

A Comparative Study of Different Surgical Procedures in the Management of Primary Vaginal Hydrocele

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Abstract

Introduction: A hydrocele is an accumulation of serous fluid in a body cavity. A hydrocele testis is the accumulation of fluids around a testicle. Vaginal hydrocele is the most common primary hydrocele. There are different operative and non-operative treatment for hydrocele and as many procedures are used for hydrocelectomy such as Jabouley's Lord's, Patch technique, Aspiration and sclerotherapy procedures. The common complications observed during the surgery of hydrocele are bleeding, injury to the cord structures and epididymis, torsion of the testis after a faulty positioning post operatively. Commonest among these is post-operative hematoma which is due to oozing from small vessels. **Aims and Objectives:** AIM - A comparative study of different surgical procedures in the management of primary vaginal hydrocele. **Objectives:** To study surgical management of hydrocele by different surgical procedures in following type of surgeries (Jaboulay's Operation, Lord's Plication and subtotal excision of sac). To assess postoperative complications associated with different surgical procedures. **Material and Methods:** A hospital based prospective study was conducted with 60 patients to assess the different surgical procedures in the management of primary vaginal hydrocele and postoperative complications associated with different surgical

procedures. **Observations & Results:** The duration of hydrocele ranged from 2 months to 15 years. Majority of the patients (36.7%) had duration of 0-6 months while minimum number of patients (5%) had duration of 6-10 years. Hydrocele occurred more in right as compared to left side (53.3% vs. 26.7%). Bilateral hydrocele was seen in 12 (20%) patients. All patients (100%) presented with scrotal swelling. 12 (20%) patients had dragging type of pain while 8(13.3%) patients had mechanical discomfort due to scrotal swelling. Majority of the patients undergoing surgery (60%) were given spinal anaesthesia while 24 (40%) patients were operated under local anaesthesia. Jaboulay's operation was performed on 37 (61.7%) patients of which 8 patients had bilateral hydrocele. Lord's plication was performed on 11 (18.3%) patients of which 1 patient had bilateral hydrocele while Subtotal excision of sac was performed in 12 (20%) patients of which 3 patients had bilateral hydrocele. Majority of the complications were observed in patients that underwent Subtotal excision of sac and the least number of complications were observed in patients that underwent Jaboulay's Operation. **Conclusion:** Considering the percentage of complications in different operative techniques, it is observed that there were least complications in Jaboulay's Operation. So, Jaboulay's Operation is best technique available in suitable cases for Jaboulay's Operation.

Keywords: Vaginal hydrocele; testis; hematoma; Jaboulay's operation; Lord's plication; Subtotal excision of sac.

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Introduction

A hydrocele is an accumulation of serous fluid in a body cavity. A hydrocele testis is the accumulation of fluids around a testicle. It is often

caused by fluid secreted from a remnant piece of peritoneum wrapped around the testicle, called the tunica vaginalis [1]. Vaginal hydrocele is the most common primary hydrocele. It usually appears in middle aged or elderly men. This is caused by the collection of amber coloured sterilized fluid present between the parietal and visceral layers of tunica vaginalis [1]. Most of the patients refuse the doctor for surgical procedure of hydrocele because of shyness and fear of development of impotence and infertility [2,3]. A hydrocele usually is not painful and harmful and may disappear without treatment with in the first year of life. It usually develops in hot climate [4]. If hydrocele gets complicated because of negligence, immediate hydrocelectomy is preferred [5]. In this connection it is important to differentiate hydrocele from chylocele, pylocele and hematocele before the induction of surgical procedure. It is also important to mention here that primary vaginal hydrocele may be due to *Wucheria bancrofti* [6,7]. Diagnosis plays a crucial role clinically and radiologically in case of the severity of the disease [8,9]. There are different operative and non-operative treatment for hydrocele and as many procedures are used for hydrocelectomy such as Jabouley's Lord's, Patch technique, Aspiration and sclerotherapy procedures [10].

All these procedures are using by the surgeons but still it has been reported that among the different procedure which method is more suitable and reliable. Surgical procedures are associated with complications of anesthesia and surgery. Moreover, hospital admission is usually required, thus affecting the health and economy of the patient. In recent years, there has been a paradigm shift in the minimally invasive approach in the treatment of various diseases. Aspiration sclerotherapy remains a minimally invasive approach to the treatment of hydroceles. Sclerotherapy has grown in popularity as it is a safe, effective, and painless outdoor procedure and also economically beneficial for the patient. The effectiveness of various sclerosants reported in the literature is between 53 and 98% [11,12].

The common complications observed during the surgery of hydrocele are bleeding, injury to the cord structures and epididymis, torsion of the testis after a faulty positioning post operatively [13,14]. Commonest among these is post-operative hematoma which is due to oozing from small vessels. Unless meticulous hemostasis is secured oozing from small vessels may continue into the layers of the loose scrotal tissue giving rise to a hematoma which cannot be prevented effectively by draining the scrotum. Hematoma acts as fertile

pabulum for bacteria, infection may supervene, often facilitated by drainage tubes [13,14].

Aims and Objectives

Aim

- A comparative study of different surgical procedures in the management of primary vaginal hydrocele.

Objectives

- To study surgical management of hydrocele by different surgical procedures in following type of surgeries (Jabouley's Operation, Lord's Plication and subtotal excision of sac).
- To assess postoperative complications associated with different surgical procedures.

Materials and Methods

A hospital based prospective study was conducted with 60 patients to assess the different surgical procedures in the management of primary vaginal hydrocele and postoperative complications associated with different surgical procedures.

Place of study: Dr. D.Y. Patil Medical College, Hospital and Research Centre, Pimpri, Pune- 18.

Type of study: A hospital based prospective study.

Plan of study: All patients presenting to surgical OPD with swelling in scrotum were admitted and evaluated as per enclosed proforma.

Period of study: April 2016 to September 2018

Sample size: 60 Patients

Sample size was calculated with 95% confidence in interval estimation and 10% absolute error of margin by using formula:

$$n = Z^2 \pi(1 - \pi) / d^2$$

Where,

Z = Table Value of alpha error from Standard Normal Distribution table (1.96 for 95% confidence interval)

π = anticipated range

d = the absolute precision required on either side of true value of the population proportion π

Population proportion = π = 20% = 0.2

Level of significance (alpha error) = 5%

Margin of error = $d = 0.1$

Confidence interval = 95%

$n = (1.96)^2 \times 0.2 \times 0.8 / (0.1)^2 = 60.4$

Hence a sample size of 60 was considered adequate for our study.

Inclusion Criteria

- All cases of scrotal swelling with presence of transillumination and fluctuation.

Exclusion Criteria

- Solid testicular swelling.
- Swelling in which there is associated impulse on coughing and reducibility.
- Patients taking medications that interfere with wound healing such as Immuno-compromised patients, patients on corticosteroids, anti-coagulants, vasoconstricting agents and anticancer drugs.

Ethical committee approval was taken before commencement of this study.

Methodology: Assessment of 60 patients having hydrocele of different sizes were done.

- Presenting symptoms:* The presenting chief complaint, duration of illness, mode of onset and progression of the swelling were recorded.
- Clinical Examination:* A thorough clinical examination of the patient was done, which included both systemic and local examination. Special emphasis was laid on the following points:

The diagnosis of hydrocele confirmed by three cardinal signs:

1. Getting above the swelling.
 2. Presence of fluctuation.
 3. Presence of transillumination.
- Investigations:* Preoperatively the following investigations were carried out:
 1. Blood- Haemoglobin, Total leukocyte count, Differential count, Bleeding time and clotting time, Blood sugar level, Peripheral blood smear (for filaria), HIV, HBsAg.
 2. Urine- routine and microscopic examination.

3. ECG and X-ray chest if necessary depending on other systemic conditions.
4. Ultrasonography of scrotum.

d) Criteria for selection of operative techniques:

In bilateral hydrocele cases, procedures were carried out on both sides as per the size.

Operative technique was decided according to the size of hydrocele.

- Lord's plication technique - Small hydrocele (<5 cm).
- Jaboulay's operation - Medium hydrocele (5-10 cm)
- Subtotal excision of sac - Large hydrocele (>10 cm)

e) CRD (corrugated rubber drain) was not kept intra-operatively during surgery in any case.

f) Scrotal support was given with compressive scrotal (coconut) bandage in all operated cases.

Postoperative Protocol

- 1) All patients were given intravenous antibiotic prophylactically.
- 2) Analgesic was given.
- 3) Pain was assessed by using Visual Analogue Scale. The mean score taken on postoperative day (POD) 3 and (POD) 7. Visual analogue scale was represented by a straight line measuring 10 cm, the extremes of which corresponds to no pain at one end and worst pain at the other.
- 4) Any post operative swelling was done for hematoma formation and the same were drained.
- 5) Assessment of wound infection was done as per Southampton scoring system. Wound discharge were sent for culture and sensitivity. Wound inspection were done daily and observation were recorded as per the criteria.
- 6) Dressing was done after 24 hours of surgery in every case.

Observations and Results

A hospital based prospective study was conducted with 60 patients to assess the different surgical procedures in the management of primary vaginal hydrocele and postoperative complications associated with different surgical procedures.

Distribution of patients according to Age

Majority of the patients (25%) were in the age group of 21-30 years followed by 23.3% in the age group of 31-40 years, 13.3% in the age groups of 41-50 years and 51-60 years, 10% in the age group of 10-20 years, 8.3% in the age group of 61-70 years and 6.8% in the age group of >70 years (Table 1).

Table 1: Distribution of patients according to Age

Age (years)	No. of cases	%
10-20	6	10%
21-30	15	25%
31-40	14	23.3%
41-50	8	13.3%
51-60	8	13.3%
61-70	5	8.3%
>70	4	6.8%
Total	60	100%

Distribution of patients according to Occupation

15 (25%) patients were in service industry while 13 (2.7%) and 12 (20%) patients were students and businessmen respectively. 10 (16.7%) and 6 (10%) patients were labourers and teachers respectively while 4 (6.6%) patients were farmers (Table 2).

Table 2: Distribution of patients according to Occupation

Occupation	N	%
Service	15	25%
Student	13	21.7%
Business	12	20%
Labourer	10	16.7%
Teacher	6	10%
Farmer	4	6.6%
Total	60	100%

Distribution of patients according to Duration of Hydrocele

The duration of hydrocele ranged from 2 months to 15 years. Majority of the patients (36.7%) had duration of 0-6 months while minimum number of patients (5%) had duration of 6-10 years (Table 3).

Table 3: Distribution of patients according to Duration of Hydrocele

Duration	N	%
0-6 months	22	36.7%
6 months - 1 year	14	23.3%
2 - 3 years	12	20%
4 - 5 years	4	6.7%
6 - 10 years	3	5%
>10 years	5	8.3%
Total	60	100%

Distribution of patients according to Involved Side

Hydrocele occurred more in right as compared to left side (53.3% vs. 26.7%). Bilateral hydrocele was seen in 12 (20%) patients (Table 4).

Table 4: Distribution of patients according to Involved Side

Involved Side	N	%
Right	32	53.3%
Left	16	26.7%
Bilateral	12	20%
Total	60	100%

Distribution of patients according to Symptoms

All patients (100%) presented with scrotal swelling. 12 (20%) patients had dragging type of pain while 8 (13.3%) patients had mechanical discomfort due to scrotal swelling (Table 5).

Table 5: Distribution of patients according to Symptoms

Symptoms	N	%
Scrotal Swelling	60	100%
Dragging Type of Pain	12	20%
Mechanical discomfort due to scrotal swelling	8	13.3%

Distribution of patients according to Type of Anaesthesia

Majority of the patients undergoing surgery (60%) were given spinal anaesthesia while 24 (40%) patients were operated under local anaesthesia (Table 6).

Table 6: Distribution of patients according to Type of Anaesthesia

Type of Anaesthesia	N	%
Spinal anaesthesia	36	60%
Local anaesthesia	24	40%
Total	60	100%

Distribution of patients according to Type of Operation

Jaboulay's operation was performed on 37 (61.7%) patients of which 8 patients had bilateral hydrocele. Lord's plication was performed on 11 (18.3%) patients of which 1 patient had bilateral hydrocele while Subtotal excision of sac was performed in 12 (20%) patients of which 3 patients had bilateral hydrocele (Table 7).

Table 7: Distribution of patients according to Type of Operation

Type of Operation	N	%
Jaboulay's Operation	37	61.7%
Lord's Plication	11	18.3%
Subtotal excision of sac	12	20%
Total	60	100%

Distribution of patients according to Post-Operative Hospital Stay

It was observed that there was shorter post-operative stay in Jaboulay’s operation with all patients being discharged within 10 days – 16 (26.7%) patients in 0-5 days and 21 (35%) patients in 6-10 days. This is similar in Lord’s plication with 2 (3.3%) patients being discharged in 0-5 days and 9 (15%) patients being discharged in 6-10 days. Subtotal excision of the sac required significantly higher post-operative stay with 50% (6 out of 12 patients) being discharged between 11-15 days ($p<0.05$) (Table 8).

Distribution of patients according to Post-Operative Complications

The post-operative complications in patients is summarised in Table 9. Majority of the complications were observed in patients that underwent Subtotal excision of sac and the least number of complications were observed in patients that underwent Jaboulay’s Operation.

Distribution of patients according to Mean suture removal (days)

In patients that underwent Jaboulay’s operation sutures were removed on a mean of 6.3 days while sutures were removed on a mean of 8.4 days and 9.1 days in patients that underwent in Lord’s plication and Subtotal excision of sac respectively. The days required to remove suture was significantly higher in patients that underwent Subtotal excision of sac as compared to patients that underwent Jaboulay’s Operation and Lord’s Plication ($p<0.05$) (Table 10).

Post-Operative Follow-up of Recurrence in patients

No recurrence was noted in all patients that underwent Jaboulay’s operation, Lord’s plication and Subtotal excision of the sac in post-operative 1 month period and post-operative 3 months period (Table 11).

Table 8: Distribution of patients according to Post-Operative Hospital Stay

Type of Operation	0-5 days	6-10 days	11-15 days	Total	p Value
Jaboulay’s Operation	16 (26.7%)	21 (35%)	0	37 (61.7%)	<0.05
Lord’s Plication	2 (3.3%)	9 (15%)	0	11 (18.3%)	
Subtotal excision of sac	1 (1.7%)	5 (8.3%)	6 (10%)	12 (20%)	
Total	19	35	6 (10%)	60 (100%)	

Table 9: Distribution of patients according to Post-Operative Complications

Complications	Jaboulay’s Operation		Lord’s Plication		Subtotal excision of sac	
	N	%	N	%	N	%
Fever	0	-	1	1.7%	2	3.4%
Hematoma	0	-	1	1.7%	4	6.7%
Scrotal edema	4	6.7%	5	8.3%	6	10%
Infection	0	-	1	1.7%	1	1.7%
Disruption of wound	0	-	0	-	3	5%

Table 10: Distribution of patients according to Mean suture removal (days)

Parameter	Mean suture removal (days)		p Value
	Mean	SD	
Jaboulay’s Operation	6.3	1.39	<0.05*
Lord’s Plication	8.4	1.29	
Subtotal excision of sac	9.1	0.90	

* - ANOVA test

Table 11: Post-Operative Follow-up of Recurrence in patients

Type of Operation	Recurrence			
	POD 1 month		POD 3 months	
	N	%	N	%
Jaboulay’s Operation	0	-	0	-
Lord’s Plication	0	-	0	-
Subtotal excision of sac	0	-	0	-

Post-Operative Follow-up of Pain in patients

On post-operative Day 3, in Jaboulay's operation pain was present in 12 (20%) patients while pain was present in 6 (54.5%) and 8 (66.7%) patients that underwent Lord's plication and Subtotal excision of sac respectively. On post-operative Day 7, in Jaboulay's operation pain was present in 2 (3.3%) patients while pain was present in 2 (18.2%) and 2 (16.7%) patients that underwent Lord's plication and Subtotal excision of sac respectively. The number of patients having pain was significantly lesser in Jaboulay's operation group as compared to Lord's plication and Subtotal excision of sac ($p < 0.05$) (Table 12).

Table 12: Post-Operative Follow-up of Pain in patients

Type of Operation	Pain				p Value
	POD 3		POD 7		
	N	%	N	%	
Jaboulay's Operation	12	20%	2	3.3%	<0.05
Lord's Plication	6	54.5%	2	18.2%	
Subtotal excision of sac	8	66.7%	2	16.7%	

Discussion

- Majority of the patients (25%) were in the age group of 21-30 years followed by 23.3% in the age group of 31-40 years, 13.3% in the age groups of 41-50 years and 51-60 years, 10% in the age group of 10-20 years, 8.3% in the age group of 61-70 years and 6.8% in the age group of >70 years.
- 15 (25%) patients were in service industry while 13 (2.7%) and 12 (20%) patients were students and businessmen respectively. 10 (16.7%) and 6 (10%) patients were labourers and teachers respectively while 4 (6.6%) patients were farmers.
- The duration of hydrocele ranged from 2 months to 15 years. Majority of the patients (36.7%) had duration of 0-6 months while minimum number of patients (5%) had duration of 6-10 years.
- Hydrocele occurred more in right as compared to left side (53.3% vs. 26.7%). Bilateral hydrocele was seen in 12 (20%) patients.
- All patients (100%) presented with scrotal swelling. 12 (20%) patients had dragging type of pain while 8 (13.3%) patients had mechanical discomfort due to scrotal swelling.
- Majority of the patients undergoing surgery (60%) were given spinal anaesthesia while 24 (40%) patients were operated under local anaesthesia.
- Jaboulay's operation was performed on 37 (61.7%) patients of which 8 patients had bilateral hydrocele. Lord's plication was performed on 11 (18.3%) patients of which 1 patient had bilateral hydrocele while Subtotal excision of sac was performed in 12 (20%) patients of which 3 patients had bilateral hydrocele.
- It was observed that there was shorter post-operative stay in Jaboulay's operation with all patients being discharged within 10 days - 16 (26.7%) patients in 0-5 days and 21 (35%) patients in 6-10 days. This is similar in Lord's plication with 2 (3.3%) patients being discharged in 0-5 days and 9 (15%) patients being discharged in 6-10 days. Subtotal excision of the sac required significantly higher post-operative stay with 50% (6 out of 12 patients) being discharged between 11-15 days ($p < 0.05$).
- Majority of the complications were observed in patients that underwent Subtotal excision of sac and the least number of complications were observed in patients that underwent Jaboulay's Operation.
- In patients that underwent Jaboulay's operation sutures were removed on a mean of 6.3 days while sutures were removed on a mean of 8.4 days and 9.1 days in patients that underwent in Lord's plication and Subtotal excision of sac respectively. The days required to remove suture was significantly higher in patients that underwent Subtotal excision of sac as compared to patients that underwent Jaboulay's Operation and Lord's Plication ($p < 0.05$).
- No recurrence was noted in all patients that underwent Jaboulay's operation, Lord's plication and Subtotal excision of the sac in post-operative 1 month period and post-operative 3 months period.
- On post-operative Day 3, in Jaboulay's operation pain was present in 12 (20%) patients while pain was present in 6 (54.5%) and 8 (66.7%) patients that underwent Lord's plication and Subtotal excision of sac respectively. On post-operative Day 7, in Jaboulay's operation pain was present in 2 (3.3%) patients while pain was present

in 2 (18.2%) and 2 (16.7%) patients that underwent Lord's plication and Subtotal excision of sac respectively. The number of patients in pain was significantly lesser in Jaboulay's operation group as compared to Lord's plication and Subtotal excision of sac ($p < 0.05$).

Conclusion

- Jaboulay's Operation and Lord's plication techniques are much easier and simpler techniques.
- Lord's plication can be done through a small incision and as the sac is not stripped from the surrounding scrotal tissues, cause minimal bleeding, postoperative haematoma is less likely.
- Both Jaboulay's Operation and Lord's plication techniques are superior to other techniques if the hydrocele is of small to moderate size.
- In case of large hydrocele with thickened and calcified sac, Subtotal excision of sac is the best choice.
- Considering the percentage of complications in different operative techniques, it is observed that there were least complications in Jaboulay's Operation. So, Jaboulay's Operation is best technique available in suitable cases for Jaboulay's Operation.

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