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Result of the conception of laparoscopic versus open varicocelectomy with its advantages and disadvantages

Resultado de la concepción de la varicocelectomía laparoscópica versus abierta con sus ventajas y desventajas

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ABSTRACT

Objective:
As the laparoscopic varicocelectomy was newly invented in this field, various studies are required to evaluate and compare between old opened method and this new developed method from various views mainly the output results and some observed postoperative complications of both methods, then to decide preferable method.

Cases and methods:
This study under run in period of 11/2/2018 to end of January/ 2019, during which (60) cases randomly collected. All selected cases were complained of infertility, claimed to be due testicular Varicocele. Of these; (32) cases were laparoscopically managed and the other (28) cases managed by open method. The inclusive criteria were concentrated on male infertile cases in which the parameters were below normal values due to 2010-WHO guidelines of Basal sperm analysis (BSA). The main causes supposed to be due to varicocele consequences clinically and proved by Doppler ultrasonic studies. While the varicocelectomy operations for other indications were excluded from study. Both operations performed in Arbil-Iraq city hospitals; then follow up carried on two monthly intervals.
SPSS version package 24 is used; presented data are used as Mean ± STD.
(P-value < 0.05 regarded non-significant).

Results:
The included ages were (24 to 43) years and mean age was 33.5 years age. In nearly 33 cases only left testis affected while the remnant 9 cases were bilateral testes.
Grades of varicocele were 28 Grade III, 25 GII and 7 cases of GI.
Of these infertile men 36 cases were secondary infertile and 28 cases primary infertile. duration of infertility arranged between 2-6 years.
Postoperative follow up showed an acute rising of motility and quality of sperms after 4-8 weeks period among laparoscopy cases and slide down again for a period of 12-20 weeks, then returned minimum normal level at the end of 24 weeks and (9) (28.18%) cases achieved conception in the first 6 months .
In the opened group the changes were slow and remained for 24 weeks to achieve wanted normal parameters and accordingly only 10 (35.71%) cases achieved conception .
Regarding postoperative complications were like all other studies in this regard; less complications and shorter recovery period no more than 72 hours were observed.
The average duration of operation in laparoscopic method was 42±5 minutes in unilateral 60±8 minutes in bilateral cases while in open method 35±5 minutes in unilateral, and 50±5 minutes in bilateral cases.

Conclusions:
The laparoscopic varicocelectomy is promising method of treating varicocele for treating abnormal sperm parameters, by same ports sites were used, giving better views of visions for uni or bilateral cases especially in subclinical varicoceles, moreover to magnified visualization of main and collateral veins. Although mild significant conceiving advantage of open method over laparoscopic mode had been observed in this study (P value > 0.07) but the laparoscopic varicocelectomy is less disabling, least traumatic and complicated in expert hands and more economic with nearly same comparative results purposed as the open method.

Key words: Laparoscopic Varicocelectomy- Normal Sperm Parameters- Varicocels

1 INTRODUCTION:

Varicocele is a tortious enlargement or dilatation of the testicular veins in the scrotum. Varicocelectomy is a surgery performed to ligate that worm like enlarged veins [1].

Varicocelectomy is by far the most commonly performed operation for the treatment of male infertility. The goal of treatment of the varicocele is to obstruct the refluxing venous drainage to the testis while maintaining arterial inflow and lymphatic drainage (2) or the procedure is done to restore proper blood flow to testes. [1, 2]

Incidence of varicoceles is about (15-20) percent of males, and vast majority (60-70) % occurs in the left side more than right [2].

In the 50% of cases usually cause no any discomfort or symptoms. Varicoceles on the right side are more likely to be caused by accentuating factor. Clinically varicoceles are divided into three grades (I, II & III) depending on the prominence of dilated veins. [3, 4].

The three grades of varicocele are:

Grade 1: The smallest type, this is not visible, but a physician can feel it if they use a Valsalva maneuver.

Grade 2: This is not visible, but it can be felt without a Valsalva maneuver.

Grade 3: The varicocele is visible.

Pathological consequences of vericocele on the testis and the contained sperms quality are due to hyperemic and hyper thermic media which will be yielded after tortious dilation of testicular veins [3, 4].

The higher incidence of left vericocele and subfertility than right postulated to be anatomical; some pathophysiological and genetic predisposing factors [5–7]

Not all the cases of varicoceles are symptomatic. The patients who search the treatment are those who are complaining of primary or secondary infertility. Moreover to those who are complain of pain in their scrotum because of advanced varicocele and rarely for cosmetic reasons [5, 6]. In this study the concentration was on the group whom were complained of infertility problems.

Not always the consequences of varicocele resulted in subfertility, as had been observed the frequent pregnancies of a couple with even grade II-III varicoceles male partners, anyhow the correction of varicoceles resulted in better results of conceives [5–7]. The pathophysiological causes of infertility caused by varicocele explained on basis of hyperemic hyperthermia and toxic antioxidants to which faced the testicular tissues and consequently resulted in spermopathies [7–10].

2 SUBJECTS AND METHODS:

This is a retrospective study of operative and post-operative follow up of varicocelectomies operations for infertility patients carried out from the period of 6/6/2016 to 10/6/2018. After clinical examination we did routine ultrasonography for the abdomen for exclusion of predisposing causes, and scrotal Doppler study for confirming variesis of testicular veins, and another ultrasonography had been done after 2 months after operation as a follow up. For all the cases basic sperm analysis (BSA) performed according to WHO 2010 guidelines preoperatively and consequently as a follow up post operatively.

Laparoscopic varicocelectomy was performed under general anesthesia with the patient in the supine position (20 degrees-Trendelenburg). No any urinary catheters were routinely used as the patient urinated just before operation and evacuated the bladder, except of (2) cases. A direct laparoscope trocar inserted through transverse supra-umbilical (1 cm) incision and in (6 obese) cases this step was done by a Veress needle for the creation of pneumo-peritoneum. Carbon dioxide insufflation was maintained and the intra-abdominal pressure was kept between 11-13 mm Hg, according the general patient's condition and stature or BMI. A 10-mm trocar was inserted through the umbilical incision, connected to the carbon dioxide insufflator, and a 0 or 30 degree laparoscope was introduced into the peritoneal cavity. In all cases, the abdominal and pelvic viscera were examined in addition to the spermatic vessels and internal inguinal rings mainly on left side and superadded at the end to examination of right side in clinically significant cases. For unilateral varicoceles, the working ports consisted of two 5-mm trocars and 10mm trocars introduced via a stab in the bilateral para-rectal area medial and inferior to mid McBurney's line. As a surgeon we were stood on the contralateral side of the operating table using the working ports, while the assistant surgeon was standing on the same side and behind, controlling the laparoscope. Lateral pelvic peritoneum excised and spermatic vessels identified. External testicular grasping tests applied nearly in all cases to prove the varieses and to confirm the involved vessels moreover this step helped me to distinguish the testicular artery (TA). The vascular bundle was then carefully grasped after dissection of testicular artery (TA) in most of the cases. Dissected were performed after application of (3-4) stainless steel clippers and endo-scissors. There were other collateral veins in about 24 cases managed individually. At the end the abdominal cavity was evacuated, and the trocars were removed under vision. In most of the cases the sigmoid colon were the most problematic for disturbing of visualization field and interfering manipulating procedures especially in obese and previously operated cases.

In the above mentioned cases we used tilting the bed to right, i.e. left side of operation table was elevated about 30 degrees and vice versa in bilateral cases.

In the open cases we used old high inguinal approach a technique described by Palomo in 1969. (15).

In all the cases approximation of the tissues and the skin sutured by 2/0 vicryls.

3 RESULTS:

As this study's main aim was to compare the generated results of both types of open inguinal and laparoscopic varico-

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cele repair managements, accordingly the study planned by including subfertile cases mainly. The ages were (24 to 43) years and mean age was (33.5) years age. In nearly 51(85%) cases only left testis affected, while the remnant 9 (15%) cases were bilateral testes. The type of subfertility was 26 cases complained of 2ary infertility and 34 cases of 1ary infertility. Grades of varicocele were distributed as the followings: 28 (46.6%) Grade III, 25 (41.6%) were GII and 7 (11.8%) cases were of GI. Of these infertile men 36 (60%) cases were secondary infertile and 24 (40%) cases were primary infertile. duration of infertility arranged between 2-6 years. The mean duration of laparoscopic operation of unilateral varicocelectomy was 42±5 minutes and 60±8 minutes for bilateral cases. For open inguinal approach time duration was (35-50) minutes. As postoperative follow up; 3 patients had immediate per-abdominal pain and restricted difficulty of respiration due to peritoneal irritation by CO2 for more than 2-3 hours which were relieved by muscle relaxants and analgesia, otherwise all the other cases were relaxed and comfortable. The rate of incisional pain was low in both groups as all had been injected locally in the different wounds post operatively by 5-10 ml Marcaine 0.75%. Hematoma and hydrocele following the open method were significantly more in than the laparoscopic varicocelectomy. The other details located in Table 1 . Hernia sac and big lipoma observed in the open group and sigmoid colon adhesion over lateral pelvic peritoneum observed and possibly blamed as a cause for pressure effect on testis vein.

Table 1. Both Laparoscope (GI) and open inguinal (GII) operative details

Subjects	Group I	Group II
Case number	32	28
Ages	(24 to 43) years mean age was (33.5)	(24 to 43) years mean age was (33.5)
Side of Varicoceles	(20) left (10) bilateral	(25) left (3) bilateral
Grades of varicocele	G III= 16, GII= 13, GI= 3	GIII=12, GII=12, GI= 4
Duration of operation	42±5 minutes left 60±8 min. Bilateral	35± 5 min. left 50±5 min. bilateral.
recovery time	2-3 days	5-6 days
Wound infection	1 port site infection	4 cases incisional infection
Scrotal hematoma	1 case	7 cases
Post op. hydrocele	(1) 3.12%	(6) 21.4%
Testes atrophy	0	0
Additional findings	(2-3) Sigmoid adhesions on the veins	(1) big lipoma (1) hernia sac
Collateral veins	14 (43.75%) cases	20 cases (71%)
Number of collateral veins	1-2	2-4

4 DISCUSSION:

Varicoceles are a major cause of impaired spermatogenesis and the most common correctable cause of male infertility. They are found in approximately 40% of men with primary infertility and 80% of men with secondary infertility, although they also occur in 12% of men with normal semen parameters ([6]. The presence of a varicocele does not always affect spermatogenesis, as it has been reported that only 20% of men with documented varicoceles suffer fertility problems. However, varicocele repair appears to have beneficial effects in men with impaired semen parameters and palpable varicoceles [7]. From 1970 to 2000, varicocelectomies gained worldwide attention for the treatment of male infertility, and first laparoscopic varicocelectomy performed in 1992 [6, 8]. Varicocele has generally been attributed to the absence or incompetence of valves in the internal spermatic veins.

The sole indication for surgery in the study was the proved presence of clinical varicocele, even when asymptomatic. This was based on the concept that early correction of varicocele will alter not only the progressive decline in fertility but will also prevent future infertility in younger male patients. The relatively higher rate of reversal of the seminal parameters were observed (51% - 43%) [6–8].

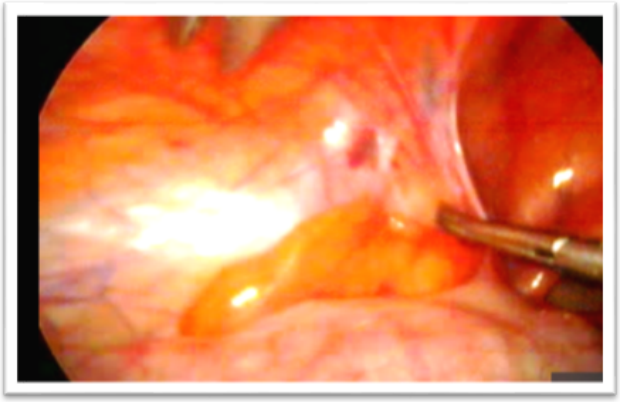

Figure 1. Sigmoidal adhesions on the posterolateral pelvicperitoneum.

After invention of laparoscopic varicocelectomy which run to a better visualization and access, the era of varicocelectomy procedure hugely changed. As this route gave a better magnification, accordingly presence of dilated dumping contained- blood well observed just by simple squeezing of scrotum by assistant. Although there were frequent collateral veins but rarely they were tortuous or dilated but the main dilated vein was easily seen and dealt with, moreover can be separated by blunt Maryland curved dissector separating any associated lymphatic tissues which gave nearly zero hydrocele complication, which are more usual with open method complication and this was clear with all other studies [4–6, 8].

Regarding positions of the ports and trocars; as mentioned three ports used one 10 mm for laparoscopy in supra or sub umbilical position and the other two (5) mm ports

Table 2. BSA and outcome results distribution

BSA	GI	GII	Comments
Type of	14 /1ary	12 / 1ary	26 cases of 2ary
Subfertility	18 / 2ndary	16 /2ndary	34 cases of 1ary
Pre-operation	Subnormal Motility < 30% Normal morphology < 4%	Subnormal Motility < 30% Normal morphology < 4%	
1st 4 weeks post	Motility:40% Morphology: 4%	Motility < 30% Morphology: 3%	Earlier arise to normal in the lap. group
1st 12 weeks post op.	Motility 35% Morphology = 4%	Motility 35-40% Morphology 5%	Drop-down in the Lap group but arise to normal in open group
hydroceles	(1) 3.25%	(6) 21.4%	
Positive pregnancy 1st 12 weeks	Only 3 case (9.3%)	2 (7.14) cases %	Sudden rise in progress in the 1st month observed
Positive pregnancy 1st year	6 cases (18.7%)	8 cases (28.6%)	P-Value> 0,05

BSA= basal seminal analysis

GI= laparoscopic varicocelectomy

GII= high inguinal varicocelectomy

for manipulating instruments put on two centimeters inferomedial to middle of McBurney's line bilaterally which were very comfortable to work in cases when bilateral varicocelectomies needed, without adding any additional port sites [8, 11, 12]

An interesting another points which we faced were adhesions of large bowel on the postero-lateral lumber and pelvic peritoneum in 3-4 cases; two cases due to previous operations and others without any operation and we observed to a certain extent causing pressure effects on the vein and we didn't knew if they were the predisposing cause for that varicoceles or not. Although in some studies on females the pelvic varicosities are thought to be the effect of gravity on an incompetent venous system. The resultant stasis produces the congestion and pain that is associated with this condition [9].

Also observed by other studies furthermore, adhesions of the bowel to the parietal peritoneum of the groin were found in 19 out of 21 patients with recurrent varicocele after open surgical varicocelectomy [7, 13].

By direct laparoscopic visions on right side we found nearly more than 5% of cases have had subclinical varicoceles on the right testis which were ligated with [2, 3, 6].

The mean operative time of laparoscopic varicocelectomy reported in this study were 42±5 minutes left and 60±8 minutes in bilateral cases. It was similar to that reported by other researchers [6, 8–10]. Technical problems with the laparoscopic instruments constituted causes of prolonged operative time for laparoscopic varicocelectomy. We had two obese cases, we faced some difficulties in patients with a case of previous operation adhesions but we didn't end in any failure.

Usually for varicosed vein ligation, after their identification and separation from surrounded sheath of lashes and collaterals and testicular artery two to four stainless steel clips applied, and we cut in between clips in (22) cases otherwise in (10) cases we left without cutting when more than two clips applied (Fig-2). The idea of non-cutting is to make the testes supported and fixed (12).

In patients with laparoscopic varicocelectomy done as a day-surgery cases, the mean hospital stay after laparoscopic varicocelectomy in our study was 6-8 hours except of two cases remained 24 hours for some non-medical causes. Almost all with open method remained for 24 hours to observe hematoma or bleedings consequences, anyhow 3 cases discharged on same postoperative day on their request. The only pain we observed in lap group was due to inadequate peritoneal emptying and irritation by CO2. And even open methods were painless due to 3-4 ml Marcaine injection locally and rarely did they need analgesia. Resuming activities including sexual intercourses was in the 1^{st} week in lap group and 2^{nd} week in open group after they become completely painless. In addition we tried to find testicular artery by pulse and strength of the wall and as much as possible the arteries were preserved and no any testicular atrophies observed after long post-operative follow up. Fortunately new other techniques of varicocelectomy operations invented lastly of microscopic varieties moreover to embolization [14], but we found laparoscopic varicocelctomy the interesting method of choice to solve and least complicated.

In all the opened cases high inguinal method applied consumed operative time were shorter in comparison to lap technique. And the complications we faced although were few but were same as previous studies were mentioned but also we observe a left old adherent hernia sac and a big lipoma we were repaired both. Pain was disregarded in both types but significantly higher in this group than laparoscopic and same about hospital stay [11, 14].

Although now a days several other methods of better procedures are invented like microsurgical varicocelectomy, varicocele embolization, sclerotherapy but still laparoscopic varicocelectomies remains a promising procedure [11, 12, 14–16]

5 CONCLUSIONS:

Laparoscopic varicocelectomy is a fantastic and promising procedure that is easy to perform. Moreover to ability to perform uni and bilateral varicocelctomy by same (3) ports and most evident method for presence of varicosity by direct vision bilaterally and any other external pressure factors like hernia sac, big lipoma and adhesions. It is the best approach when recurrent varicoceles and obesity are problems. The clear views and magnification it provides facilitate easy detection of the affected vessels and enable detection of abnormal collateral channels, which if they missed may cause failure of operation. Compared to the open technique, laparoscopic varicocelectomy lead to minimal postoperative morbidity, shorter recovery and an earlier return to normal activities. If there was no mild significant conceiving numbers superiority of the open method (P-Value > 0.26) we recommend the laparoscopic technique for varicocele ligation to replace the conventional open method. But surely needs longer time follow up and bigger volumes of studies.

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