

# Short-term Results of Laparoscopic Transabdominal Preperitoneal Inguinal Hernioplasty in a Developing Country

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## ABSTRACT

**Introduction:** Inguinal hernias have plagued mankind for its upright gait since evolution. Around 16% of the patients presenting to surgery outpatient department have inguinal hernias. Various procedures like the use of patients' own tissues or prosthetic meshes have been used in the past to repair inguinal hernia with varying degrees of success. Laparoscopic hernioplasty is the latest technique with several advantages over open procedures like reduced postoperative pain and shorter recovery period. However, steeper learning curve and cost of the procedure have been cited as limiting factor.

**Aim:** To study the outcome of laparoscopic transabdominal preperitoneal (TAPP) inguinal hernia repair in terms of operating time, postoperative pain, wound complications, and recurrence.

**Materials and methods:** This is an analysis of patients that underwent TAPP inguinal hernia repair, from January 2013 to May 2015. Case records of 90 patients between 18 and 60 years that underwent TAPP by a single surgical team were followed prospectively. Data regarding operative time, complications, immediate postoperative pain, chronic groin pain, recurrence, and sensory disturbance were recorded and evaluated.

**Results:** All the patients were males aged from 18 to 60 years. Mean operative time was 60 minutes (40–120 minutes). Postoperative pain as assessed by visual analog scale (VAS) 6 hours after has been low (mean: 2). Chronic pain occurred in 2 patients (2.22%), but that has not affected routine work or mobility.

**Conclusion:** Short-term results of TAPP hernia repair using mesh demonstrated to be an effective and safe procedure with low prevalence of chronic pain that was generally of a mild, infrequent nature. Intraoperative bleeding and use of postoperative analgesia were considerably less. There was no incidence of early recurrence. Learning curve is not so steep as claimed, and considering advantages, the cost of the procedure should not be a limiting factor even in a developing country.

**Keywords:** Laparoscopic hernia repair, Lichtenstein hernioplasty, Stoppa repair, Total extraperitoneal hernioplasty, Transabdominal preperitoneal hernioplasty.

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**Conflict of interest:** None

## INTRODUCTION

Inguinal hernia repair is the most frequently performed operation in general surgery. The standard method for inguinal hernia repair had changed until the introduction of mesh and minimal access laparoscopic technique. The concept of hernia repair underwent evolution from Bassini's repair to Lichtenstein tension-free repair with the introduction of polyethylene mesh.<sup>1</sup> Prosthetic biomaterials have been combined to form composite mesh in order to minimize the undesirable side effects. Mesh placement can be achieved by both open and laparoscopic techniques.<sup>2</sup> There are two main approaches for the laparoscopic repair of inguinal hernia.<sup>3</sup>

Transabdominal preperitoneal repair involves access to the hernia through the peritoneal cavity. Mesh is placed in the preperitoneal space, after incising and dissecting parietal peritoneum. Total extraperitoneal (TEP) repair is the newer laparoscopic technique, in which preperitoneal is created without entering the peritoneal cavity. This TEP repair is technically more difficult than the TAPP technique, but it may reduce the risk of damage to intraabdominal organs.

The potential benefits of using a laparoscopic approach include reduced postoperative pain, earlier return to normal activities, and a reduction in long-term pain and numbness. The repair of bilateral hernias (including occult hernias detected during contralateral inspection at the time of a unilateral repair) may be undertaken during the same operation. Laparoscopic surgery is associated with additional costs, for the endoscopy system (video unit, monitor, endoscope, and CO<sub>2</sub> insufflator) and instruments (staplers, diathermy scissors, or ports), although these may be reusable.

Today, inguinal hernia repair is one of the most commonly performed general surgical procedures in the USA, accounting for 10 to 15% of all operations.<sup>3,4</sup> These

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numbers are largely attributed to the high incidence of the disease, which carries a lifetime risk of approximately 27% for men and 3% for women.<sup>5,6</sup> Considering the socio-economic impact of inguinal hernia repair, we discuss the advantages and disadvantages of TAPP laparoscopic inguinal hernia repair.<sup>7</sup>

**AIM**

The aim of the article is to study the outcome of laparoscopic TAPP inguinal hernia repair in terms of operating time, postoperative pain, wound complications, and recurrence.

**MATERIALS AND METHODS**

This is an analysis of patients that underwent TAPP inguinal hernia repair, from January 2013 to May 2015. Case records of 90 patients between 18 and 60 years that underwent TAPP by a single surgical team were followed prospectively. Data about operative time, intraoperative complications, immediate postoperative pain, chronic groin pain, recurrence, sensory disturbance, and limitation of activity were collected and compared.

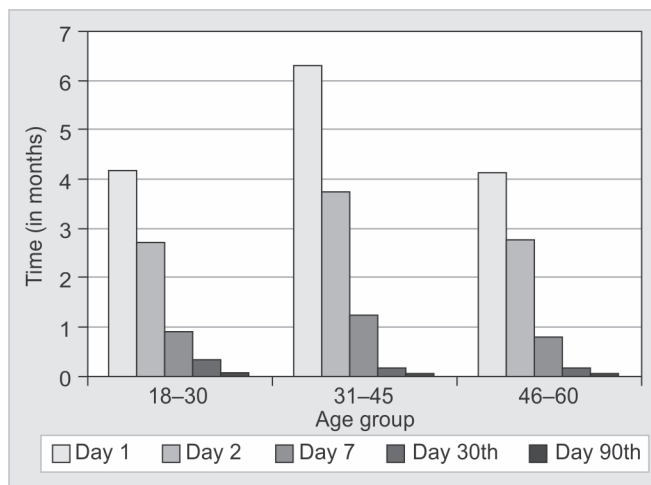
**RESULTS**

During initial learning period, we have included patients between 18 and 60 years of age under American Society of Anesthesiologist (ASA) grade I (Table 1). Mean operative time was 60 minutes (40–120 minutes). Postoperative pain as assessed by VAS 6 hours after has been low (mean: 2; Graph 1). Chronic pain occurred in 2 patients (2.22%), but that has not affected routine work or mobility; 98% of patients were satisfied with their repair and resumed their work on 14th or 15th postoperative day (Graph 2). No incidence of wound infection, seroma formation, or recurrence has been reported so far. In the beginning, we chose an arbitrary age limit. However, now we are

**Table 1:** Distribution of site and type of hernia

Age group	Site		Type	
	Right	Left	Direct	Indirect
18–30	13	8	4	17
31–45	20	14	14	20
46–60	19	16	22	13
Total	52	38	40	50

Right side inguinal hernia is more common than left side; Indirect hernia is more common in younger age group than direct hernia which is more common in older age group

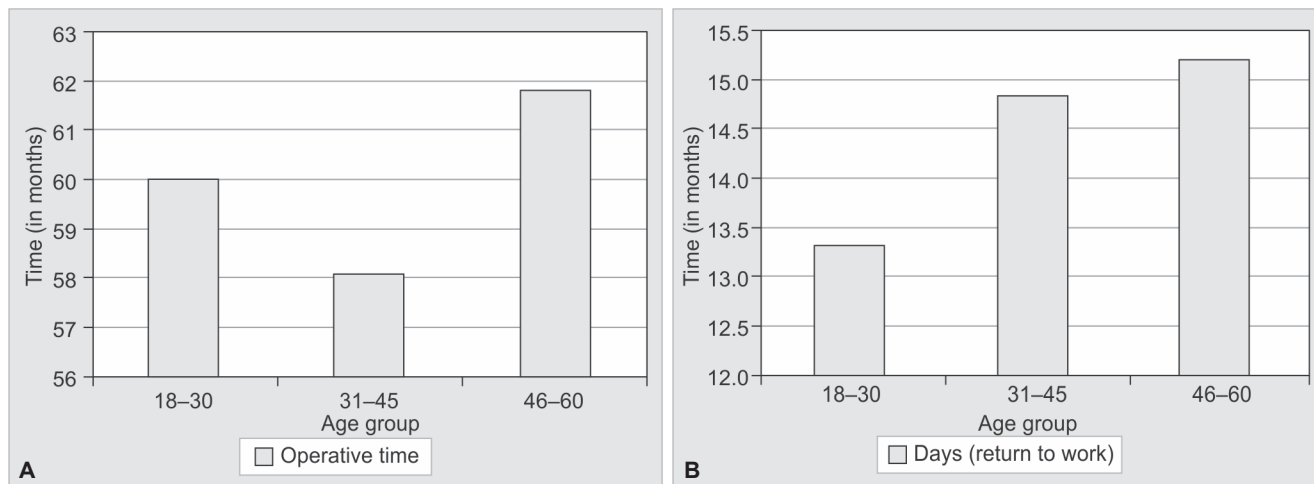


**Graph 1:** Postoperative pain (mean)

offering this modality to even patients aged 75 years old and above, accepted under ASA grades I and II. Average cost of the mesh and fixation material per procedure is approximately 15,000 INR, which is less than the Central Government Health Scheme rate.

**REVIEW OF LITERATURE**

Anatomical understanding of inguinal canal anatomy increased through the work of Camper, Scarpa, Cooper, Hassel Bach, and Hunter. Edoardo Bassini reported first



**Graph 2:** Operative time and return to work (days)

successful reconstruction of the inguinal floor. Then, in the late 20th century, the tension-free repair, introduced by Irving Lichtenstein, caused a dramatic drop in recurrence rates and became the procedure of choice.<sup>8,9</sup> However, the introduction of a laparoscopic technique in the early 1990s started a new debate over the best method of inguinal hernia repair.

Recurrence is the most important indicator of the success of a hernia procedure, which may occur in 15% of the cases or more. The frequency of hernia recurrence depends on many factors including the type of hernia repair, the comorbidities of the patient, and the experience of operating surgeon itself. Cochrane Database Systematic Review (2003) reported 86 recurrences among 3,138 patients who underwent laparoscopic repair and 109 among 3,504 patients who underwent open repair.<sup>10,11</sup> A separate meta-analysis published in the British Journal of Surgery in 2000 reported similar findings in that overall recurrences did not differ between the laparoscopic and open groups.<sup>12</sup> There is, however, some evidence in the literature demonstrating increased recurrences with laparoscopic repair. Neumayer et al,<sup>13</sup> in a randomized controlled study, found that laparoscopic repair resulted in significantly more recurrences at 2 years (10.1 vs 4.9%) and was associated with more complications (39 vs 33.4%) including life-threatening complications (1.1 vs 0.1%). Surgeons who have performed a high volume of hernia operations appear to have better results.<sup>13</sup> In an article published in the *Lancet*, all seven hernia recurrences occurred in the laparoscopic group, while there were no recurrences in the open repair group (1.9 vs 0.0%).<sup>14</sup> The largest reviews of inguinal hernia repairs suggest no apparent difference in recurrence between laparoscopic and open mesh methods of hernia repair. However, there are some evidences in the literature demonstrating increased recurrences with laparoscopic repair. In 2004, Neumayer et al.<sup>13</sup> found in a randomized, controlled study that laparoscopic repair resulted in significantly more recurrences at 2 years (10.1 vs 4.9%) and was associated with more complications (39 vs 33.4%) including more life-threatening complications (1.1 vs 0.1%). In another study published in the *Lancet*, all seven hernia recurrences occurred in the laparoscopic group, while there were no recurrences in the open repair group. When treating recurrent hernias laparoscopic repair of inguinal hernias was found to have a similar recurrence to open repair (10.0 vs 14.1%).<sup>15,16</sup> The laparoscopic approach to inguinal hernia repair is also associated with a steeper learning curve, probably due to the increased complexity and technical difficulty of the surgery. Surgeons who had performed more than 250 laparoscopic repairs had half

**Table 2:** Comparative data of various studies

Study	Duration of surgery	Complication	Return to work	Recurrence
Hamaza et al <sup>18</sup>	77.4 min.	25.0%	14.87 days	4%
Leibl et al <sup>19</sup>	66.0 min.			
Felix et al <sup>20</sup>		0.78%	16 days	
Master of surgery		10.7%		2%
Swanstorm et al <sup>21</sup>	92 min.			2%
Our study	60.0 min.	0.00%	14.63	0%

the rate of recurrence of surgeons who had performed fewer repairs.

Surgeons who have performed a high volume of hernia operations appear to have better results in terms of recurrence and operation time. Cochrane Database Systematic Review in 2003 demonstrated that the duration of operation was longer in the laparoscopic groups with mean difference 14.81 minutes. An article published in the British Journal of Surgery described a similar increase of 15.2 minutes with laparoscopic inguinal hernia repair.<sup>17</sup> With regard to operation length, most evidence in the literature points to a shorter operation duration with open repair (Table 2)<sup>18-21</sup>.

Postoperative pain is an important consideration when choosing between laparoscopic and open repair of inguinal hernias. Laparoscopic repair has been associated with less postoperative pain than open repair. Cochrane Database Systematic Review (2003) demonstrated less persisting pain (overall 290/2,101 vs 459/2,399), and incidences of numbness were less (overall 102/1,419 vs 217/1,624) in the laparoscopic groups. Similarly, another meta-analysis study from the EU Hernia Trialists Collaboration reported decreased postoperative pain with the employment of laparoscopic methods.<sup>22</sup> Bignell et al<sup>23</sup> reported a similar higher incidence in chronic groin pain in open vs laparoscopic inguinal hernia repair. However, the decrease in chronic groin pain with laparoscopic repair reported in this study did not translate into a significant improvement in the quality of life.

Another variable, i.e., used as a primary outcome in numerous studies comparing laparoscopic and open techniques is time to return to work. There is a consensus in the literature that patients who undergo laparoscopic inguinal hernia repair return to work and normal activities earlier than those with open repair. An earlier return to work and resumption of normal activity is associated with an earlier discharge from the hospital and fewer postoperative complications, both of which are associated with laparoscopic hernia repair. Liem et al reported that patients following laparoscopic inguinal hernia repair

resumed normal daily activity 4 days earlier and returned to work 7 days earlier than open repair. Patients with laparoscopic repair resumed athletic activities 12 days earlier than those who had open repair. Thus, a patient's work profile can play a role in the decision for laparoscopic or open inguinal hernia repair.<sup>24-26</sup>

## CONCLUSION

Short-term results of TAPP hernia repair using mesh demonstrated to be an effective and safe procedure with low prevalence of chronic pain that was generally of a mild, infrequent nature. Intraoperative bleeding and use of postoperative analgesia were considerably less. There was less occupational limitation, no recurrence, and high satisfaction rate. This modality can be offered to even patients more than 75 years old under ASA grades I and II. Learning curve is not so steep as claimed, and considering advantages, the cost of the procedure should not be a limiting factor even in a developing country.

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