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Original Research Article

Laparoscopic Umbilical Hernia Repair by Modified 2 Port Technique

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Abstract

Background: Laparoscopic umbilical hernia repair has largely replaced open method and is gaining increasing popularity due to its various advantages. Hence the present research was undertaken tostudy the feasibility, efficiency, and safety of the laparoscopic umbilical hernia repair technique using modified two ports, combined with Herniorraphy and intraabdominal mesh fixation by trans- abdominal non-absorbable suture technique.
Methodology: In this study, total 100 patients, including non-emergency and emergency underwent laparoscopic repair by combined Herniorraphy and intraabdominal mesh were studied. Two-port technique was used and the umbilical defect was closed using trans-abdominal suture, composite polypropylene, and PTFE mesh was placed intra abdominally and fixed to abdominal wall using trans abdominal polypropylene sutures at 4 corners of mesh and with absorbable fixation device.
Result: The average operative time for laparoscopic repair was 60 min, ranged from 45-100 min. The average hospital stay was 2.5 days (range 1 to 4 days). Early complications was seen in 13 patients who developed urinary retention requiring catheterization, 04 patients developed ileus which resolved spontaneously by 3rd day, including 02 emergency patients. Late postoperative complications occurred in six patients, complaining of abdominal pain which resolved over 6 months without further treatment. No patients presented with chronic pain or recurrence over the follow-up period of more than one year. None of the patient developed seroma at umbilicus or discharge from suture site.
Conclusion: The modified 2 port laparoscopic umbilical hernia repair with combined Herniorraphy and intraabdominal mesh fixation has good clinical outcomes, less post-operative morbidityand offers an efficient, safe, and effective repair for umbilical hernia.
Keywords: Umbilical hernia, Laparoscopy, Modified 2 port technique, Herniorraphy, Polypropylene.

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1. Introduction

Umbilical hernia is protrusion, bulge, or projection of an organ through the abdominal wall. In young children the cause is failure of closure of umbilical ring during gestation, the central defect in linea Alba causes protrusion of abdominal contents such as omentum or bowel. In adults the cause is increase intra-abdominal pressure seen in pregnancy, obesity, multi parous women, cirrhotic patients. The incidence of umbilical hernia ranges from 10% to 25% and is increased in females.[1]

The laparoscopic repair of umbilical hernia has largely replaced open method and is gaining increasing popularity due to its low recurrence rate, short hospital stay, and low complication rate.[2] Laparoscopic repair is classically carried out using three to four ports in the abdominal cavity.[3,4] However, the recently reported "two-port" technique has the added advantage of being the least minimally invasive procedure described to date.[5,6] With laparoscopic repair of ventral and incisional hernia becoming the standard treatment, attention has gradually shifted to chronic pain as the outcome for comparing various methods. Some issues need to be addressed in Laparoscopic repair, fixation of the prosthesis with single-crown or double-crown helical tackers and trans-abdominal sutures (TASs), number of ports required, seroma formation, incidence and management of chronic pain.[7]

This paper reports our experience with laparoscopic umbilical hernia repair with modification of procedure to address the above issues. This study of modified 2 port technique with primary port in epigastric region by open method and second port laterally in anterior axillary line on left side above descending colon under vision, and if required other port on either side of second port, for combined Herniorraphy with intraabdominal mesh fixation with trans abdominal absorbable suture technique have added advantage.

2. Materials and methods

Total 100 patients including non-emergency and emergency of umbilical hernia registered in surgical center for repair from 2014 to 2017 were included in the study. The study was done at single surgical center in Kalyan city. The information of umbilical hernia patients was taken from the hospital records. The patients with medical comorbidities who were very high risk for general anaesthesia were excluded from the study. Demographic data, clinical presentation, radiological investigations (defect size), treatment modality (Mesh size, and operative time), and hospital stay were recorded. Data entry and analysis: The data is first tabulated and then frequencies for variables are calculated.

2.1 Laparoscopic Technique: By Modified 2 Port

The patient is placed in the supine position. Monitors are placed at the foot end. A second generation cephalosporin is administered intravenously. After General Anaesthesia, the anterior abdominal wall is sterilized and draped. A nasogastric tube is placed for stomach decompression.

The pneumoperitoneum is achieved with 10 mm port put by open method in the epigastric region about 2 cms below the xiphisternum, the second 5 mm port is put in the horizontal line from the umbilicus entering the abdomen just above the descending colon. The third port (5mm) if required on either side ipsilateraly of the second port.

The abdominal cavity is examined by 30° laparoscope placed through the 10mm epigastric port. The hernia contents were reduced through a combination of blunt and sharp dissection with scissors. The hernia defect is sized and the undersurface of the abdominal wall is cleared of fatty deposits, for smooth flat application of the mesh. A 2 mm incision is placed within the umbilical skin fold.

A percutaneous suture passing instrument was used for closure of umbilical defect, under direct vision, with No.1 polypropylene suture, introduced into the abdominal cavity on one side of the defect and retrieved back on the other side of the defect after once more passing the suture passing instrument. The suture knots were buried under the skin, and the incision was closed with a subcutaneous suture. The technique is previously described by Carter [8] for closure of trocar sites.

The composite mesh size of 15 by 15 cm was used to have an overlap of more than 5 cm over the defect. The four corner sutures with 2-0 Polypropylene are placed through the polypropylene side of the mesh, about 2 mm inside from corner and are tied to the mesh with three square knots. The mesh is then rolled and inserted through the 10 mm port into the abdominal cavity and positioned with the polypropylene side against the abdominal wall and the polytetrafluoroethylene side down toward the abdominal contents. The pneumoperitoneum was reduced to 10 mmHg and the 4 corner sutures of mesh were individually pulled Trans abdominally. The sutures are snugly tied to pull and fixed the mesh to abdominal wall.

The further fixation of the mesh was done by absorbable tackers. Pneumoperitoneum was released and ports sites were closed.

The abdominal compression strapping with dynaplast from one Anterior Superior Iliac Spine to Other Side Anterior Superior Iliac Spine was given after dressing.

3. Observations and Results

In the present study, no patient required conversion to conventional (open) method. Hundred patients underwent laparoscopic repair out of which were 34 males and 66 were females. Mean age was of patients was 45 years, ranged from 30 to 60. The majority of patients (50%) were between age group 45 to 60 years followed by 30 to 45 years (44%), (Table 1). Most of the patients (97%) were OPD patients and only 3% were emergency cases.

Table 1: Demographic profile of the patients

Demographic Data		No. of Patients (%)
Age of patient	30-45	44 (44%)
	45-60	50 (50%)
	>60	06 (06%)
Gender	Male	34 (34%)
	Female	66 (66%)
Presentation	Non-emergency	97 (97%)
	Emergency	03 (03%)

The average Hernial defect size was 3cms with ranging from 2 cm to 6cm. The distribution of patients according to hernial defect size is shown in table 2. Composite mesh size was 15 cm x 15 cm.

Table 2: Distribution of Patients According to Hernial Defect Size

Hernial Defect Size	USG of abdomen and pelvis	During intra operative measures
2-4 cm	56 (56%)	56 (56%)
4-6cm	44 (44%)	44 (44%)

About 48 patients were operated with two-port techniques, 52 patients's including 03 emergency patients' required additional port, (Table 3).

Table 3: Number of Ports

Number of Ports	Non-Emergency patients	Emergency patients
2 Ports	48 (48%)	-
Additional Port	49 (49%)	03 (03%)

The operative time ranged from about 60 minutes to120 minutes, with average time was 90 minutes. The average hospital stay was 2.5 days, ranging from 1 to 4 days. Follow-up surveillance was on outpatient clinic up to every week up to 4th week for early complications and later every month for 6 months to know late complications.

Early (within 4 weeks of postoperative) and late (More than 4 weeks post-operative) postoperative complications are shown in table 4. Out of the 100 patient's, the 13 patients developed urinary retention requiring catheterization, 04 patients developed ileus which resolved spontaneously by 3rd day, including 02 emergency patients. None of the patient developed seroma at umbilicus or discharge from suture site in follow-up for regular dressing as abdominal compression strapping from One ASIS to Other side ASIS was given for 10 days. One emergency case developed infection at umbilicus which was treated successfully with antibiotics. Late postoperative complication occurred in six patients, complaining of abdominal pain which resolved over 6 months without further treatment. No patients presented with chronic pain or recurrence over the follow-up period of more than six months to one year.

Table 4: Early and late postoperative complications

Complications		Non-Emergency cases	Emergency cases	Total
Early Complic-ations	Urinary retention	10	03	13
	Ileus	02	02	4
	Seroma	00	00	00
	Infection	00	01	01
Late Complic-ations	Chronic abdominal pain up to 6 months	04	02	06
	Chronic abdominal pain >6 months	00	00	00
	Recurrence	00	00	00

4. Discussion

The laparoscopic repair of umbilical hernia has gain popularity since last few years. The insertion of epigastric port by open method has much advantages than the Veress needle insertion, through the Palmer's point, to enter the abdomen and to create pneumoperitoneum[9], like no damage to any organ, unobstructed view, no hernia from port site, no clash with instrument from second port and if required from additional port.

The advantage of lateral port entering just above the descending colon (In this study) is that the Absorbable fixation device can be used very easily on the ipsilateral side of the mesh.

The mesh fixation was primarily done by sutures taken with 2-0 polypropylene at 4 corners of mesh and along with absorbable tackers [10,11].

The low recurrence rates are due to higher tensile holding strengths of Trans- abdominal sutures in comparison to trackers.[12] The use of trackers reduces operative time considerably while maintaining similar recurrence rates.[13] Recently, Mesh fixation with Fibrin Sealant, is associated with less acute postoperative pain, discomfort, than tackers or Trans- abdominal suture without compromising on the recurrence rate.[14] The studies shows, the laparoscopic approach have a recurrence rate of 10%.[15,16] Mechanisms of recurrence described in the literature, in decreasing order of frequency are infection, lateral detachment of the mesh, inadequate mesh fixation, inadequate overlap, missed hernias, increased intra-abdominal pressure, and trauma.[17]

In this study, Seroma formation is almost negligible (0%) due to abdominal strapping after dressing and the recurrence rate in follow up period is also almost negligible (0%). In the various trials, seroma was clinically apparent more than 8 weeks postoperatively, in 2.6% cases.[18] The incidences of seroma are higher where the mesh is fixed by single or double crown technique where the Hernial defect is not obliterated. The chronic postoperative abdominal pain could be due to sutures, as sutures penetrate through the full thickness of abdominal wall muscle and fascia, resulting in local muscle ischemia and pain postoperatively.[19] Cobb *et al*[20] has also proposed that intercostal nerves may become entrapped within the Trans-abdominal sutures causing chronic, persistent neuropathic pain. Series of repairs using transfascial sutures report persistent pain and discomfort in 1% to 6% of patients.[21] The oral anti-inflammatory medications or injections of a local anesthetic can alleviate the symptoms in the majority of cases.[22] Others have reported re-explorations for persistent pain, finding immediate relief after the release of a suture from the site of symptoms.[23]

The postoperative morbidity, like unrecognized enterotomy, wound infection, intraperitoneal abscess, bowel obstruction due to adhesion to mesh and respiratory failure, often increase the hospital stay and the cost of treatment, more seen in open technique as compared to laparoscopic repair.[24] In a recent series, laparoscopic umbilical hernia repair using a dual-layer polypropylene mesh and transfascial sutures significantly reduced surgical site infections, length of hospital stay, and costs as compared to open mesh repair.[25]

5. Conclusion

In the present study, modified 2 port technique was used and the umbilical defect was closed. PTFE mesh was placed intra abdominally and fixed to abdominal wall using trans-abdominal polypropylene sutures at 4 corners of mesh along with absorbable fixation device. This technique offers an efficient, safe, and effective repair with ideal outcome, low recurrence, and lesser complication of infection, no seroma formation, no chronic pain and short hospital stay with reduced cost of procedure.

References

[1]. Coste AH, Parmely JD. Umbilical Hernia. Stat Pearls [Internet] - NCBI Bookshelf.

[2]. Wright BE, Beckerman J, Cohen M, Cumming JK, and Rodriguez JL. Is laparoscopic umbilical hernia repair with mesh a reasonable alternative to conventional repair? *The American Journal of Surgery* 2002; 184(6):505–508.

[3]. Liberman MA, Rosenthal RJ, Phillips EH. Laparoscopic ventral and incisional hernia repair: a simplified method of mesh placement. *J Am Coll Surg* 2002; 194(1):93- 95.

[4]. Heniford BT, Park A, Ramshaw BJ, Voeller G. Laparoscopic ventral and incisional hernia repair in 407 patients. *J Am Coll Surg* 2000;190(6):645-650

[5]. Abir F, Eisenberg D, Bell, Laparoscopic ventral hernia repair using a two (5-mm) port technique, *JSLS* 2005;9(1): 94-96.

[6]. Mehrotra PK, Ramachandran CS, Arora V. Two port laparoscopic ventral hernia mesh repair: an innovative technical advancement. *Int J Surg* 2011; 9(1):79-82.

[7]. Abhishek V, Mallikarjuna MN and Shivaswamy BS. Laparoscopic Umbilical Hernia Repair: Technique Paper. *ISRN Minimally Invasive Surgery*, Volume 2012, Article ID 906405, 1-4 pages.

[8]. Carter JE. A new technique of fascial closure for laparoscopic incisions," *Journal of Laparoendoscopic Surgery* 1994; 4(2):143–148.

[9]. Palmer R. Safety in laparoscopy. *The Journal of Reproductive Medicine* 1974; 13(1):1–5.

[10]. Carter JE. A new technique of fascial closure for laparoscopic incisions. *Journal of Laparoendoscopic Surgery* 1994; 4(2):143–148.

[11]. Joels CS, Matthews BD, Austin CE *et al*. Evaluation of fixation strength and adhesion formation after ePTFE mesh placement with various fixation devices, Presented at SAGES Scientific Session, Denver, Colo, USA, April 2004.

[12]. Van't Riet M *et al*. Tensile strength of mesh fixation methods in laparoscopic incisional hernia repair. *Surgical Endoscopy* 2002; 16(12): 1713–1716.

[13]. Eid GM, Prince JM, Mattar SG, Hamad G, Ikrammudin S, and Schauer PR. Medium-term follow-up confirms the safety and durability of laparoscopic ventral hernia repair with PTFE. *Surgery* 2003; 134(4):599–603.

[14]. Wassenaar EB, Raymakers JT FJ, and Rakic S. Impact of the mesh fixation technique on operation time in laparoscopic repair of ventral hernias. *Hernia* 2008; 12(1):23–25.

[15]. Eriksen JR, Bisgaard T, Assaadzadeh S, Jorgensen LN, and Rosenberg J. Randomized clinical trial of fibrin sealant versus titanium tacks for mesh fixation in laparoscopic umbilical hernia repair. *British Journal of Surgery* 2011; 98(11); 1537–1545.

[16]. Heniford BT and Ramshaw BJ. Laparoscopic ventral hernia repair: a report of 100 consecutive cases. *Surgical Endoscopy* 2000; 14(5):419–423.

[17]. Toy FK, Bailey RW, Carey S *et al*. Prospective, multicenter study of laparoscopic ventral hernioplasty: preliminary results. *Surgical Endoscopy* 1998; 12(7):955–959.

[18]. Awad ZT, Puri V, LeBlanc K *et al*. Mechanisms of ventral hernia recurrence after mesh repair and a new proposed classification. *Journal of the American College of Surgeons* 2005; 201(1):132–140.

[19]. LeBlanc KA, Whitaker JM, Bellanger DE, and Rhynes VK. Laparoscopic incisional and ventral hernioplasty: lessons learned from 200 patients. *Hernia* 2003; 7(3):118–124.

[20]. Cobb WS, Kercher KW, and Heniford BT. Laparoscopic repair of incisional hernias. *Surgical Clinics of North America* 2005; 85(1); 91–103.

[21]. Gillian GK, Geis WP, and Grover G. Laparoscopic incisional and ventral hernia repair (LIVH): an evolving outpatient technique. *Journal of the Society of Laparoendoscopic Surgeons* 2002; 6(4):315–322.

[22]. Heniford BT, Park A, Ramshaw BJ, and Voeller G. Laparoscopic repair of ventral hernias: nine years' experience with 850 consecutive hernias. *Annals of Surgery* 2003; 238(3): 391–400.

[23]. Carbonell AM, Harold KL, Mahmutovic AJ *et al*. Local injection for the treatment of suture site pain after laparoscopic ventral hernia repair. *American Surgeon* 2003; 69(8):688–691.

[24]. Theodoropoulou K, Lethaby D, Hill J, Gupta S, and Bradpiece H. Laparoscopic hernia repair: a two-port technique. *Journal of the Society of Laparoendoscopic Surgeons* 2010; 14(1):103–105.

[25]. McGreevy JM, Goodney PP, Birkmeyer CM, Finlayson SR, Laycock WS, and Birkmeyer JD. A prospective study comparing the complication rates between laparoscopic and open ventral hernia repairs," *Surgical Endoscopy* 2003; 17(11)1778–1780.