

## Mini Hydrocelectomy – Outcome of A Short Term Study and Comparison with Conventional Jaboulays Technique

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### ABSTRACT

**Background:** Hydrocele is among the commonest benign conditions of scrotum. Its incidence is around 1% in adult male population with a predilection for males above 40 years of age. Conventional surgical procedures like Jaboulays Eversion of Sac (EOS) and Lords plication of redundant tunica vaginalis remain the most commonly used procedures used in the treatment of idiopathic adult hydrocele. Both procedures are invasive and are associated with durable success and low incidence of recurrence. These procedures are however associated with many post-operative complications like pain, hematoma, infection, persistent swelling and induration of scrotal skin, wound related complications, chronic pain and reduced fertility. All these translate into high morbidity, loss of work hours and increased surgical expenses. To avoid / minimize these complications associated with plication or excision of the redundant hydrocele sac fenestration has been proposed as a minimal access procedure. Fenestration exposes the secretory surface of the tunica vaginalis sac to the lymphatic-rich subcutaneous tissues, from where the hydrocele fluid is cleared off the scrotal cavity.

**Methods:** The present study was carried out in the Department of General Surgery, Hamdard Institute of Medical Sciences and Research, Jamia Hamdard during the time period of June 2014 - December 2015. 120 patients of primary vaginal type hydrocele with ASA grade 1 were randomly allocated into two groups of 60 patients each – one group for the Mini-Hydrocelectomy MiH-(Group A) and the other group for routine Jaboulays EOS (Group B). All the patients were followed up for a period ranging from 6-18 months. **Results:** Mean age of patients was 42 years for jabouleys and 45 for mini hydrocelectomy group. Mean hydrocele volume for Group A was 240 ml and for group B was 252 ml. Average time for the procedure in group A was 10-12 min (mean 11min) and for group B was 25 -30min (mean 27min). In Group A, Average incision length was 2.1 cm whereas in Group B it was 5.4 cm. **Conclusions:** We hereby present our experience that mini-hydrocelectomy (MiH) technique to be the procedure of choice for medium sized uncomplicated hydroceles.

**Key words:** Hydrocele, Mini hydrocelectome, Jaboulays Procedure

### INTRODUCTION

Hydrocele is among the commonest benign conditions of

scrotum. Its incidence is around 1% in adult male population with a predilection for males above 40 years of age.<sup>[1,2]</sup> Conventional surgical procedures like Jaboulays Eversion of Sac (EOS) and Lords plication of redundant tunica vaginalis remain the most commonly used procedures used in the treatment of idiopathic adult hydrocele. Both procedures are invasive and are associated with durable success and low incidence of recurrence.<sup>[3]</sup> These procedures are however associated with many post-operative complications like pain, hematoma, infection, persistent swelling and induration of scrotal skin, wound related complications, chronic pain and reduced fertility.<sup>[4,5]</sup> All these translate into high morbidity, loss of work hours and increased surgical expenses.

To avoid / minimize these complications associated with plication or excision of the redundant hydrocele sac

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fenestration/ pull through procedures has been proposed as a minimal access procedure.<sup>[6]</sup> Fenestration exposes the secretory surface of the tunica vaginalis sac to the lymphatic-rich subcutaneous tissues, from where the hydrocele fluid is cleared off the scrotal cavity.

We hereby present our experience of minimal access hydrocelectomy via a small scrotal skin incision and compare the results with conventional Jaboulays hydrocelectomy.

## METHODS

The present study was carried out in the Department of General Surgery, Hamdard Institute of Medical Sciences and Research, Jamia Hamdard during the time period of June 2014 - December 2015.

120 patients of primary vaginal type hydrocele with ASA grade I were randomly allocated into two groups of 60 patients each – one group for the Mini-Hydrocelectomy MiH- (Group A) and the other group for routine Jaboulays EOS (Group B). All the patients were followed up for a period ranging from 6-18 months.

### Pre-Operative Workup

It included a detailed history and full physical examination. Diagnosis was affirmed by demonstration of clinical signs of fluctuation and trans-illumination. All patients underwent scrotal ultrasonography. All the procedures were done under regional / spinal anesthesia.

Exclusion Criteria:

All patients of Secondary hydrocele (clinically lax hydrocele with tender epididymis and / with sonographic features suggestive of epididymo-orchitis or solid testicular mass) were excluded from the present study.

The outcome was measured in relation to the following 6 common complications

1. Pain score
2. Postoperative hematoma,
3. Wound infection
4. Dehiscence requiring secondary suturing,
5. Induration of the scrotal wall requiring additional bed rest and anti-inflammatory agents.
6. Recurrence.

Statistics: Student' t test was applied to check the statistical significance. A null hypothesis ( $H_0$ ) was postulated that minimal access hydrocelectomy does not give better outcome as compared to Jaboulays hydrocelectomy in terms of post-operative complications. An alternate hypothesis ( $H_1$ ) was postulated that minimal access hydrocelectomy gives better outcome as compared to Jaboulays hydrocelectomy in terms of post-operative complications.

### Group A -Minimal Access Hydrocelectomy

The technique of mini-hydrocelectomy proceeds via the following steps. (Fig1 &2)

An ipsilateral transverse skin incision of about 2 cm is made. The dissection is proceeded via the dartos till the parietal layer of tunica vaginalis. The sac is punctured and a small volume of fluid is aspirated. Next a disc of tissue

(with a diameter of minimum 1.5 times the skin incision) is excised from the parietal layer of tunica vaginalis.

Undermining is kept to a minimum to prevent violation of sub-dartos and sub-dermal lymphatics. The edge of the parietal layer of tunica vaginalis is then sutured to the dartos and scrotal sub-cutaneous tissue by absorbable sutures in a continuous fashion with knots at opposite ends of the circle to prevent future stomal stenosis. The aim is to expose the secretory surface of visceral tunica vaginalis to the lymphatic channels of dartos and subcutaneous tissue which provide an effective efferent pathway for egress of the fluid. Skin was closed in an interrupted mattress fashion by 3-0 polypropylene.

Maximum hospital stay was one day. Day care stay option was provided to patients and Enhanced recovery after surgery protocols were followed. Single dosage of ceftriaxone injection was given before starting the procedure. Post-operative instructions for dressing care plus local hygiene and scrotal support was given. Oral non-steroidal analgesics were prescribed in the post-operative period and patients were advised to use them only if required. The patients were followed up weekly for first month and then at 3 monthly intervals. Suture removal was done at the end of second week.

### Group B - Jaboulays Hydrocelectomy

60 patients underwent routine Jaboulays procedure with eversion of sac under spinal anesthesia.

All patients had an in-patient stay of one day and were discharged next day with instructions for dressing and wound care and use of scrotal support. Single dosage of Ceftriaxone injection was given at the time of induction of anaesthesia as prophylaxis antibiotic. Oral non-steroidal analgesia was prescribed post-operatively as and when required. Outcome was assessed under the same parameters as MiH. Suture removal was done at the end of 2<sup>nd</sup> week.

## RESULTS

The present study included 120 consecutive patients with diagnosis of primary vaginal hydrocele. Age range was between 18-60 years with a mean patient age of 43 years. All these patients presented with pure scrotal swelling. 60 patients underwent Minihydrocelectomy (Group A) while 60 underwent Conventional Jabouleys procedure (Group B). Mean age of patients was 42 years for jabouleys and 45 for mini hydrocelectomy group. Mean hydrocele volume for Group A was 240 ml and for group B was 252 ml. Average time for the procedure in group A was 10-12 min (mean 11min) and for group B was 25 -30min (mean 27min). In Group A Average incision length was 2.1 cm whereas in Group B it was 5.4 cm.

**Table 1- Patient Demographic and Hydrocele data**

| Parameters                | Group A | Group B |
|---------------------------|---------|---------|
| No of patients            | 60      | 60      |
| Mean age(yrs)             | 45      | 42      |
| Left sided                | 27      | 24      |
| Right sided               | 31      | 32      |
| Bilateral                 | 2       | 4       |
| Mean hydrocele volume(ml) | 240     | 252     |

Pathologic examination of the resected disks of the hydrocele sac tissue was performed and did not reveal any structures other than the normal tunica. The follow-up period was 6-18 months (mean 12). None of our patients were lost to follow-up.

All patients were monitored closely for the postoperative complications and pain score was calculated using Visual Analogue Scale (VAS). In Group A, Average Pain score on first and seventh post-operative day was 7 and 5 respectively Whereas in Group B Average Pain score on first and seventh post-operative days was 8 and 6 respectively.

In Group A, Superficial wound infection characterized by purulent discharge from the suture line occurred in 2 patients Whereas in Group B Superficial wound infection characterized by purulent discharge from the suture line occurred in 5 patients. In Group A persistent induration of the scrotal wall occurred in 4 patients whereas in Group B persistent induration of the scrotal wall occurred in 12 patients. In Group A, Post-operative hematoma was seen in one patient whereas in Group B Hematoma occurred in 4 patients, requiring re-exploration and evacuation. In Group A, there was no occurrence of wound dehiscence whereas in Group B Wound dehiscence requiring secondary suturing was needed in 3 patients. There was single recurrence in group A while two patients had recurrence in group B (Table 2).

**Table 2- Complications in both the groups**

| Complications       | Group A<br>No. of<br>Cases (%) | Group B<br>No. of<br>Cases<br>(%) | Calculated value<br>of t – test |
|---------------------|--------------------------------|-----------------------------------|---------------------------------|
| Wound Infection     | 2 (3.3%)                       | 5 (8.3%)                          |                                 |
| Scrotal Induration  | 4 (6.6%)                       | 12 (20%)                          |                                 |
| Hematoma            | 1 (1.6%)                       | 4 (6.6%)                          | -1.89737                        |
| Wound<br>Dehiscence | 0                              | 3 (5%)                            | <b>p Value=.047175</b>          |
| Recurrence          | 1 (1.6%)                       | 2 (3.3%)                          |                                 |

On applying unpaired student’s t – test, p- value is less than .05 which is statistically significant i.e. null hypothesis is rejected and alternate hypothesis (H1) is accepted.

Group A Patients could resume their normal daily activity at an average of 4 days after surgery whereas for Group B it was 7 Days.



**Fig 1: 2cm transverse incision**



**Fig 2: Opened up tunica vaginalis**



**Fig 3: Disc of tunica vaginalis removed**

**DISCUSSION**

Jabouleys Eversion of Sac procedure and Lords plication are practiced as the reference standard technique for the treatment of hydrocele worldwide. Newer techniques like aspiration and sclerotherapy have resulted in fewer complications and morbidity. They are less expensive, but have traditionally enjoyed a lower success rate and less patient satisfaction than conventional hydrocelectomy. Mini-Hydrocelectomy is aimed to minimize the complications to the patient without compromising the safety and efficacy of the treatment and. Quicker recovery,

earlier return to work translates into less disease specific health care costs.

Many reports have advocated various techniques for minimal access hydrocelectomy. Fenestration of the tunica has been performed which puts the sac in contact with the lymphatic- rich subcutaneous tissues.<sup>[7]</sup> Other techniques such as a small skin incision with traditional Jabouleys or Lord's repair have been described.<sup>[8]</sup> A pull-through technique has also been described to remove large hydrocele sacs through a small incision, with minimal dissection.<sup>[6]</sup> All these techniques have been performed through small incisions, but the hydrocele sacs were removed nearly completely with or without eversion or plication.<sup>[12]</sup>

Mini hydrocelectomy is a novel surgical technique for minimal access hydrocelectomy. Through a 2-cm scrotal skin incision a disc of the parietal tunica vaginalis is excised. The mean operative time in our study was 11 minutes. 4 patients (6.6%) were unsatisfied with their treatment by the end of second postoperative week owing to scrotal edema. The remaining 56 (93.4%) patients were completely satisfied during the entire follow-up period. These values are in concordance with other published reports.<sup>[9,10]</sup> The overall most common postoperative complication was persistent edema. One patient (1.6%) each in MiH group developed scrotal hematoma and recurrence of the hydrocele during the follow-up period. Additionally, return to work was within 4 days on an average in the MiH group.

In Jabouleys procedure the hematoma rate was 6.6% (4 patients). Persistent scrotal wall edema was seen in 12 patients (20 %) The mean operative time was 27 minutes for Jabouley's technique, more time was required for partial excision of the sac and to achieve achieving hemostasis and suturing of a large area. The average return to work was within 7 days.

In previous studies, the overall rate of postoperative complications was 17.5%-40%.<sup>[5,10]</sup> An interesting recent study reviewed all scrotal surgery for benign conditions and found that the overall complication rate was 20%, with most complications occurring after hydrocele surgery.<sup>[13]</sup> The overall incidence of post-operative complications was significantly lower among mini hydrocelectomy patients with less operative trauma.<sup>[14]</sup> The most common complications occurring after scrotal surgery for hydrocele and spermatocele reported in other series were persistent scrotal swelling, inflammation, and postoperative infection.<sup>[5,13,14]</sup> Injury to the epididymis during hydrocelectomy is significant, occurring in as many as 4% of patients, and can lead to infertility.<sup>[13-15]</sup> In MiH technique, the epididymis is completely safe, because only a small disk of the hydrocele sac is excised.

In operations requiring greater manipulation, such as dissection and ample removal of the vaginal tunica, the incidence of edema and hardening has been much greater.<sup>[14,16]</sup> Conventional surgery for hydrocele invites edema, hematoma, and infection, because it requires

excessive handling and wide dissection of the testicular sac.<sup>[5,6,10,16]</sup>

In the present technique, a disk of the hydrocele sac is pulled and resected through a small scrotal incision, with minimal dissection. Thus, hematoma formation did not occur in our patients.<sup>[6]</sup> In contrast, after conventional hydrocelectomy, the hematoma formation rate has been 3.3%.<sup>[9,14]</sup> According to previous data, conventional surgery for hydrocele or less-invasive hydrocelectomy invites edema and hematoma owing to the tissue handling and dissection and has not been related to the length of the scrotal skin incision.<sup>[5,6,9,10,14,16]</sup> Significant postoperative infection occurred in patients subjected to more operative trauma. It ranged from superficial surgical site infection,<sup>[9]</sup> scrotal abscess formation,<sup>[5]</sup> to pyocele,<sup>[9]</sup> with a rate of incidence of 5%-14%.<sup>[5,9,16]</sup> Other studies reported a 0% rate of postoperative infection.<sup>[6]</sup> In the present study, only two patients in minihydrocelectomy group had surgical site infection whereas in jabouleys group superficial wound infection was seen in 5 (8.3 %) of patients. During the follow-up period, only one recurrence (1.6%) was noted with the MiH technique. Many studies have reported the recurrence rate after hydrocelectomy to be between 1.3%-7%.<sup>[6,14,15]</sup>

## CONCLUSION

The results of the present study have indicated that this procedure requires minor dissection and minimal manipulation of the scrotal contents during treatment. The overall surgical trauma to the tissues is minimal as compared to conventional surgical procedures. The procedure completely abides by physiological principles as it serves to preserve the efferent lymphatics for eventual egress of fluid. The conventional surgical procedures like Jabouleys and Lords techniques are quite anti-physiological in the sense that they violate all important sub-dartos and sub-cutaneous lymphatics, which translates into higher incidence of persistent scrotal edema. This procedure also showed minimal recurrence during the defined follow-up period. Chances of injury to epididymis is minimized as they are not exposed at all. Overall, the procedure results in minimal complications and required a short operative time. We hereby advocate this mini-hydrocelectomy (MiH) technique to be the procedure of choice for medium sized uncomplicated hydroceles.

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