

A Prospective Clinical Evaluation of Laparoscopic Repair of Incisional Herniae

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A postoperative ventral abdominal wall hernia, more commonly termed incisional hernia, is the result of a failure of fascial tissues to heal and close following laparotomy. With an incidence of 2-11%¹⁻³, incisional herniae are the most common late postoperative complications following abdominal surgical procedures.

The management of patients with incisional hernia continues to test the skill and judgement of the gastrointestinal surgeons. The standard open approach to incisional hernia repair has produced unsatisfactory outcomes. The only randomized clinical trial to produce reliable data on the outcomes of open incisional hernia repair reported a recurrence rate of 43% for sutured repair and 24% for mesh repair of small abdominal wall herniae⁴. The disappointing results underscore

the important dilemma currently facing general surgeons. With the excessive morbidity, long hospital stay and unacceptable high recurrence rates that plague the traditional open approach to incisional hernia, an alternative solution is required⁵.

LeBlanc and Booth first described the laparoscopic repair of incisional hernia in 1993⁶. The laparoscopic intraperitoneal onlay mesh (IPOM) technique and mesh materials were developed further in subsequent years, and there have been numerous reports on successful use of the IPOM technique even for extremely large hernial openings, morbidly obese patients and in elderly patients^{7,8,9,10}. The reduced surgical trauma and low rates of infection and recurrence are key advantages of the minimally invasive repair¹¹.

In a laparoscopic intraperitoneal mesh repair, it is unnecessary to separate the layers of the abdominal wall. This results in less abdominal wall trauma and a lower incidence of wound related morbidity. It is essential to perform a careful and complete laparoscopic adhesiolysis prior to mesh implantation. A possible bowel lesion is an important decision making criterion for further operative management¹².

Another advantage of IPOM technique is that it bypasses the original operative field and thus avoids contact with old foreign material and any persistent micro-organism that may be present^{13,14}. The placement of a large mesh with adequate overlap of the defect is also facilitated.

Keeping in view the above facts, a prospective study of laparoscopic repair of incisional hernia was taken up in the Postgraduate Department of Surgery, Government Medical College, Srinagar with the aim to evaluate the feasibility of this procedure and to offer the benefits of minimally invasive surgery to our patients. It is a whole new experience to treat patients of incisional hernia laparoscopically.

MATERIALS AND METHODS

This study was a prospective study and comprised of patients admitted for elective surgery for incisional hernia in our ward of SMHS hospital, Srinagar between July 2008 to November 2010. 30 patients who underwent laparoscopic incisional hernia repair were included in the study. The patients were selected unbiased from either sex, with age above 18 years and were evaluated on the basis of pre-determined proforma. High risk patients (ASA III or IV), patients with coagulation disorders, patients with massive hernial defects, complicated hernias and patients with intra-abdominal sepsis were excluded from the study.

The patients were initially evaluated in the OPD and then admitted for surgery. On admission detailed history was taken from the patients. Detailed physical examination was done to demarcate the extent and location of hernia and to rule out any strangulation, etc. Routine base line investigations like full blood count, blood glucose level, KFT, LFT, serum electrolytes, chest X-ray, ECG,urinalysis and an abdominal ultrasound were done in all patients.

Thirty (30) patients were included in this study after evaluating them for inclusion and exclusion criteria.

The procedures were done as elective surgeries. Each patient and his/her attendants were fully explained about the nature of laparoscopic repair in the language which they understood and written consent was taken from the patient before surgery.

OPERATIVE THECHNIQUE

All cases were done under general anaesthesia with patient supine and arms at the side of the patient. Patients were asked to void just before entering the operating room and some patients particularly with lower abdomen herniae were

catheterized before needle insertion. Gastric decompression was done using a Ryle's tube. One dose of prophylactic antibiotic was administered preoperatively. An angled 30° laparoscope of 10mm or 12mm was preferably used.

Pneumoperitoneum was usually created using a Veress needle in the subcostal region. Three trocars were placed very laterally on the anterior axillary line. Positioning of the surgeon and trocars were dependent on the localization of the hernia. Complete adhesiolysis of the anterior abdominal wall was performed. Care was taken to avoid accidental enterotomy. Adhesiolysis was performed with careful sharp dissection and electrocautery. The content of the hernia sac was completely reduced with the peritoneal sac left in place.

After completion of the adhesiolysis, the fascial defect was measured. A prosthetic mesh was tailored to overlap the defect by atleast 3cm. A composite mesh was used in all cases as an intraperitoneal onlay mesh. Four non-absorbable sutures were placed extracorporally at the cardinal points of the mesh, marked on the skin and on the prosthesis. The mesh was introduced in the abdomen and unrolled. The sutures at the cardinal points were pulled transabdominally and knotted in prefascial levels. Additional transfascial sutures were then placed using a suture passer instrument. A compressive bandage was applied depending on the size of the hernia.

Postoperative Care

After the operation, patients were shifted to ward and monitored. For the immediate postoperative relief injectable diclofenac sodium 50mg intramuscular was used. Later oral diclofenac 50mg was used. Patients were made ambulatory on the same day of operation. Orals were usually started on the same day of surgery. Patients were usually discharged from the hospital on 1st or 2nd postoperative day. After discharge patients

were called for follow up. At 1 week, 2 weeks, 4 weeks, 3 months and 6 monthly thereafter.

RESULTS

This prospective study consisted of 30 patients. Age range of patients was 25 to 62 years with an average age of 53.33 years. There were 9 males and 21 females. All patients underwent laparoscopic incisional hernia repair. Intraperitoneal onlay mesh placement technique was used in all patients. Most common location of hernia was central (46.66%), followed by lower midline (23.33%) and least frequent was lateral left quadrant hernia (6.66%). The defect size ranged from 20cm² to 306cm² with mean defect size of 117.57cm². Size of the prosthetic mesh used varied from 110cm² to 552cm² with a mean mesh size of 275.43cm². Conversion to open surgery was needed in 1 (3.33%) patients and the reason for conversion was iatrogenic enterotomy during dissection of adhesions. Operating time ranged from 47 to 209 minutes with an average of 118.03 minutes. The complication rate in our series was low. Over all complication rate was 10%. One (3.33%) patient had an accidental enterotomy. The patient needed conversion to an open procedure, gut injury was closed and the hernia was repaired successfully using an open approach. There was 1 (3.33%) accidental bladder injury which was closed laparoscopically and the procedure was completed. Seroma formation occurred in 1 (3.33%) patients which resolved with conservative treatment. There was no other complication.

No patient complained of chronic pain.

Hospital stay ranged from 2 to 4 days with an average of 2.17 days.

Time to return to work ranged from 2 to 3 weeks with an average of 2.03 weeks. Laparoscopic incisional hernia repair had a definite cosmetic advantage.

Laparoscopic incisional hernia repair was found to be overall cost-effective.

Recurrence was not seen in any patient.

DISCUSSION

The laparoscopic approach for treating ventral and incisional herniae has become increasingly popular during the last decade. The technique is based on the same surgical principles as the open underlay proposed by Stoppa, Rives and Wantz, which entails the placement of a large piece of mesh above the posterior rectus sheath. Indeed, in the laparoscopic approach the prosthesis is placed one layer deeper and precisely, internal to the posterior rectus sheath, directly onto the peritoneum of the anterior abdominal wall. However, other fundamental surgical principles of the open technique, such as wide mesh overlap of the hernial defect and fixation of prosthesis, are maintained.

Although few prospective randomized clinical trials comparing laparoscopic and open incisional hernia repairs have been conducted non-randomised studies have clearly shown that the laparoscopic procedure present many advantages over open hernia repair. In particular, the minimally invasive approach eliminates the need for extensive tissue dissection necessary to achieve adequate mesh overlap, reducing the wound related complications. Another advantage of the laparoscopic approach is the identification of small fascial defects known as “Swiss cheese defects”, that could be missed in an open approach and predispose to an incisional hernia recurrence. Finally the laparoscopic approach is associated with a lower mean hospital stay, quick recovery of the patients and reduced recurrence rates.

This prospective study consisted of 30 patients. The minimum age in our study was 25 years and maximum age was 62 years with a mean age of 53.33 years whereas other studies

have reported mean ages of 56 and 52 years^{15,16}. As regards type of incisional hernia with respect to its locations, the most common hernia site in our study was central (46.66%) followed by those located in lower midline (23.33%) lateral right quadrant (13.33%) upper midline (10%) and lateral left quadrant (6.66%). Other studies have reported similar observations¹⁵. As regards size of the hernia defect, the mean defect size in our study as measured at operation was 117.57cm² with range of defect being 20cm² to 306cm² ^{15,17}. Studies with mean defect size of 116.9cm² and 123.9 cm² have been reported. As regards the mesh size used, in our study it ranged from 110cm² to 552cm² with a mean mesh size of 275.43cm². The basic principal of incisional hernia repair is to have a mesh overlap of 3-5cm on all sides. This is achieved accurately with laparoscopic method. Other studies have reported similar mesh sizes being used^{15, 18}. In our study one patient needed conversion, rate of conversion being 3.33%. Reason for conversion was accidental enterotomy during dissection of adhesions between abdominal wall and small intestine. Other studies have shown conversion rates comparable to our study^{19,20}. A formal laparotomy was done in this patient to look for any other injury. There was a single ileal perforation that was repaired. Mesh hernioplasty was completed using the open approach. There is a debate in world literature whether to proceed with prosthetic repair in such a case. One school of thought is that the size of inoculum is too small to infect the prosthetic patch. In our case, there was no visible peritoneal contamination and additionally the repair was completed with an open approach. Till the completion of this study the patient did not develop any complication or recurrence. As regards operating time, the range of operating time in our study was 47-209 minutes with mean operating time being 118.03 minutes In one patient in our study operating time was 200 minutes because of a an accidental bladder injury while as another patient had an operating time

of 209 minutes because of a large defect size and extensive adhesions. The results of operating time shown by **Fabrizio Ferranti et al**¹⁵, **H Lau et al**²¹ and **B. Todd Heniford et al**¹⁹ are comparable to our study. The overall rate of complication in our study was 10%; of which two were major complications and one minor complication. Other studies have shown complication rates which are more or less consistent with results of our study^{22, 23}. One patient (3.33%) had a persistent seroma. Seroma formation is one of the commonest complications of this procedure. Patient was treated conservatively and seroma resolved without any intervention. The rate of seroma formation in our study is comparable to that shown by **Rooh-Ul-Muqim et al**²⁴ (3.20%) and **B. Todd Heniford**¹⁹ (2.6%) in their studies.

One patient (3.33%) in our study group had bladder injury during the procedure because the hernia was low midline and there were extensive adhesion. Bladder injury was repaired laparoscopically, procedure was completed and patient was put on indwelling catheter for three weeks.

Till the completion of this study, patient had no complication or recurrence. Bladder injury during laparoscopic incisional hernia repair has been mentioned in literature as reported by **Brandon Varnell et al**²⁵ (2.12%) and **B. Todd Heniford et al**¹⁹ (0.12%) in their studies.

One patient (3.33%) in our study group had iatrogenic enterotomy during the procedure. Procedure was converted to an open approach. Peritoneal cavity was thoroughly examined for any other injury, Gut perforation was repaired. Mesh hernioplasty was completed using an open approach. Till the completion of this study patient had no complication or recurrence. Others have shown results comparable to our study^{15,17}. Enterotomy is one of the dreaded complications of this procedure. Literature notes that rate of enterotomies is decreasing as surgeons are getting more familiar with this procedure. None of the patients in our study group had any

major vascular injury or developed haematoma. There was no other complications noted in our study group. Complications like port site infection, urinary retention, bowel obstruction fistula, infection of mesh etc. have been mentioned in literature. None of the patients in our study group complained of prolonged suture site pain. Our results are comparable to those shown by **Ben- Haim et al**²⁶ (0%) and **Chowbey et al**²⁷ (0%) in their studies. **Hernia Recurrence**, the most important factor by which a hernia surgery is assessed was not seen in any of our patients till November 2010. Chronic pain, an important feature of herniorrhaphy was not seen in any of the patient. Our findings as well as of others show that this repair has got excellent results as far as recurrence is concerned^{28,29}. With the laparoscopic approach a wide mesh overlap of the defect is possible, small additional defects are identified and wound related morbidity is low, consequently recurrence rate with this procedure is low as compared to other methods of repair. The minimum hospital stay in our study was 2 days and 86.66% patients had a postoperative hospital stay of 2 days with a mean of 2.17days. Others have shown results comparable to our study^{24,30}. The minimum time to return to work in our study was 2 weeks and the maximum time to return to work in our study was 3 weeks with a mean of 2.03 weeks. The results of other studies and results of our study are comparable²⁴. In our cases, cosmesis were assessed by total size of port site scars. All patients got one 10mm scar and two 5mm which were hardly visible after healing. Cosmesis is a definite advantage of laparoscopy.

M.C. Misra et al³¹ and **Hung Lau et al**³² in their studies concluded that laparoscopic incisional hernia repair offers a definite cosmetic benefit. Cost-effectiveness was assessed by the cost of mesh and tackers, cost of anaesthesia, hospital stay and time to return to work. Since in our series tackers were not used due to price constraints, although tackers are quick and easy to use, hospital stay was short and time to

return to work was early, it proved to be a cost-effective procedure. Many studies like our study also noted that laparoscopic incisional hernia repair is an overall cost-effective procedure^{33,34}.

CONCLUSION

Laparoscopy is safe and effective in the management of incisional hernia. Laparoscopy does not compromise the basic principles of surgery for incisional hernia and provides all advantages of minimal access surgery. The results of present study and published literature support the view that the complication rate and recurrence rate can be significantly reduced by using the laparoscopic technique.

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