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ORIGINAL ARTICLE

Laparoscopic TAPP repair following tumescent injection: The patient outcomes and feasibility for surgeons

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ABSTRACT

Background: Laparoscopic transabdominal preperitoneal inguinal hernia repair (TAPP) is technically demanding procedure with relatively long learning curve. Procedure is associated with operative and postoperative complications and pain, especially when performed by inexperienced surgeon. Most of the problems are associated with different anatomical environment and technical inadequacy. In order to make TAPP relatively simple with better visibility of landmarks, we used pre peritoneal infiltration of 60-100ml saline with lidocaine and epinephrine before proceeding for TAPP repair.
Methods: About 60-100 ml of diluted lidocaine with epinephrine solution was injected in pre peritoneal space below arcuate line and extending to and around hernial sac. Care is taken not to inject in triangle of doom. Laparoscopic aspiration needle was used for injection after lifting peritoneum with grasper. Tumescent TAPP was performed in 35 patients (32 men, 3 women; mean age, 44.3 years).
Results: With use of tumescent TAPP, it was relatively simple to identify anatomical landmarks owing to bloodless field. One of the main advantages was demonstration of procedure to residents leading to better understanding and more confident dissection while being performed under supervision. The mean operation time was 95 min. ranging from 55 to 110 minutes. Another advantage was reduced pain in early post-operative period.
Conclusions: Tumescent injection before TAPP is easier and safe with advantage of clearer anatomy and reduced post-operative pain.
Keywords: Tumescent TAPP, Tumescent local anesthesia, Inguinal hernia

INTRODUCTION

Laparoscopy approach for hernias has advantage of being minimal invasive and a good alternative to open mesh repair. Less postoperative pain, early return to work, cosmetic advantages and reduced hospital stay make it preferential technique in experienced hands. Increasing evidence suggest laparoscopic approach comparable or better than open hernia repair[1–4]. However, it may be difficult to learn laparoscopic repair of inguinal hernia than open mesh repair because of different anatomical environment and potential of serious injuries during surgery[5-10]. Its combination of dexterity as well as clear concepts regarding the anatomy of inguinal region[11,12]. Dissection of thin layer of peritoneum, identification of neurovascular structures and spermatic cord dissection to free sac pose some challenge especially in learning curve and even for experienced in difficult cases like recurrent hernia, obesity, previous surgery or adhesions. To make it easier with reduced bleeding we started with tumescent injection before proceeding for TAPP. In this procedure we inject safe dose (Usually 60-100ml) of tumescent in consultation with anesthetist containing diluted lidocaine with epinephrine into the preperitoneal space[13–15].

Based on our experience we find it easier to dissect and identify structures with reduced operative time and less post-operative pain than TAPP without tumescence.

MATERIAL AND METHOD

Between March 2019 and Feb 2021, tumescent was injected in 35 patients with total of 38 inguinal and one femoral hernia (Table 1) after permission from Ethical Committee. There were 32 men and 3 women, with a mean age of 44.3 years (range 21-72yrs).
Technique: General anesthesia with endotracheal intubation in all patients. With aseptic measures, 10-mm trocar was inserted through umbilicus in all for the camera of laparoscope. Pneumoperitoneum with pressure of 12 mmHg created using CO_2 insufflator. Two 5-mm trocars were introduced in midclavicular line on either side and level adjusted according to size of patient. Hernial defect identified, peritoneum lifted with grasper and diluted lidocaine and epinephrine (tumescent solution consist of 20ml 1% lidocaine 0.2mg adrenaline and 40-80ml Normal Saline) injected in the preperitoneal space to create tumescence by aspiration needle. In bilateral hernias volume and dose of tumescent reduced to half on each side. Multiple 2-4 pricks were made to infiltrate tumescent taking care not to inject close to inferior epigastric artery and triangle of doom. Usual dissection for TAPP technique proceeded[9], mostly from lateral to medial. Scissor and monopolar cautery hook were used for most of dissection. Hernial sac was dealt with in usual fashion and polypropylene mesh placed in all cases. Total resection of the sac was not mandatory for complete indirect hernias. The peritoneum was closed with running 2–0 absorbable sutures or with tacker. Trocars were removed and umblical port closed. Operative time was noted in all cases.

Table 1: Demography

Number of patients	35
Age range	21-72 yrs. (Mean 44.3)
Male: Female ratio	11.7:1
Bilateral Inguinal hernias (all direct)	4 (All male)
Indirect Inguinal hernias	14
Unilateral direct hernias	16 (All male)
Femoral hernia	1 (Female)

Injection Paracetamol 1G IV infusion 12hourly was used for post-operative pain reliever. Injection ketorolac 10mg I/M was used only if pain persists. All patients were discharged within 24 hours post operatively. Follow-up on outpatient department and examinations was done conducted one week postoperatively. Pain was assessed by VAS in a score of 1-5. The following quantitative and qualitative outcomes were assessed.

Operation time, intraoperative bleeding, ease of performing the procedure with identification of landmarks, postoperative pain and complications.

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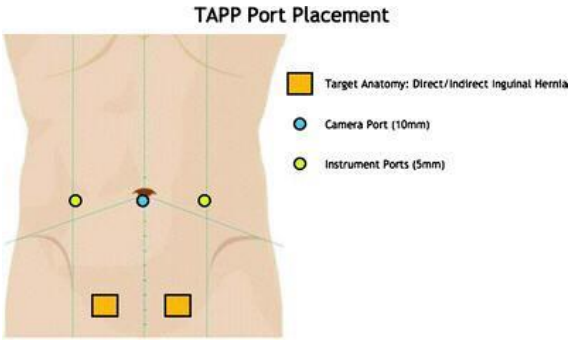


Fig. 1 After Tumescent injection

Fig. 2

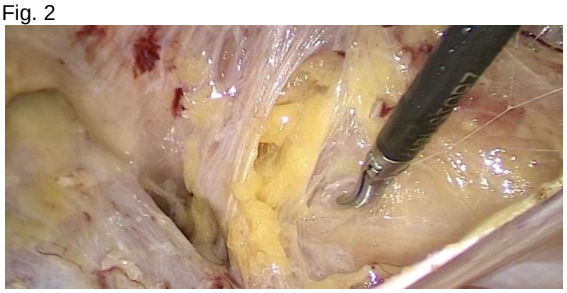


Fig. 3:

Fig. 4

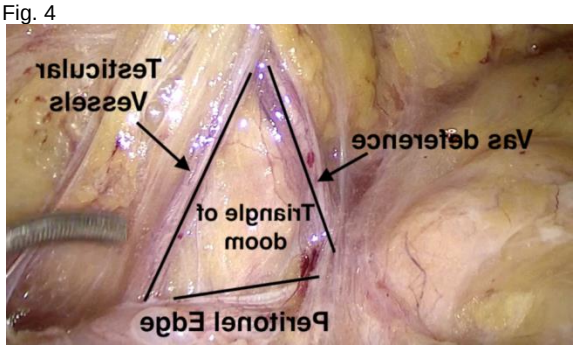
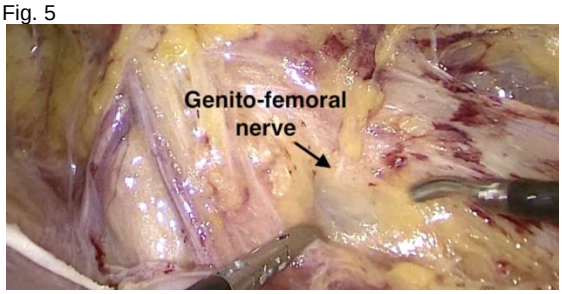


Fig. 5



RESULTS

Intraoperative: course: Unilateral Hernia was in 31 patients and bilateral in 4 patients with 1 patient having Femoral hernia. The mean operation time was 85 min for unilateral hernias and 135 min for bilateral hernias (Table 2). The average 80-100 ml volume of tumescent used in each case. No complication related to cardiovascular or respiratory ware encountered during or after surgery.

There was no any case of subcutaneous bleeding around the trocar sites no SSI. Average pain score in early post-operative period was 2 (Range 1-3). No recurrence noticed in follow up ranging from 6months to one year. A questionnaire was distributed amongst 14 post graduate residents who observed or assisted regarding for objective scoring from 1-4

1- Identified all anatomical landmarks
2- Difficult to recognize one anatomical landmark
3- Most landmarks were difficult to identify
4- Not sure or not able to answer

Average score for ease and identification was 1.08

Table 2: Operative results

	Indirect Inguinal hernia	Direct Inguinal hernia (Unilateral)	Bilateral Inguinal hernia	Femoral hernia
No. of patients	14	16	4	1
Average Operative time	90 min	75 min	135 min	80 min
Per-operative bleeding	<15 ml	<10ml	<15ml	<15ml
Post operative Seroma	2	6	3	0
Average hospital stay	17 hrs	15 hrs.	21 hrs.	12hrs

DISCUSSION

Laparoscopic TAPP has been associated with less postoperative pain and reduced hospital stay than open mesh hernioplasty[2,3]. However, If performed by inexperienced surgeons it carries a greater risk of operative and postoperative complications[11]. Laparoscopic TAPP remains technically demanding mainly due to different anatomical landmarks. It also carries higher risk of damaging the important structures e.g. Ductus Deference, Gonadal vessels, contents of Triangle of Doom (External iliac vessels) and Triangle of Pain (Femoral branch of genitofemoral nerve and lateral cutaneous nerve of thigh) and hernia recurrences when done by inexperienced hand[12]. Laparoscopic TAPP iapproach is also associated with more extensive dissection of the peritoneum and inguinal floor. To decrease these difficulties we used preperitoneal injection of tumescent local lidocaine before performing TAPP[16]. With this new technique we assume the same advantage as with use of tumescent local lidocaine in other procedures[13–15].

Mainly the tumescent local anesthesia lidocaine with epinephrine was used in liposuction[13]. This hydrodissection give more ease to suction fat, and the diluted lidocaine and epinephrine solution minimized bleeding and provided longer pain relief both intraoperatively and postoperatively. The use of tumescent solution in open hernia surgery also decrease bleeding ease the dissection and causes less postoperative pain as in liposuction[17,18]. The use of epinephrine in the tumescent solution with lidocaine decrease bleeding and also delays its absorption in systemic circulation, which results in decrease in the side effects associated with local anaesthesia[13].

According to us it is sufficient to inject 80-100 ml of solution into the preperitoneal space to achieve the sufficient space for tumescence. If we increase the amount it will damage peritoneum and will distort the anatomy of Fruchaud which cause harm rather than a benefit and if less amount injected required results would not be obtained.Also the solution in prevesical space make it easy to define the anatomy properly and good exposure of cooper's ligament without damage and minimum bleeding.

Although the traditional TAPP causes less pain and discomfort in inguinal region as compare to open hernia repair as reported[1–4]. But McCormack et al[7] said that it is 13.5 % of patients who experience chronic pain after TAPP, which is quite significant[18–20]. In our study postoperative pain less generally. A very small number experience post operative pain which normally resolve in a period of 2-3 months. The tumescent might have effect of local anesthesia which causes less pain after surgery. Chronic pain is rare in tumescent as compare to Conventional TAPP but it need further study to prove it.

No any significant side effect reported with tumescent solution even for bilateral hernia[12,13] not even any peritoneal damage or any vascular injury seen with needle used for tumescence but these event are serious danger in these group. Postoperative hematoma reported in 4.2% and seroma in 4.4% in conventional TAPP but there were very much less in Tumescent TAPP.

CONCLUSION

We concluded from our results that this new technique for inguinal hernia repair has favourable outcome with less side effects and it has small learning curve make it easy procedure for the new trainee or senior registrar to use it for hernia repair and to learn it quickly.

Conflict of interest: Nil

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