Endoscopic hydrocelectomy for primary vaginal hydrocele – A novel technique

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Introduction

Recent years have seen a surge of endoscopic and minimal access surgical alternatives to traditionally done open techniques. The horizon of minimal access surgery – laparo-endoscopic/robotic has expanded in recent years and has moved beyond the confines of the abdominal and the thoracic cavity. Minimal access techniques have made inroads into thyroid surgery(1), head and neck cancers(2,3), breast surgeries(4) and inguinal lymphadenectomy(5), and it is possible that most of such subcutaneous surgeries will be done with minimal access techniques in the future. Although introduction of such techniques does not guarantee its acceptance as a standard surgical technique, it does give the surgeon an additional armamentarium to deal with a specific anatomical region and harvest the better vision, finer dissection and early recovery which is possible with minimal access techniques.

Case report

We present a case of unilateral primary vaginal non-communicating hydrocele in a 48-year-old male patient who had been suffering from left-sided painless scrotal swelling for the last 5 months. There was no history of trauma. There is no relevant family or surgical history. He is a known diabetic on oral hypoglycaemic medications, hypertensive on oral antihypertensives and a known hypothyroid on thyroxine replacement therapy. On clinical examination, there was a tense cystic painless globular swelling of around 8 x 6 cm in the left scrotum (Fig.1). The testis was not felt separately and testicular sensation was intact. There was no other significant clinical finding. An ultrasound study of the abdomen and the inguinoscrotal region showed moderate to gross hydrocele with intact bilateral testes. There was also an incidental finding of grade I fatty liver. With the clinical and radiological diagnosis of left-sided primary vaginal hydrocele, he was planned for hydrocelectomy. The patient insisted the surgery be done via minimal access methods, even after explaining to the patient that there is currently no role of endoscopic surgery in the management of scrotal diseases. Informed consent was taken regarding the novelty of the procedure and its concomitant risks and benefits after proper explanation to the patient and attendants. Being a novel procedure, we took ethical approval (IEC/2023/04/SWR/005), dated 12th of April, 2023. Accordingly, he was posted for endoscopic hydrocelectomy.



Fig. 1: Clinical photograph of the hydrocele

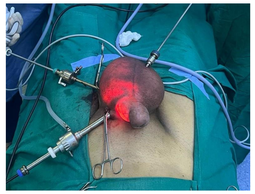


Fig. 2 – The port positions. Initially, one 10 mm port and two 5 mm ports were made, but subsequently, the lateral 5 mm port had to be changed to a 10 mm port for camera position change during the dissection.

The technique

Position - He was placed in the supine position.

Pre-port placement preparation of the scrotum - Space was developed between the internal spermatic fascia and the tunica vaginalis with the help of blunt plus sharp dissection and a balloon before insertion of the scope. This balloon was made in the operation theatre with surgical gloves and air inflated with a suction-irrigation cannula. An area of around 6 x 6 cm was thus created to facilitate the insertion of ports.

Port position - First, a 10 mm camera port was made at the root of the scrotum just lateral to the pubic tubercle. Insufflation with carbon dioxide was done and pressure was kept at 10 mm Hg. Note that after insufflation, the penis may swell up a little since the external spermatic fascia is continuous with the Buck's fascia. The swelling resolves with mild compression of the penis after the procedure. Further blunt dissection was done with the camera itself to create some more space. Another 5 mm port was placed laterally around 6 cm from the camera port which was subsequently changed to 10 mm to facilitate the insertion of the 10 mm camera. The camera position was changed to facilitate dissection all around the tunica vaginalis (Fig. 2).

Sharp dissection for further creation of planes was done with the help of a harmonic scalpel inserted through the lateral port and space for the third port was thus created. (Fig. 3). The 5 mm third port was placed near the median scrotal raphe at a distance of around 6 cm from the camera port so that it made an isosceles triangle with an equal distance from the first port to the second port, and first port to third port (Fig. 2)

Dissection - A non-traumatic grasper was taken at the third port and sharp dissection with the harmonic scalpel was done around most of the tunica vaginalis. Needle aspiration was then done to make the sac flaccid and aid in the completion of dissection all around the tunica vaginalis. To achieve this, the camera and other instruments were shifted from one port to another to aid dissection. After completion of mobilisation of the whole of tunica vaginalis from the internal spermatic fascia, a small incision is made anteriorly at the midpoint of the cranial and caudal end of the hydrocele sac (Fig. 5). After the incision is made, the endoscope is taken inside the rent made in the tunica vaginalis (Fig. 4) and position of the testis determined. The tunica vaginalis sac is then excised all around the testis (Fig. 5). The excised specimen is then retrieved through one of the 10 mm ports. The surgical field is then checked for haemostasis and ports were closed without drain. A 'T' bandage was applied with adequate compression, which was replaced by a scrotal support on post-operative day 1. The patient went home on post–op day 1 without any untoward event.

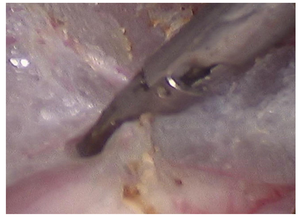


Fig. 3 – Creation of space for the third port with sharp dissection with the ultrasonic scalpel.

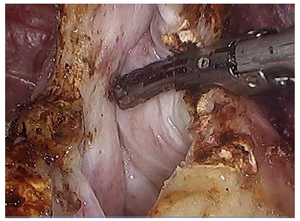


Fig. 4 – The thick tunica vaginalis being excised

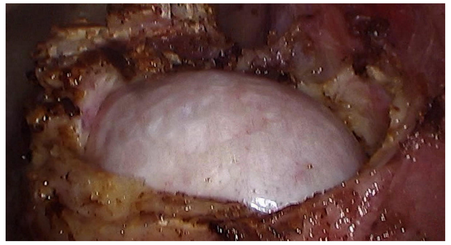


Fig. 5 – Excision of the tunica vaginalis sac completed all around the testis

Discussion

This is the first attempt to explore the scrotum endoscopically with intra-scrotal excision of the tunica vaginalis sac to our knowledge as per literature evidence. Although there are studies on endoscopic management of hydrocele, in those studies the tunica vaginalis was excised extra-scrotally as against intra-scrotal tunica vaginalis excision after the creation of pneumo-scrotum like we did in our case(6–9). Paediatric hydrocele management is established laparoscopically, it is done abdominally via an extraperitoneal or intraperitoneal approach and not via the scrotum (10).

Here we have moved on to the next frontier in endoscopic surgery, the scrotum, which can be deemed a natural evolution in laparo-endoscopic subcutaneous surgery. Although it can be argued that open surgery is simple enough not to warrant any undue complexity with the laparo-endoscopic approach, it cannot be negated that the demonstration of the feasibility of endoscopic surgery in the scrotum opens a floodgate of options for conservative surgical management of the diseases of the testis and the spermatic cord. For example, it opens a portal for partial orchidectomy, which we believe will be better managed with minimal access techniques aided with auxiliary tools like magnified vision, advanced imaging techniques, perfusion imaging techniques with indocyanine green and augmented reality, which can accurately guide margins for testicular tumours. Partial orchidectomy is a relatively new procedure and is invaluable in cases where there are bilateral testicular tumours in young patients who wish to preserve fertility. The list of the feasibility of surgeries possible inside the scrotum with the help of minimal access surgery is vast. We just needed to unlock the portal to it. We can tackle most of the diseases of the anatomical structures that are present inside the scrotum – the testes, epididymis and the contents of the spermatic cord.

The limitation of our case report is that there is scarcity of data in the available literature on intra-scrotal hydrocelectomy and hence a comparison with the technique used in our case report cannot be done. Moreover even though we are on the process of accrual of cases for a case series on intra-scrotal hydrocelectomy, we don't have long term results of this novel technique.

Conclusion

The ability to create a pneumo-scrotum and exploration of scrotal contents may open a portal to various surgeries inside the scrotum. The addition of an ancillary armamentarium with minimal access techniques may make many surgeries feasible for which open and microscopic surgeries were the only options. Here we have only shown the feasibility of such a technique and long-term results are awaited.

Disclosures – The authors Prof. Subhash Khanna and Dr. Areendam Barua have no conflicts of interest to disclose.

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