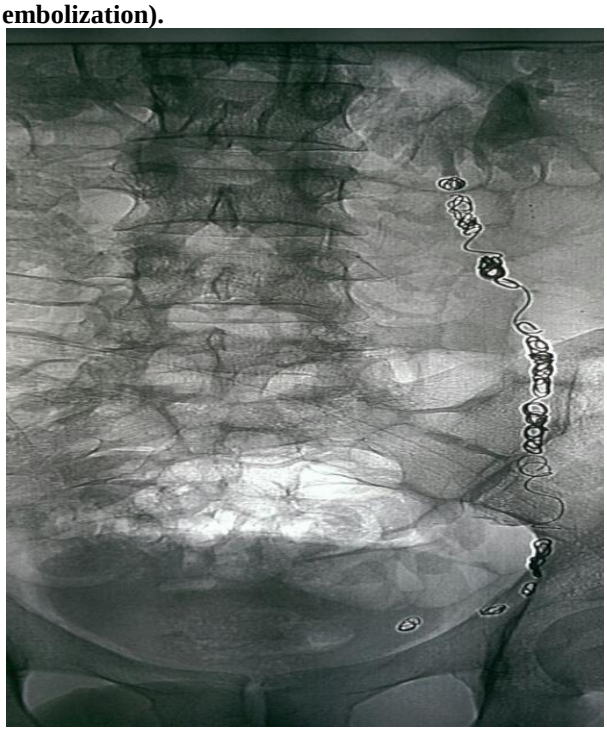


Picture 1: left grade 4 varicocele (pre embolization).



Picture 2: left varicocele (post embolization).

Discussion

With development in radiological techniques and surgical approaches, comparison is started between both approaches, to apply for patients have varicocele. it is proved that, varicocele treatment despite open method or embolization ,will improve sperm parameters and treat infertility [1] [4] [6] [8] [9] , but most researches comparing between both methods in many points ,as cost , hospital stay ,and complications , etc .

One of studies underwent on 61 patients in King Saud University in Saudi Arabia, 30 patients underwent an open ligation and 31 had varicocele embolization, patients had been followed up for year after treatment, and seminal fluid analysis results were compared before and after treatment, they found a significant improvement in sperms count and motility for both groups, but No significant improvement was noticed in the volume of ejaculate for both groups. The study conclusion was that, angiographic embolization procedure being of low cost, need no general anesthesia has short hospital stay and recovery time, and it is more recommended than the surgical technique. [7]

Jason Ronald Kovac et al and his collegues in 2014, compared the cost effectivness between the open surgery as a method to treat varicocele and embolization as another option of treatment, as a result, they showed that varicocele surgery gave the greatest number of pregnancies at an acceptable level of incremental cost, comparing to varicocele embolization. Based on these study findings, varicocele surgery should be the first line of treatment for varicocele related infertility. Conversely, they found that varicocele embolization is best reserved to treat varicocele refractory to surgical management. [10]

On the other hand, a study discuss the using of varicocele embolization in treatment of varicocele orchalgia, study included 96 patients in which Pain scores were assessed with a 10 -point score .in the questionnaires, the Analgesia requirements and satisfaction scores were assessed also. The result of the study showed that Median pain scores reduced significantly following embolization, 74 % of patients had reduced pain (30 % of these had resolution of pain), 24 % had no change in symptoms, and 1 % had worsening pain. Those patients with moderate or severe pain had a reduction of pain in 81 % and 79 %, respectively. However, 64 % of cases with mild pain did not experience any benefit. As a conclusion, varicocele embolization can successfully reduce varicocele related orchalgia; it works best in those with moderate or severe pain. [11]

Another retrospective study done in Canada in University of Toronto for varicocele database, they reviewed 158 patients who underwent varicocele embolization between 2004 to 2008, 19.3 % of these patients failed to obliterate right gonadal vien, and 2.3 % failed to obliterate the left gonadal vein. These numbers was between patients who tried bilateral varicocele embolization. But in

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patients who underwent unilateral embolization the success rate was higher (no failures on right side embolization, and 4.4 % failure rate on the left side embolization). as a conclusion, they belief that bilateral varicoceles are best treated by varicocele ligation , where failure rates could be less than 5 %, based on published data . Patients with left-sided varicoceles only, should be offered both methods of treatment, as they have similar failure rates, but with embolization offering some advantages to the patient. [12]

Conclusion:

- Embolization has less recurrence rate in our center but in literature it is more recurrence than open approach.
- Embolization is more suitable for refractory or recurrent cases for open approach.
- Open approach is better in Right side and bilateral varicocele, to avoid technical difficulties occurred from embolization in the Right side.
- Embolization is better regarding post operative pain ,back to normal lifestyle , and cost effectiveness(in literature), but in our center, the surgical approach is less costly .

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