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Original Research Article

Avoidance of hydrocele after non microsurgical varicocelectomy by pre-emptive eversion of tunica vaginalis in infertile men with varicocele

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ABSTRACT

Background: In infertile men with varicocele, controlled studies clearly indicate that varicocelectomy improves pregnancy rates. Non microsurgical varicocelectomy is associated with many complications; hydrocele is the most common one. Many techniques have been done to reduce the incidence of post-varicocelectomy hydrocele which is somewhat difficult to be done. This study aimed to evaluate the efficacy of pre-emptive eversion of tunica vaginalis in avoidance of post-operative hydrocele after non microsurgical varicocelectomy and its effect on fertility.
Methods: A total number of 115 infertile men with varicocele underwent varicocelectomy during August 2015 to December 2016 in Sohag university hospital. Fifty five patients underwent bilateral microsurgical varicocelectomy (group A), were compared with 60 patients who underwent bilateral non microsurgical varicocelectomy with pre-emptive eversion of tunica vaginalis (group B) as regard, development of post-operative hydrocele, operative time, complication rates, hospital stay and effect on spontaneous pregnancy.
Results: Group A has longer duration of surgery (26±11.7minutes versus 20±10.2minutes) while there was no significant difference in hospital stay (6±2.5 hours versus 6±1.5 hours) in both groups. No post-operative wound infection in both groups. There was one case (1.6%) develop scrotal haematoma in (group B) only. No post-operative recurrence in both groups. No post-operative hydrocele developed in both groups. Improvement in sperm count, motility and morphology occurred in both groups. No significant difference in percentage of paternity during 6-24 months.
Conclusions: Pre-emptive eversion of tunica during non- microsurgical varicocelectomy might be offered as an adjunctive technique to avoid development of post-operative hydrocele that is easy, not time consuming and has comparable results of microsurgical varicocelectomy.

Keywords: Hydrocele, Male infertility, Varicocele, Varicocelectomy

INTRODUCTION

Varicocele was presented in approximately 15% of the general population, 35% of men with primary infertility and in 75-80% of men with secondary infertility.[1] Recent controlled studies clearly reported that varicocelectomy for infertile men with varicocele improved pregnancy rates.[2] Surgical repair of a varicocele may be done by several open surgical methods, including retroperitoneal, inguinal and subinguinal approaches, or by laparoscopy. None of these methods has been proven to be superior to the others in its ability to improve fertility.[3] Surgical repair using loupes or an operating microscope for optical magnification maximize preservation of arterial and

lymphatic vessels while reducing the risk of persistence or recurrence of varicocele.[4]

All approaches to varicocele surgery are associated with a small risk of wound infection, hydrocele, persistence or recurrence of varicocele and, rarely, testicular atrophy.[5] In non-microsurgical varicocelectomy hydrocele is the most common complication and it affects about 20% of patients secondary to ligation of testicular lymphatics.[6]

Several surgical techniques have been done to reduce the incidence of post-varicocelectomy hydrocele which is somewhat difficult to be done. The effect of hydrocele on spermatogenesis and fertility is unknown. It may impair testicular function by insulating the testis and preventing normal thermoregulation.[7] Microsurgical varicocelectomy using the operating microscope has eliminated the development of post-varicocelectomy hydroceles but unfortunately not available in all operative theatres.

This study aim to evaluate the efficacy of pre-emptive eversion of tunica in avoidance of hydrocele after non microscopic varicocelectomy and its effect on fertility.

METHODS

This study was conducted immediately after obtaining the institutional review board approval. Our study included 115 infertile men with a clinical diagnosis of bilateral varicoceles. Diagnosis of varicoceles was made by scrotal examination while the patient in a standing position and during Valsalva's maneuver. Varicoceles were classified as grade I (palpable only during Valsalva's maneuver), grade II (palpable without

Valsalva's maneuver), and grade III (visible). Diagnosis of varicoceles was confirmed by scrotal color Doppler ultrasound and testicular volume was assessed. Semen analysis was done for all patients according to WHO 2010. Patients with pre-operative hydrocele or unilateral varicocele were excluded. Laboratory investigations (complete blood picture, liver function tests, urea, creatinine prothrombine time, and fasting blood sugar) were done for all patients before operation.

After obtaining informed consent from the participants they were classified into two groups; (Group A) included 55 patients underwent microsurgical bilateral varicocelectomy (using microscope) through sub-inguinal approach and (Group B) included 60 patients underwent bilateral varicocelectomy (using loupe magnification) through the same approach with delivery of the testes and eversion of tunica vaginalis before doing varicocele division and ligation in both sides then return the testes to the scrotum.

All patients received spinal anesthesia. Both groups were compared as regard, development of post-operative hydrocele, operative time, complication rates, hospital stay and effect on spontaneous pregnancy. Follow up of patients were done every 3 monthes for 2 years duration to detect development of post-operative hydrocele, change in semen parameters and occurrence of spontaneous pregnancy of their wives.

Statistical analysis

Statistical analysis was carried out using Statistical Analysis Software (SPSS) version 16 (SAS Institute, Inc., Cary, NC, USA). Data were recorded as mean ± standard deviation (SD). Comparisons of data within the group were performed using paired t-test. $P \leq 0.05$ was considered statistically significant.

RESULTS

This study included 115 patients suffering from primary or secondary infertility with bilateral varicocele. They were admitted at Sohag University Hospital, Surgery Department within a time frame from August 2015 to December 2016. Fifty five patients underwent bilateral microsurgical varicocelectomy (group A), their mean± SD of age and infertility duration were 34.7± 7.8 and 7.4± 5.8, respectively.

While (group B) included 60 patients, their mean± SD of age and infertility duration were 32.6± 6.8 and 6.4± 5.3, respectively. The mean operative time in (group A) was 26±11.7 min while it was 20±10.2 min in (group B). There was no difference in hospital stay; it was 6±2.5 hours in (group A) and 6±1.5 hours in (group B).

Scrotal oedema occurred in 3 cases (5.4%) in (group A) and in 5 cases (8.3%) in (group B) while scrotal haematoma occurred in one case (1.8%) in (group B) and in no case in (group A). There was no wound infection in both groups. Hydrocele neither develops in (group A) nor in (group B) during the follow up period as shown in (Table 1).

Table 1: Operative and post-operative results in both groups.

	Group A(MV) N=55	Group B(NMV) N=60	P value
Operative time (min) mean SD	26±11.7 min	20±10.2 min	0.97
Wound infection	0	0	-
Scrotal haematoma	0	1 (1.8%)	0.85
Scrotal oedema	3 (5.4%)	5 (8.3%)	0.62
Recurrence of varicocele	0	0	-
Post-operative hydrocele	0	0	-
Hospital stay (hours)	6±2.5 hours	6±1.5 hours	0.51

MV: Microsurgical varicocelectomy; NMV: Non-microsurgical varicocelectomy; p≤0.05= significant

Improvement in sperm count, motility and morphology occurred in both groups (Table 2).

Table 2: Sperm parameters before and after varicocelectomy in (group A and B).

Mean	Group A	P value	Group B	P value
Sperm count : million/ ejaculate				
Preoperative	59.02	0.000	58.91	0.000
Postoperative	66.05		67.03	
P value	>0.05			
Motility (total) %				
Preoperative	38.27	0.000	37.92	0.000
Postoperative	41.09		41.1	
P value	>0.05			
Morphology %				
Preoperative	54.59	0.000	53.38	0.000
Postoperative	56.41		55.98	
P value	>0.05			

P≤0.05= significant

Preoperative sperm count in (group A) was 59.02 and become 66.05 million per ejaculate with p=0.000 while the count in (group B) was 58.91 preoperatively and became 67.03 post operatively with p=0.000 and as regarded sperm motility in (group A) it was 38.27% preoperatively and became 41.09% postoperatively with p-value 0.000 and in (group B) the motility was 37.92% and became 41.1% post operatively with p-value 0.000. Also improvement in morphology occurred in both groups where it was 54.59% and became 56.41% in (group A) and it was 53.38% and became 55.98 % in (group B) with p-value 0.000 in both groups. The pregnancy rates after varicocelectomy increased because of the increased quantity and quality of sperm in both groups. In (group A) there was improvement in paternity rate from 7.2% after 6 months to 12.7% after 12 months to 20% after 24 months while the improvement in (group B) was from 8.3% to 13.3% to 21.6% with p- value >0.05 in both groups (Table 3).

Table 3: Percentage of paternity 6-24 months after varicocelectomy.

	No. of patients	6 months	12 months	24 months	P value
		N (%)	N (%)	N (%)	
Group A	55	4 (7.2)	7 (12.7)	11 (20)	>0.05
Group B	60	5 (8.3)	8 (13.3)	13 (21.6)	

P≤0.05= significant.

DISCUSSION

Varicocelectomy is the second most common cause of scrotal hydrocele.[8] It is thought that hydrocele is caused by damage to the lymphatic network that drains the testicle during dissection of the spermatic cord.[9] The incidence of hydrocele after varicocelectomy is extremely variable ranging from 0% to 25% of operated patients, depending on surgical technique.[10] Hydrocele of may lead to raised intrascrotal temperature possibly harming testicular function and tense hydroceles might also cause a pressure atrophy of the testis.[11] Hence, early treatment of hydrocele, particularly those that are large and tense, might be necessary to prevent testicular damage. The technique used for varicocelectomy can affect the hydrocele rate. Approaches that avoid dissection of the spermatic cord, such as sclerotherapy of the internal spermatic veins, are associated with virtually no risks of hydrocele formation.[12]

Several technical modifications can be used to prevent damage to the lymphatic vessels during spermatic cord dissection.[13] Optical magnification is generally accepted to be a key component of a lymphatic-sparing varicocelectomy. Accordingly, microsurgical subinguinal varicocelectomy is associated with a very low hydrocele rate, approaching 0 %.[14] Optical magnification can also be advantageous for varicocelectomy performed using minimally-invasive surgery.[15]

Lymphatic enhancement with vital dye has been proposed as an additional means of preventing post-oprative hydrocele.[16] Hydrocele rate after varicocelectomy might also be lowered by using techniques that spare the internal spermatic artery, such as high ligation of the internal spermatic vessels (Palomo procedure).[17] A pre-emptive hydrocelectomy has been suggested to reduce the risk of hydrocele formation in patients who undergo varicocelectomy without the aid of microsurgery.[18] In this study pre-emptive eversion of tunica vaginalis proved to be effective in avoidance of hydrocele formation after varicocelectomy as there is no case developed hydrocele during the follow up period and as effective as microsurgical varicocelectomy. This result came in accordance to Castagnetti et al. who compared 96 cases of subinguinal varicocelectomy plus pre-emptive hydrocelectomy with 46 patients who underwent subinguinal varicocelectomy alone.[19-21] The rate of postoperative hydrocele was statistically lower in those who received a pre-emptive hydrocelectomy (4.2% versus 13%; P = 0.04). Pre-emptive surgery can consist of vaginalis excision only or excision and eversion. Hydrocele occurred in 3 of 54 cases where the vaginalis was excised only and in 1 of 42 patients who also underwent eversion.

So, tunica vaginalis excision and eversion might be more effective than excision alone. In another study by Tsikopoulos et al. who compared 15 patients who underwent the Palomo procedure plus excision of the tunica vaginalis with patients who underwent the Palomo procedure alone.[22] Post-operative hydrocele requiring surgical treatment was not experienced by any of the patients who underwent a pre-emptive hydrocelectomy, and was observed in four patients who did not. Neither of

the series reported any complications associated with pre-emptive excision or eversion of the tunica vaginalis.[23-26] We also reported no significant differences in complications rate between non microsugical varicocelectomy with pre-emptive eversion of tunica vaginalis and microsurgical varicocelectomy. Improvement in sperm count, motility and morphology occurred in both groups. Hence, the pregnancy rates after varicocelectomy increased because of the increased quantity and quality of sperm in both groups without any significant difference. This came in accordance to Jungwirth, et al. and Chu et al. results.[26,27]

CONCLUSION

Pre-emptive eversion of tunica vaginalis can be offered as an adjunctive treatment that might be able to reduce the incidence of postoperative hydrocele in centers performing subinguinal varicocelectomy without the aid of an operating microscope.

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