

Inguinal versus Scrotal Approach for The Management of Vaginal Hydrocele in Adult Patients

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ABSTRACT

Background: Hydrocele is one of the commonest causes of painless scrotal swelling which results from a pathological accumulation of serous fluid between the two layers of the tunica vaginalis. The scrotal approach is the standard approach for treating adult vaginal hydrocele. Scrotal swelling is commonly encountered postoperative complication in such an approach.

Objective: This study aimed to improve the postoperative outcomes of hydrocelectomy in adult patients.

Patients and methods: This prospective study was conducted on 32 male adult patients with hydrocele in the period from February 2021 to January 2022, in General Surgery Department, Zagazig University Hospitals. The patients were subdivided into two groups: patients in group (1) were managed by hydrocelectomy through scrotal approach, while those in group (2) hydrocelectomy were performed through inguinal approach.

Results: The mean age of patients in group (1) was 24.5 ± 4.81664 years versus 25.4375 ± 5.31625 years in group (2). Persistent postoperative scrotal edema for more than one month was encountered in five patients in group (1), while no patient in group (2) developed persistent postoperative scrotal edema. This was statistically significant ($p < 0.05$).

Conclusion: The inguinal approach was better than the scrotal approach for hydrocelectomy in adults with hydrocele. The inguinal approach provides better postoperative outcomes and more patient satisfaction.

Keywords: Hydrocelectomy, Scrotal approach, Inguinal approach.

INTRODUCTION

Hydrocele is one of the commonest causes of painless scrotal swelling ⁽¹⁾, which results from a pathological accumulation of serous fluid between the two layers of the tunica vaginalis. Hydroceles can be unilateral or bilateral with variable degrees of scrotal enlargement ⁽²⁾. The etiology of hydrocele is classified into congenital and acquired causes. The congenital hydrocele is caused by patent processus vaginalis that communicates the tunica vaginalis with the peritoneal cavity. While acquired hydroceles are commonly idiopathic without unknown cause. Causes of acquired other than idiopathic causes are infection, infarction, torsion, tumors, radiotherapy, tuberculosis, or filariasis ^(2,3). The scrotal approach is the standard approach for treating adult vaginal hydrocele ⁽⁴⁾. Scrotal swelling is a commonly encountered postoperative complication in such an approach. It may last for more than a month. The swelling is usually large and discomforting ⁽⁵⁾. Postoperative scrotal swelling is due to inflammatory edema, as a response of the sensitive scrotal skin to incision and dissection. The dependent position of the scrotum assists in making the scrotal swelling large, very discomforting, and difficult to resolve quickly ⁽⁵⁾. There are few studies encountered on the inguinal approach in the management of adult vaginal hydrocele. Herein, we compared the inguinal approach with the standard scrotal approach for the management of adult vaginal hydrocele.

PATIENTS AND METHOD

This prospective study was conducted on 32 male adult patients with hydrocele in the period from

February 2021 to January 2022, in the General Surgery Department, Zagazig University Hospitals.

Inclusion criteria: adult patients aged 16 years or older with vaginal hydrocele.

Exclusion criteria: hydrocele volume less than 50 ml or larger than 500 ml, patients with concomitant pathology such as inguinal hernia or varicocele, patients with testicular tumors, and patients with bilateral hydrocele.

The patients were randomly subdivided into two groups using the closed envelop method of randomization. In group (1): the patients were managed by a scrotal approach where the skin, dartos muscle, and thin cremasteric fascia are incised transversely and reflected together as a single layer from the underlying parietal layer of the tunica vaginalis, which is the outer wall of the hydrocele. The hydrocele fluid was removed then eversion of the tunica after securing hemostasis, suction drain was inserted and the scrotal wound was closed in layers. In group (2), the patients were managed through an inguinal approach. Firstly the hydrocele fluid was aspirated intraoperatively after draping using a 50 ml syringe under aseptic conditions (**Fig. 1**). Then an oblique inguinal incision over the external inguinal ring and directed towards the scrotal neck (**Figs. 2, 3**) was made and the spermatic cord was dissected after its exit from the inguinal canal. There was no need to open the inguinal canal. Delivery of the testis was helped by combined cord traction and upward pushing of the testis. The tunica vaginalis was opened,

the redundant tunica was excised with diathermy leaving a suitable part at its attached border allowing its eversion behind the testis (Fig. 4). Then the testis was delivered back to the bottom of the scrotum (Fig. 5). The hydrocele fluid was collected and measured in all cases. The hydrocele volume was classified according to the drained fluid (Table 1). Any patient with hydrocele volume less than 50 ml or more than 500 ml was excluded from the study.

Table (1): The grading of hydrocele according to the drained hydrocele fluid volume

Hydrocele size	Amount of drained fluid
Mild Hydrocele	Less than 200 ml
Modarate Hydrocele	200-400 ml
Marked hydrocele	More than 400 ml

The visual analogue score (VAS) of pain was measured on the first postoperative day. Patients were instructed to mark a position on the line to indicate how much pain they feel. This system is a 10 cm line with anchor statements on the left (no pain) and on the right (extreme pain). The score of the VAS was recorded by measuring the distance in centimeters (0 to 10) from the “no pain” point (6).

Follow up:

The patients were followed up twice weekly at the outpatient clinic, Zagazig University Hospital for two weeks then once weekly for a month then monthly for 3 months. The suction drain was removed when it drained less than 30 ml per day. Any complications were recorded. A questionnaire about patient satisfaction was filled by the patients two months postoperatively. The patients recorded the degree of their satisfaction on a scale from one to five (1: very dissatisfied, 2: dissatisfied, 3: neutral, 4: satisfied, 5: very satisfied).



Figure (1): Intraoperative picture showing trans-scrotal aspiration of the hydrocele.



Figure (2): Intraoperative picture after aspiration of the hydrocele.



Figure (3): Inguinal incision over the external inguinal ring.



Figure (4): Intraoperative picture after eversion of the tunica.



Figure (5): Intraoperative picture after repositioning the testis back into the scrotum.

Ethical approval:

This study was approved by The Institutional Ethical Committee, and written informed consents were obtained from all cases.

This work has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Statistical analysis

The collected data were coded, processed and analyzed using the SPSS (Statistical Package for Social Sciences) version 22 for Windows® (IBM SPSS Inc., Chicago, IL, USA).

Data were tested for normal distribution using the Shapiro Walk test. Qualitative data were represented as frequencies and relative percentages. Chi square test (χ^2) was used to calculate difference between two or more groups of qualitative variables. Quantitative data were expressed as mean \pm SD. Independent samples t-test was used to compare between two independent groups of normally distributed variables (parametric data). P value < 0.05 was considered significant.

RESULTS

The mean age of patients in group (1) was 24.5 \pm 4.81664 years versus 25.4375 \pm 5.31625 years in group (2). There was no significant difference between the two groups regarding the patients' age.

There was no difference between both groups of patients regarding the degree of hydrocele. The operative time was significantly shorter in group (1) with mean operative time of 22.81 \pm 2 minutes versus 28.88 \pm 3.28 minutes in group (2). The pain was significantly lower in group (2) with p-value less than 0.05. The visual analogue score of pain mean values were 6.8125 \pm 1.27639 and 3.6875 \pm 1.49304 in groups (1) and (2) respectively (Table 2).

There were 7 patients with right-sided hydrocele and 9 patients with left-sided hydrocele in group (1), while in group (2) there were 11 and 5 patients respectively, with no difference between both groups (Table 3).

The volume of the hydrocele fluid was measured and accordingly, we graded the hydrocele into mild, moderate, and marked. In group (1) there were 12 patients with mild hydrocele, two patients with moderate hydrocele, and two patients with marked hydrocele versus twelve, three, and one patients with mild, moderate, and marked hydrocele respectively in group (2).

There was no statistical difference between both groups regarding the grade of the hydrocele (Table 4). Regarding postoperative complications, there were postoperative hematoma and persistent scrotal edema. Both were recorded in group (1).

Hematoma formation was found in a single patient and resolved spontaneously. There was no statistical difference between both groups regarding

hematoma formation ($p > 0.05$). Persistent postoperative scrotal edema for more than one month was encountered in five patients in group (1), while no patient in group (2) developed persistent postoperative scrotal edema. This was statistically significant ($p < 0.05$). There was no postoperative wound infection or wound dehiscence in both groups (Table 5).

In group (1), there was a significant relationship between the occurrence of persistent postoperative scrotal edema and the degree of hydrocele ($p = 0.019$) as shown in table (6).

According to the questionnaire filled by patients two months postoperatively, patients were more satisfied in group (2) than in group (1). This was significant, p-value = 0.017 (Table 7).

Table (2): Patient' age, operative time, and visual analogue score of pain 24 h postoperatively

	Group	Mean	Std. Deviation	P-value
Age (years)	Group 1	24.5000	4.81664	0.605
	Group 2	25.4375	5.31625	
Operative time (minutes)	Group 1	22.81	2.0	0.001
	Group 2	28.88	3.28	
Visual analogue score of pain 24h postoperatively	Group 1	6.8125	1.27639	0.001
	Group 2	3.6875	1.49304	

Table (3): The side of hydrocele in patients in both groups

		Side		Total	p-value
		Right-sided hydrocele	Left-sided hydrocele		
Group	Group 1	7	9	16	0.154
	Group 2	11	5		
Total		18	14	32	

Table (4): The distribution of hydrocele grade among the patients of both groups

		Grade			Total	P-value
		Mild	Moderate	Marked		
Group	Group 1	12	2	2	16	0.921
	Group 2	12	3	1		

Table (5): The postoperative complications in both groups

		No	Yes	P-value
Hematoma	Group 1	15	1	1.0
	Group 2	16	0	
Persistent postoperative scrotal edema	Group 1	11	5	0.043382
	Group 2	16	0	

Table (6): The relation between the occurrence of persistent postoperative edema and the grade of hydrocele in group (1)

		Persistent postoperative scrotal edema in group 1		Total	p-value
		No scrotal swelling	Scrotal swelling		
Grade	Mild	10	2	12	0.019
	Moderate	1	1	2	
	Marked	0	2	2	
	Total	11	5	16	

Table (7): The distribution of patient satisfaction among the patients of both groups

		Patient satisfaction					Total	P-value
		Very dissatisfied	Dissatisfied	Neutral	Satisfied	Very satisfied		
Group	Group 1	3	3	6	3	1	16	0.017
	Group 2	0	1	5	8	2	16	

DISCUSSION

A hydrocele causes physical, psychological, and social stress. Many men with a hydrocele are often embarrassed by the condition, and frequently lose hope of living a normal life (7). Hydroceles are generally painless. However, it may interfere with daily activities if painful. Large hydroceles can even cause difficulty with sexual intercourse (8). In this study, operative time in the inguinal approach hydrocelectomy was significantly longer than the scrotal approach. Pain at the second postoperative day was significantly lower in the inguinal approach. The scrotal wound is dependant and liable for friction during walking, so it can induce more pain than the inguinal wound. Postoperative mild scrotal edema was accepted, while persistent postoperative edema more than one month was considered a complication. In this study, there were 5/16 (31.25%) patients who developed persistent scrotal edema in the scrotal approach hydrocelectomy group, on the other hand, there was no patient with persistent scrotal edema in the inguinal approach. This was statistically significant with p-value of less than 0.05. The postoperative scrotal hematoma developed in a single patient in the scrotal approach versus no hematoma in the inguinal approach, which was not significant with p-value of more than 0.05. In this work, the development of persistent postoperative scrotal edema was related to the volume of the hydrocele fluid in group (1). While, there was no persistent scrotal edema in group (2).

Kadir *et al.* (9) conducted a study on 32 adult patients with the scrotal and inguinal approaches for hydrocele repair. They found that the scrotal hematoma occurred in 4/15 (26.67%) patients with scrotal approach and 1/17 (5.88%) patient in the inguinal approach. Agnihotri *et al.* (10) reported that persistent scrotal oedema is more common in the scrotal approach (14% versus no in the inguinal approach).

Nweze (5) published a study that included 11 adult patients with primary hydrocele. He performed hydrocelectomy using the inguinal approach after transscrotal aspiration of the hydrocele fluid. He found no or minimal scrotal edema without patient discomfort. He used inguinal incision parallel to the inguinal ligament. In our study, we used oblique inguinal incision over the

external inguinal ring that can be extended down to the scrotal neck if testicular delivery was difficult or if its repositioning back to the scrotum at the end of the procedure was troublesome.

Agnihotri *et al.* (10) reported that Pain, persistent scrotal edema and hematoma were more frequently seen in patients of scrotal approach. The difference of these complications between the inguinal and scrotal approach groups was found to be statistically significant.

CONCLUSION

The inguinal approach is better than the scrotal approach for hydrocelectomy in adults with hydrocele. The inguinal approach provides better postoperative outcomes and more patient satisfaction.

Financial support and sponsorship: Nil.

Conflict of interest: Nil.

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