ORIGINAL RESEARCH PAPER

General Surgery

KEY WORDS:

MINIMALLY INVASIVE HYDROCOELECTOMY SHOWS BETTER OUTCOME IN TREATMENT OF ADULT TESTICULAR HYDROCOELE IN A RURAL TERTIARY CARE CENTRE: PROSPECTIVE STUDY

Dr. Dhrubajyoti Maulik Associate professor ,Dept of General Surgery ,Bankura Sammilani Medical College

Dr. Oli Das Adhikary* Senior Resident, Dept of General Surgery,Chhatna Superspeciality Hospital*Corresponding Author

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.But they are more invasive & complication rate are high.To reduce these complication rate we used minimally invasive hydocoelectomy procedure in our study. **AIMS:** The aim of this study is to compare the operative outcomes among the primary vaginal hydrocele patients those underwent minimal access hydrocelectomy and conventional hydrocelectomy. **SETTINGS & DESIGN:** This prospective study was conducted at Bankura Sammilani Medical College & Hospital for a period of 18 month on a study population of 60 patients . **MATERIAL AND METHODS:** .62 patients of primary vaginal type hydrocele with ASA grade 1 were randomly allocated into two groups .one Mini-Hydroceletomy (Group A) and the other group routine Jaboulays EOS (Group B). All the patients were followed up for a period ranging from 6-18 months.there outcomes compared SummaryThe MIH for hydrocelectomy provided satisfactory cosmetic results with a 2 cm scrotal incision only. It resulted in no recurrence, fewer complications, and rapid postoperative rehabilitation in comparison to the traditional "JES procedure." So The minimally invasive hydrocoelectomy may be gold standard for the conventional surgical treatment of adult primary vaginal hydrocele.

INTRODUCTION

A hydrocele is an accumulation of fluid in the potential space between the visceral and parietal tunica vaginalis(TV) and is most common cause of scrotal swelling in adult males. Its incidence is around 1% in adult male population with a predilection for males above 40 years of age.[1,2] Primary vaginal hydrocele is well-defined as abnormal accumulation of serous fluid in tunica vaginalis." Secondary hydrocele occur subordinate to disease of the testes and epididymis and its management mainly comprises of treatment of the underlying cause. Filarial hydrocele and chylocoele account for 80% of hydrocele in some humid countries where the parasite, Wuchereria bancrofti, is endemic. In India the highest incidence is seen along the coastal belt where the filariasis is common.In Westbengal,Bankura is also a endemic area(18.37%) causative parasite as Wuchereria bancrofti & Culex quinquefasciatus was recorded as vector.[3]Various minimally invasive procedures have been widely applied for treatment, such as sclerotherapy4,endoscopic hydrocele ablation5, silicone catheter drainage6, and surgical methods, including the Jaboulay's procedure7or Lord's technique8.

However, contemporary large series9,10 suggest that the overall complication rate of these procedures is as highas 20%. Complications involve infection, persistent swelling, hematoma, and pain. Some patients may also experienceepididymal and/or vas deferens injuries, which may lead to decreased fertility11 To avoid / minimize these complications associated with plication or excision of the redundant hydrocele sac fenestration/ pull through procedures has been proposed as a minimal access procedure.[12] Fenestration exposes thesecretory 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.Access this article online

AIM

The aim of this study is to compare the operative outcomes among the primary vaginal hydrocele patients those underwent minimal access hydrocelectomy and conventional hydrocelectomy.

MATERIALS AND METHODS:

The prospective randomized study was carried out in the Department of General Surgery, Bankura Sammilani Medical College & Hospital from march 2018 to October 2019.62 patients of primary vaginal type hydrocele with ASA grade 1 were randomly allocated into two groups .one Mini Hydroceletomy (Group A) and the other group routine Jaboulays EOS (Group B). All the patients were followed up for a period ranging from 6-18 month Inclusion criteria: 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. Patients were included if they met the following criteria: (1) scrotalsymptoms that disturb their daily life; (2) diagnosis of testicular hydrocele; (3) agreement to undergo treatment according to this surgical protocol;

Exclusion criteria:

1. All patients of Secondary hydrocele (clinically lax hydrocele with tender epidydimis and / with sonographic features suggestive of epidydimoorchitis or solid testicular mass) were excluded from the present study.
2. other scrotal conditions or diseases such as trauma, tumor, hernia, testicular torsion, acute infection of the scrotal skin, communicating hydrocele, or tuberculosis of the epididymis or testis
3. previous scrotal trauma, surgery, puncture, or sclerotherapy.
4. chronic illnesses such as severe heart and lung disease, acute infectious diseases, or coagulopathy.

The following data were obtained and analyzed for the purpose of evaluating the clinical outcomes: maximum effusion diameter of the hydrocele according to ultrasound, maximum resection diameter of the parietal tunica vaginalis, operation time, postoperative outcomes , and patient satisfaction.

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.

All of the patients provided written informed consent. All of the study data were securely maintained by a single investigator . Preoperative workup The detailed history and full physical examination of each patient were assessed. The diagnosis was confirmed by fluctuation and trans--illumination. Laboratory investigations like hemoglobin,white blood cell count and urine routine examination were done in all. Scrotal ultrasound imaging was done in all patients.

The surgical techniques Cephradine 1gm IV at the time of induction of anesthesia or just after the administration of spinal anesthesia was given followed by another dose 2 h postoperatively.

Group A -Minimal Access Hydrocelectomy

The technique of mini-hydrocelectomy proceeds via the following steps. 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 nonsteroidal 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.(13)

Group B - Jaboulays Hydrocelectomy

31 patients underwent routine Jaboulays procedure with eversion of sac under spinal anesthesia. The testis was delivered through an incision in the scrotum, the tunica was opened and everted and most of the hydrocele sac was resected with electrocautery, leaving a reasonable cuff along the borders of the testicle. Bleeding was controlled by a running suture closing the free edges of the hydrocele sac Standard two-layer closure was used to close the scrotum with small tube drain (14)and hemostasis was secured by the aid of electrocautery 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 2nd week.

Statistical analysis.

All statistical analyses were performed using a statistical software package (SPSS,Version 22.0, Chicago, IL, USA). Continuous variables were expressed as mean ± standard deviation. Discrete variables were expressed as percentages. The t-test was used to compare continuous data, and chi-square tests were used for discrete data. Statistical significance was defined as $p < 0.05$ (two-sided).

RESULTS

Considering the baseline characteristics, there was no significant difference between the two groups. The distribution of participants in the both groups of the study population in different age categories was almost nearly equal with no much difference. The difference in the distribution of study participants in the both groups was statistically insignificant.

The presentation of symptoms of the patients is almost equal in both groups of the study population and the difference in the distribution is statistically insignificant.

The presentation of side of hydrocele of patients in the both groups had no much difference with right side more common followed by left side and a few by both sides. The difference in the distribution is statistically insignificant. Age ranged between 18–56 years with a mean age of 37±11.4 years. Average time for the procedure in group A was 12-14 min (mean 13min) and for group B was 30-40 min (mean 35 min). In Group A Average incision length was 2.5 cm whereas in Group B it was 6.1 cm. The mean time of hospital stay for group B was 15.48±6.38 hours with 12 hours as a minimum and 36 hours as a maximum value, while in group A was 24.18±10.60 hours with 14 hours as a minimum and 49 hours as a maximum value. Time off from work was defined as the number of days between the day of surgery and the first day a patient returned to work (10). The mean time to return to work was 8.5±2.1 (7-10) days in group B while in group A was 12.5±3.53 (10-15) days. The mean time off from work in group B was 9±2.35 days and in group A was 13.5±4. (P=0.0001) The most exciting result of the minimal invasive group was the near-perfect level of satisfaction in comparison to the JA group (100% vs 83.3%). 87% of the patients presented with oedema and hardening out of which 29% also presented with wound infection and 6% also presented with hematoma..

Only 15% of the study participants underwent minimal separation hydrocelectomy presented with oedema and hardening and only 7% presented with wound infection & 3% shows haematoma.. 85% of the patients didn't experience any post-operative complications.

Edema and hardening was the most common complication and is more incident in patients who underwent conventional hydrocelectomy. The difference in the distribution of edema and hardening among the patients in the two study groups was statistically significant.

Taking into account, the overall post-operative complications suffered by the patients in both groups of the study population, the conventional hydrocelectomy group had more incidences of post-operative complications. Around 67% of the patients belonged to conventional hydrocelectomy group of the study population suffered complications whereas only 17% of the patients belonged to minimal separation hydrocelectomy group suffered complications. No recurrence of hydrocele, chronic scrotal pain, or testicular atrophy occurred during follow-up.

DISCUSSION

Testicular hydrocoele is most common disease of testis among men at bankura district as this is a filaria endemic zone. though Jabouleys Eversion of Sac procedure and Lords plication are practiced as the reference standard technique for the treatment

of hydrocele worldwide still There are several methods for surgical treatment of testicular hydrocele, including sheath fenestration proposed by Ozdilek[15] in 1957, and sheath folding reported by Lord[7] in 1964. In recent years, the surgical treatment of hydrocele has gradually developed in the direction of minimal invasion. The objective of the minimally invasive procedures is to use the smallest incisions possible and to narrow the scope of anatomical separation without compromising the outcomes of safety and effectiveness[17]. As early as 2002, Chalasani and Woo[6] proposed a minimally invasive treatment of hydrocele with a small incision of 3 cm. In 2009, Onol et al[12] used a 1.5-cm incision to pull the sheath out of the scrotum and then remove it. These kinds of surgeries have in common the small skin incisions, but they still entail the removal of most or even all of the anterior wall of the sheath. In our study we also tried to show outcome of minimally invasive hydrocoelectomy using approx. 2.1 cm incision &1.5 cm of disc of tissue removed.

In 2011, Saber[13] first reported a procedure involving a 2-cm small incision and a sheath resection size twice that of the incision, which means that all patients underwent resection of approximately 4 cm of the sheath. In Saber's report, a total of 62 patients accepted the surgery, its median operation time was 15.1 min, and the overall complication rate was 12.88% with no occurrence of hematoma; 75.8% of the patients reported satisfaction, and one patient (1.6%) experienced hydrocele recurrence[3].

In our study the size of our sample was similar (62 cases), the median operation time was 13 min and the overall complication rate 12% with hematoma occurring in 2 case (3.22%); however, the patient satisfaction rate was slightly higher 100% and, most importantly,

none of our patients had recurrence of hydrocele. In previous studies, the overall rate of postoperative complications was 17.5%-40%.[9,19] 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.[8]The overall incidence of post-operative complications was significantly lower among mini hydrocelectomy patients with less operative trauma.[18] The most common complications occurring after scrotal surgery for hydrocele and spermatocele reported in other series were persistent scrotal swelling, inflammation, and postoperative infection.[8,9,18] Injury to the epididymis during hydrocelectomy is significant, occurring in as many as 4%of patients, and can lead to infertility.[9,18] In MiH technique, the epididymis is completely safe, because only a small disk of the hydrocele sac is excised 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 occours in 2 cases occur in our patients. In contrast, after conventional hydrocelectomy, the hematoma formation rate has been6% 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.[8,12,18,19,20] Significant postoperative infection occurred in patients subjected to more operative trauma. It ranged from superficial surgical site infection,[9] scrotal abscess formation,[9] to pyocele,[21] with a rate of incidence of 5%-14%.[9,21,16] Other studies reported a 0% rate of postoperative infection.[6] In the present study, only 7% in minihydrocelectomy group had surgical siteinfection whereas in jabouleys group superficial wound infection was seen in 21% of patients. During the follow-up period, no recurrence (1.6%) was noted with the MiH technique. Many studies have re- ported the recurrence rate after hydrocelectomy to be between 1.3%-7%.[6,14,15]

CONCLUSIONS

The MIH for hydrocelectomy provided satisfactory cosmetic results with a 2 cm scrotal incision only. It resulted in no recurrence, fewer complications, and rapid postoperative rehabilitation in comparison to the traditional "JES procedure." So The minimally invasive hydrocoelectomy may be a viable alternative for the conventional surgical treatment of adult primary vaginal hydrocele.

REFERENCES :

1. Christopher Fowler. The Testes and Scrotum. Chapter 79. In: Bailey and Love's Short Practice of Surgery, Norman S Williams, Christopher J K Bulstrode, P Ronan O Connell(eds). 25th Edition, London: Arnold publishers 2008; 1377-1416.
2. Mihmanli I, Kantarci F, Kulaksizoglu H, Gurses B, Ogut G, Unluer E, et al. Testicular size and vascular resistance before and after hydrocelectomy. AJR Am J Roentgenol. 2004;183:1379-85
3. Biplab Mandal et al. Bancroftian filariasis in four slums of Bankura, Westbengal.vol6 ,issue 9,September 2016 page 699-708
4. Hu, K. N., Khan, A. S. & Gonder, M. Sclerotherapywith tetracycline solution for hydrocele. Urology 24, 572 (1984).
2. Ho, G. T., Ball, R. A., Schuessler, W. & Kavoussi, L. R. Efficacy of endoscopic hydrocele ablation. J Endourol 7, 71 (1993).
5. Aslan, M., Kilinc, M., Yilmaz, K. & Özturk, A. A new approach in the management of the hydrocele with a silicone catheter. Urology 63, 170 (2004).
6. Jaboulay M. Chirurgie des centres nerveux des viscères et des membres. Lyon/Paris Storck 192 (1902).
7. Lord, P. H. A bloodless operation for the radical cure of idiopathic hydrocele. Brit J Surg 51, 914–6 (1964).
8. Swartz, M. A., Todd, M. M. & Krieger, J. N. Complications of scrotal surgery for benign conditions. Urology 69, 616–9 (2007).
9. Kiddoo, D. A., Wollin, T. A. & Mador, D. R. A population-based assessment of complications following outpatient hydrocelectomy and spermatocelectomy. J Urol 171, 746–8 (2004).
10. Zahalsky, M. P., Berman, A. J. & Nagler, H. M. Evaluating the risk of epididymal injury during hydrocelectomy and spermatocelectomy. J Urol 171, 2291 (2004).
11. Bijur, P. E., Silver, W. & Gallagher, E. J. Reliability of the visual analog scale for measurement of acute pain. Acad Emerg Med 8, 1153–57 (2001).
12 Onol SY, Ilbey YO, Onol FF, et al. A novel pull-through technique for the surgical management of idiopathic hydrocele. J Urol. 2009;181:1201-05.
13. Saber A. New minimally access hydrocelectomy. Urology. 2011;77:487-90.
14. Rioja J, Sánchez-Margallo FM, Usón J, Rioja LA. Adult hydrocele and spermatocele. BJU Int. 2011;107:1852-64.
15. Ozdilek S. The pathogenesis of idiopathic hydrocele and a simple operative technique. J Urol 1957; 77: 282-284 [PMID: 13406878 DOI: 10.1097/00007890-195804000-00008]
16 Darzi A, Mackay S. Recent advances in minimal access surgery. BMJ 2002; 324: 31-34 [PMID: 11777804 DOI: 10.1136/bmj.324.7328.31]
17. Chalasani V, Woo HH. Why not use a small incision to treat large hydroceles? ANZ J Surg 2002; 72: 594- 595 [PMID: 12190736 DOI: 10.1046/j.1445-2197.2002.02469.x]
18. Kim JK, Shin JH, Lim JS. 10-Year retrospective study of the operative treatment results of adult type hydrocele. Korean J Urol. 2008;49:82-87.
19 . Beiko DT, Kim D, Morales A. Aspiration and sclerotherapy versus hydrocelectomy for treatment of hydroceles. Urology. 2003;61:708-12
20. Shan CJ, Lucon AM, Arap S. Comparative study of sclerotherapy with phenol and surgical treatment for hydrocele. J Urol. 2003;169: 1056-1059.
21. Khaniya S, Agrawal CS, Koirala R, et al. Comparison of aspiration-sclerotherapy with hydrocelectomy in the management of hydrocele: A prospective randomized study. Int J Surg. 2009;7:39239