Techniques – Mini incision and plication (MIP) cure hydrocele: A minimally invasive surgical variation

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Abstract

Idiopathic hydroceles are the commonest cause of chronic benign scrotal swelling, affecting 1% of adult men. Larger idiopathic hydroceles can become symptomatic and affect quality of life. The popular Jaboulay technique described in 1902 is curative and remains the standard for most surgeons. However, it is associated with significant morbidity and has a reported recurrence rate of 5%. Various minimally invasive approaches have been described with fewer reported complications but are of limited efficacy and unacceptable recurrence rates requiring multiple treatments. In this single-surgeon case series of 92 men, we present the mini incision and plication (MIP) cure hydrocele technique for the treatment of idiopathic hydrocele. This minimally invasive open surgical variant achieves the desired eversion and plication with minimal hydrocele manipulation, providing excellent results independent of hydrocele size, with fewer complications and a recurrence rate of <1%.

Introduction

Idiopathic hydroceles are the commonest cause of chronic scrotal swelling, affecting 1% of adult men [1]. Although benign, larger idiopathic hydroceles can become symptomatic and affect quality of life [2]. Adult hydrocele is an accumulation of fluid between the two layers of the tunica vaginalis due to an imbalance of the secretory and resorptive activity of the visceral and parietal layers of the tunica vaginalis, respectively [3]. Open surgical intervention is usually curative and various techniques have been described[4]. The Jaboulay (1902) approach of sac delivery, eversion and plication remains the standard [5,6]. However, this approach is associated with significant morbidity and a reported recurrence rate of 5% [4,5,7].

Minimally invasive approaches including sclerotherapy and tunica vaginalis fenestration have fewer complication rates but limited efficacy, with unacceptable recurrence rates requiring multiple treatment[8,9].
We present the Mini Incision & Plication (MIP) cure hydrocele technique, a minimally invasive surgical variant for the primary treatment of idiopathic hydrocele. Compared to published literature, this technique is associated with fewer complications, can be utilised independent of hydrocele size with a recurrence rate of 1%.

Methods

Patient data

We conducted a retrospective single-surgeon audit on 92 patients that underwent MIP at three hospitals in Sydney, Australia between January 2013 until December 2020. Written consent for sharing intraoperative images for research purposes was obtained from the patient during the pre-operative consultation.
All patients had routine post-operative follow-up at 6 weeks and 3 months. Recurrence was defined to be any visible or palpable fluid collection that appeared and persisted within 3-months after surgery.

Equipment and materials

The following equipment are used: 15-blade scalpel, monopolar electrocautery blade, Yankauer suction, 2-0 Vicryl on a taper needle, 3-0 Vicryl on a taper needle, 4-0 Monocryl on cutting needle, a dressing and scrotal support undergarment.
This procedure can be performed under general or spinal anaesthesia in supine position. Sequential calf compression devices are applied for venous-thromboembolism prophylaxis and intravenous peri-operative antibiotic prophylaxis administered on induction per American Urological Associated (AUA) guidelines[10].

Operative technique

1. Place the scrotum on stretch. Using the scalpel, make a 2-3cm incision along the midline raphe. Using electrocautery, dissect down but not into the anterior hydrocele wall. (Fig. 1)
2. Make a stab incision on the anterior hydrocele wall (avoiding the testis) and drain the fluid with a Yankauer-sucker. (Fig. 2)
3. Apply two haemostat clips on either edge of the incised hydrocele wall. (Fig. 3)
4. Lifting the haemostats, use electrocautery to incise the hydrocele sac until the anterior wall of the hydrocele is fully incised. The incision may be extended into inguinal region as far as practically possible retracting the scrotal skin with cats paw retractors. (Fig. 5)
5. Perform the same manoeuvre caudally, incising the hydrocele sac to just before the epididymal tail. (Fig. 4)
6. Deliver the testicle out of the wound and the hydrocele sac will evert. (Fig. 6)

7. Plicate the everted free edges of the hydrocele ***posterior*** to the epididymal tail with a tight haemostatic running 2-0 Vicryl suture on a tapered needle. Continue the plication proximally to the spermatic cord base (snug but not too tight). (Fig. 7a, 7b)
8. Always create a medial dartos pouch and reposition the testis within the scrotum. (Fig. 8a, 8b, 8c)
9. Apply local anaesthetic and close the scrotum in layers (3-0 Vicryl on tapered needle for dartos and 4-0 Monocryl on cutting needle to skin). (Fig. 9)
10. Apply dressing and scrotal support.

Results

92 men underwent MIP for symptomatic hydrocele over a 7-year period (table 1 and 2). Bilateral procedures were performed in 11/92 (12%) of patients. 77/92 (83%) had idiopathic hydroceles of variable size, 39/92 (42%) >100cc and 18/92 (20%) were >250cc. 86/92 (93%) had day only procedures and those kept overnight were following spinal analgesia. The commonest complication was transient post-surgical oedema 20/92 (~22%). 4/92 (~4.3%) had small haematoma which did not require take back to the theatre. Only 1/92 (1%) patient had a hydrocele recurrence requiring a modified-Jaboulay redo procedure 3-years post initial surgery. 1/92 (1%) developed scrotal cellulitis 4-months following surgery and 1/92 (1%) developed chronic testicular pain (table 3).

Discussion

Complications arising from surgery are inevitable and it is essential we continue refining our techniques to reduce surgery associated morbidity; particularly when operating on benign diseases. Traditional open cure hydrocele approaches can be categorised in groups based on the characteristics: *delivery, dissection, excision, eversion, and plication* of the hydrocele sac (Table 4).

There appears to be unanimity amongst the groups that eversion and plication of the hydrocele sac are essential manoeuvres to achieving a successful cure but contrasting views on the extent of sac dissection, delivery, and excision one should undertake. Extensive dissection and excision in the frequently utilised Jaboulay is associated with higher complication rates with post-operative oedema in 91% of patients, haematoma in 22% and wound infection rates of 14%[7]. A more recent study also reported increase complications with the use of Jaboulay compared to other techniques but superior cure rates[8].

The MIP approach achieves eversion and plication with minimal hydrocele manipulation providing excellent success rates independent of hydrocele size, a recurrence rate of <1% and fewer complications compared to the traditional Jaboulay approach (Fig.1). Without the use of drains and due to the small incision, MIP was found to be more time efficient and anecdotally, easier for our residents to learn. Unfortunately, no formal data was collected to measure these parameters.

We acknowledge the limitations of this single-surgeon series. External validation, reproduction and long-term follow-up is still required. Given the well-established operative interventions for idiopathic hydrocele, there is scarcity of new data comparing well established techniques particularly in redo procedures. Prospective comparative trials against

Jaboulay and Lord would be useful to determine superiority before mainstream adoption. Future prospective trials could assess other metrics such as post-operative pain, quality of life, operative-time and learning curve.

Conclusions

Elegance in its simplicity, this MIP technique achieves eversion and plication with minimal hydrocele manipulation providing excellent success rates independent of hydrocele size, a recurrence rate of <1% and fewer complications. Prospective comparative trials comparing MIP to the popular Jaboulay and Lord would be useful to determine superiority before mainstream adoption.

References

1. Kafka M, Strohhacker K, Aigner F, et al. Incidental Testicular Pathologies in Patients With Idiopathic Hydrocele Testis: Is Preoperative Scrotal Ultrasound Justified? *Anticancer Res* 2020;40:2861-4.
2. Rioja J, Sánchez-Margallo FM, Usón J, et al. Adult hydrocele and spermatocele. *BJU Int* 2011;107:1852-64.
3. Rinker JR, Allen L. A lymphatic defect in hydrocele. *Am Surg* 1951;17:681-6.
4. Tsai L, Milburn PA, Cecil CL, et al. Comparison of Recurrence and Postoperative Complications Between 3 Different Techniques for Surgical Repair of Idiopathic Hydrocele. *Urology* 2019;125:239-42.
5. Gottesman JE. Hydrocelectomy. Evaluation of technique. *Urology* 1976;7:386-7.
6. Jaboulay M. *Chirurgie des centres nerveux des viscères et des membres.* Vol 2. Storck, Lyon/Paris 1902.
7. Rodríguez WC, Rodríguez DD, Fortuño RF. The operative treatment of hydrocele: a comparison of 4 basic techniques. *J Urol* 1981;125:804-5.
8. Ku JH, Kim ME, Lee NK, et al. The excisional, plication and internal drainage techniques: a comparison of the results for idiopathic hydrocele. *BJU International* 2001;87:82-4.
9. Khaniya S, Agrawal CS, Koirala R, et al. Comparison of aspiration-sclerotherapy with hydrocelectomy in the management of hydrocele: A prospective randomized study. *International Journal of Surgery* 2009;7:392-5.
10. Wolf JS, Jr., Bennett CJ, Dmochowski RR, et al. Best practice policy statement on urologic surgery antimicrobial prophylaxis. *J Urol* 2008;179:1379-90.

Figures and Tables

Fig 1. Advantages: MIP cure hydrocele technique

- Time efficient.
- No drains.
- Fewer complications.
- Utility independent of hydrocele size.
- Recurrence rate of <1% based on our data.

Table 1. Summary of patient characteristics (n=92)			
Patient demographic		**Past medical history**	
Age		**Smoking**	
Mean	55	None/unknown	66
Min	87	Active	24
Max	16	Ex-smoker	2
Range	71		
Epidemiology		**Diabetes mellitus**	
Idiopathic	75	Type 2	15
Previous surgery	13	Type 1	1
Trauma	1	Unknown	76
Epididymo-orchitis	3		
Previous hydrocele treatment		**Anticoagulant**	
Nil	84	NOAC	3
Previous aspirate	6	Warfarin	3
Previous cure (internal)	1	No/Unknown	86
Previous cure (external)	1		
Weight		**Antiplatelet**	

Unknown	72	Aspirin or Clopidogrel	23
Obese (BMI >30)	17	Dual Antiplatelet (Aspirin & Clopidogrel)	7
Morbid (BMI >40)	3	No/unknown	62
Followup		**Comorbidities**	
3-month	68	Less than 2	48
6-month	10	2 or more	28
12-month	14	IHD/AMI/CABG	12
		CVA	4

Table 2. Summary of hydrocele and surgical characteristics

Hydrocele factors		**Surgical factors**	
Side		**Anaesthetic**	
Bilateral	11	General	88
Left	30	Spinal	4
Right	51	Local	0
Hydrocele size		**Length of stay**	
Small (0–50 cc)	2	Day only	86
Moderate (50–100 cc)	33	Overnight	5
Large (100–250 cc)	39	>48hrs	1
Very large (>250 cc)	18	**Drains**	
Range	50-1200cc	Nil	92

Table 3. Summary of postoperative complications

Immediate day 0		Intermediate day 1-90		Long-term >day 90	
Nil	91	Nil	58	Wound cellulitis	1
Pain	1	Mild swelling	20	Chronic testicular pain	1
		Haematoma	4	Recurrence	1
		Hyperesthesia	2	Stitch granuloma	1

Table 4. Summary of open surgical approaches

		Characteristics				
Group	**Technique**	**Delivery**	**Dissection**	**Excision**	**Eversion**	**Plication**
I	Radical	P	P	P	No	No
II	Jaboulay	P	P	No	P	P
	Winkelmann	P	P	P	P	P
	Von Bergmann	P	P	P	P	P
III	Andrews (Bottle)	No	Minimal	No	P	No
IV	Lord	No	No	No	Minimal	P
	Solomon	No	No	No	Minimal	P
	Wilkinson	No	No	No	No	No
Novel	MIP	No	Minimal	No	P	P