

# Ambulatory Total Extraperitoneal Inguinal Hernia Repair: Feasibility and Impact on Quality of Life

Ashwin A. Kallianpur, MS, Rajinder Parshad, MS, Maya Dehran, MD, Priya Hazrah, MS

## ABSTRACT

**Background and Objectives:** Feasibility of ambulatory laparoscopic inguinal hernia repair in developing countries is not known due to lack of dedicated outpatient centers. This study prospectively evaluated the feasibility of outpatient discharge after laparoscopic total extraperitoneal inguinal hernia repair done in combination with in-hospital services and its impact on quality of life.

**Methods:** Forty patients were studied who had uncomplicated inguinal hernias and fulfilled the selection criteria. Quality of life was evaluated by using the SF-12 questionnaire.

**Results:** Ninety percent of patients could be discharged as outpatients. Four patients required admission. No major complications or readmissions occurred. Physical components of quality of life deteriorated in the immediate post-operative period but improved to above preoperative levels within one month. A transient deterioration in subgroups of the mental health component was observed, which recovered to normal in less than a week. There was no significant alteration in the emotional component. There has been no recurrence at a median follow-up of 25 months.

**Conclusion:** It was feasible to safely perform outpatient TEP in combination with routine in-hospital services without increasing complications or causing any adverse impact on quality of life. This was possible subject to adherence to proper selection and discharge criteria.

**Key Words:** Hernia, Laparoscopy, Quality of life, Outpatient, Ambulatory, TEP.

## INTRODUCTION

The extraperitoneal laparoscopic hernia repair, a technically demanding procedure with a recognized learning curve, has a number of cited advantages. Reduced post-operative pain, unimpaired muscle strength, early recovery, and a small scar are the principal advantages proffered by the procedure. However, these attractive attributes are largely overshadowed by certain disadvantages, prominent amongst which are the cost of the procedure largely related to the cost of a stapler, the need for general anaesthesia and in-hospital admission, and the rare though increased risk of serious complications in inexperienced hands.<sup>1-6</sup>

An increase in the trend of traditional inpatient laparoscopic total extraperitoneal inguinal hernia repair being performed as outpatient surgery has been reported in the Western literature.<sup>7-14</sup> Universal extrapolation of the published Western experience to developing countries is potentially dangerous in the absence of dedicated outpatient centers, low literacy rates, lack of adequate transportation and communication systems, and the absence of community nursing, which prevent the successful introduction of major surgeries into outpatient settings. Moreover, few reports exist on the quality of life of patients in the first few days after outpatient discharge following laparoscopic hernia repair, which is essentially the vulnerable period.

In an earlier study,<sup>15</sup> we found the unstapled technique of laparoscopic herniorrhaphy to be a suitable alternative to stapled repair for uncomplicated unilateral hernias. The present study evaluates the feasibility of integrating outpatient TEP in routine surgical practice and its impact on the quality of life of these patients.

## METHODS

Between June 2003 and April 2005, 40 patients with inguinal hernias who fulfilled the eligibility criteria and consented were prospectively enrolled in the study. Patients >20 years of age, with ASA grade 1&2, body mass index <25, good exercise tolerance, and well-controlled hypertension/diabetes with no history of angina, myocardial infarction, transient ischemic attack, or cerebral vas-

Department of Surgery, All India Institute of Medical Sciences, New Delhi, India, (Drs Kallianpur, Prashad, Hazrah).

Department of Anesthesiology, All India Institute of Medical Sciences, New Delhi, India, (Dr Maya).

Address reprint requests to: Rajinder Parshad, MS, Additional Professor, Department of Surgical Disciplines, All India Institute of Medical Sciences, New Delhi, 110029, India. Telephone: 91 11 26593462, Fax: 91 11 26588663/26588641, E-mail: rparshad@yahoo.com

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cular accident in the past and with ready access to a hospital after discharge (preferably <20 km if not having a good personal conveyance facility) were considered eligible. Patients with recurrent hernia, complicated or irreducible hernia, those with any chronic illness, and those contraindicated for general anesthesia were excluded from the study. Initially, bilateral hernias were excluded, but towards the latter part of the study an attempt was made in 3 patients. Contact addresses and phone numbers of all patients were recorded.

All patients underwent laparoscopic total extraperitoneal inguinal hernia repair under general anesthesia. We used reusable trocars and instruments in all cases. Three working ports were used. An initial 10-mm port was placed just below the umbilicus by using an open technique. The port was placed in front of the posterior rectus sheath after creating the preperitoneal space by using an indigenously designed balloon dissector. Two fingers of a size-8 glove were cut and mounted on either a red rubber or a suction catheter as an alternative to a balloon dissector. This was filled with 150mL to 200mL of saline to create the initial preperitoneal space. A zero-degree 10-mm telescope introduced through this port was used to perform further dissection supplemented by instruments inserted through 2 additional 5-mm ports. It should be noted that with experience it is possible to create a preperitoneal space without the balloon dissector. A polypropylene mesh of 15x11-cm to 15x13-cm in size, depending on the patient's body habitus, was introduced and unrolled in the preperitoneal space after dissection and reduction or ligation of the hernial sac. The mesh was positioned to cover the entire myopectineal orifice from the symphysis pubis in the midline to the anterior superior iliac spine laterally. In patients with bilateral hernias, 2 pieces of mesh, one on each side overlapping in the midline, were used. The use of staplers was restricted to only 5 patients, and no tackers or staplers were used in remaining 35 patients. The use of reusable trocars and instruments, unstapled TEP repair, and indigenous balloon dissector was mainly implemented to minimize cost.

A patient who could be discharged on the same day after a short period of observation without requiring hospital admission was considered to have fulfilled the criteria of outpatient discharge. Modified postanesthesia discharge score<sup>16</sup> was used to assess the suitability for discharge after outpatient surgery. The patient was assessed at the time of discharge by both the anesthesiologist and the surgeon and discharged only after the consent of both. Quality of life was evaluated preoperatively and on postoperative days 1, 3, 7, and 28 by using the SF-12 questionnaire. Visual analogue score and analgesic intake were also assessed postopera-

tively. Exercise tolerance specific to lower abdominal musculature viz. straight leg raising test and curled sit-ups were compared pre- and postoperatively. Any complications related to the procedure were noted. Return to work was assessed as return to indoor activity, return to outdoor activity, and return to the workplace. A telephone follow-up system in which the status was inquired either by the attending doctor or reported to the doctor by the patients themselves was used to assess postoperative recovery in the first few days after surgery with subsequent clinic visits at 1 week, 1 month, and 3 to 6 months thereafter. Statistical analysis was done using the repeated measures test.

## RESULTS

Forty patients with 43 hernias underwent laparoscopic total extraperitoneal repair without any conversions. The unstapled technique of repair was used in 35 patients, and the mesh was stapled in the remaining 5, the decision being based on the type of hernia and the patient's choice. Thirty-six (90%) patients were discharged on the same day. Four patients required admission: retention of urine (2), prolonged surgery (1), and social reasons (1). Three were discharged within 24 hours, and one of the patients who required admission for urinary retention was discharged in 48 hours. Three patients had bilateral hernias; two of whom were discharged as outpatients and one within 48 hours. There were no readmissions.

All patients could be contacted by telephone for evaluation of quality of life in the immediate postoperative period and also for assessment of any possible complications. Further, they complied with recommended clinic follow-up for one month in the postoperative period. Thereafter, one patient was lost to follow-up, ie, after 1 month and 2 others after 6 months. One patient was diagnosed with esophageal cancer in the follow-up period and expired within 13 months. At a median follow-up of 25 months, no recurrence has been noted.

The mean visual analogue pain score on the day of discharge was  $2.88 \pm 1.42$ . All patients were given round-the-clock NSAIDs for 2 days. Thereafter, most (94%) required only occasional NSAIDs up to 5 days, and none required opioids. Ten percent of the patients in our study did not require analgesia after postoperative day 2. The median return to activity inside the home, outdoor activities, and work were 1, 2, and 14 days postoperatively, respectively. Ninety-seven percent (97%) of our patients could resume normal outdoor activities within a week. No serious intraoperative or postoperative complications occurred. Peritoneal tears occurred in 4 patients (3 unilateral and 1

bilateral case) but none required conversion to TAPP or an open procedure. Seroma was detected in 5 patients; 4 patients had small seromas that resolved on conservative management and only one required repeated aspirations.

The quality of life of patients deteriorated transiently with recovery of all physical components within one month and the mental component within one week. **Tables 1 and 2** show the mean comparative scores of the various components of quality of life in the preoperative and postoperative periods. All physical components of quality of life decreased in the immediate postoperative period with the role of physical and general health components returning to baseline values within a week. Physical functioning and bodily pain returned to normal by one month. The postoperative scores of general health and the role of physical components improved over preoperative baseline values by day 28 with a

significant improvement seen in the former. In the immediate postoperative period, a lower deterioration was observed in the mental health components other than vitality and the values recovered in the first 3 days. The mental health score was the only quality of life score that did not change significantly after the operation.

**DISCUSSION**

Open hernia repair is routinely performed as an outpatient procedure, but many patients are denied the benefits of laparoscopic repair, which is usually done as an inpatient procedure due to unavailability of beds. An outpatient discharge circumvents an indoor admission in our situation where it is difficult to prioritize admission for routine hernia surgery against other more serious diseases

**Table 1.**

Comparison of The Mean Preoperative and Postoperative Scores of the Physical Component of Quality of Life and Significance

Quality of Life	Day of Evaluation	Mean Score	SD	Significance Compared With Preop Values
Physical Functioning	Preop	88.8889	19.3136	
	Day 1	58.3333	22.3607	0.000
	Day 3	69.7222	21.4458	0.000
	Day 7	80.2083	21.4174	0.013
	Day 28	85.4167	21.8559	NS
	Overall			0.05
Role Physical	Preop	92.7568	19.4242	
	Day 1	73.9865	23.4555	0.001
	Day 3	84.1216	16.5749	0.032
	Day 7	89.8649	14.3849	NS
	Day 28	95.6081	9.8673	NS
	Overall			0.001
Bodily Pain	Preop	95.9211	9.9902	
	Day 1	73.9474	24.6916	0.000
	Day 3	81.1842	16.8633	0.000
	Day 7	86.4474	17.0416	0.000
	Day 28	95.7105	8.5642	NS
	Overall			0.007
General Health	Preop	64.3421	16.8527	
	Day 1	47.1053	20.6853	0.000
	Day 3	60.9211	18.5580	NS
	Day 7	63.2895	15.9931	NS
	Day 28	68.9474	18.0524	0.031
	Overall			0.000

**Table 2.**

Comparison of the Mean Preoperative and Postoperative Scores of the Mental Component of Quality of Life and Significance

Quality of Life	Day of Evaluation	Mean Score	SD	Significance Compared With Preop Values
Vitality	Preop	65.2778	19.1589	
	Day 1	48.6111	21.5012	0.000
	Day 3	49.3056	20.2538	0.000
	Day 7	57.6389	21.3971	0.001
	Day 28	63.1944	19.3521	NS
	Overall			0.52
Social Functioning	Preop	100.0000	0.0000	
	Day 1	93.9189	17.0837	0.04
	Day 3	95.6081	13.8870	NS
	Day 7	97.9730	9.0875	NS
	Day 28	100.0000	0.0000	NS
	Overall			0.16
Role Emotional	Preop	99.6711	2.0278	
	Day 1	96.3816	13.6027	NS
	Day 3	98.6842	5.6574	NS
	Day 7	99.6711	2.0278	NS
	Day 28	99.3421	4.0555	NS
	Overall			0.339
Mental Health	Preop	86.5132	9.3639	
	Day 1	80.5921	11.8754	0.003
	Day 3	81.5789	12.5798	0.005
	Day 7	85.1974	10.0064	NS
	Day 28	85.8553	10.1388	NS
	Overall			0.281

due to patient load and shortage of in-hospital beds. Outpatient procedures are usually done in combination with routine inpatient surgical procedures in our country due to the lack of dedicated outpatient centers. Because few reports have been published about ambulatory surgery from developing countries where there is a paucity of dedicated outpatient centers, safe guidelines need to be evolved for an honest appraisal of outcomes and to identify deficiencies and potential pitfalls.

Ninety percent<sup>36</sup> of our patients were successfully managed on an outpatient basis, which compares favorably with success rates of 62% to 100% reported in the literature. In our study, patients discharged the same day without an overnight stay were considered to have fulfilled the outpatient discharge criteria. The definition of what constitutes outpatient discharge has been variable.<sup>17,18</sup> Some authors have

used discharge on the day of operation/admission without an overnight stay as criteria for ambulatory surgery,<sup>17</sup> while others have included patients discharged within 24 hours, irrespective of overnight admission or stay.<sup>18</sup> Among patients who required admission, most were discharged within 24 hours of surgery, 3 of the 4 in our study as has been observed in other studies as well.<sup>8</sup>

Improper patient selection, complications, and inadequate facilities are the important causes of failure of outpatient laparoscopic hernia repair. Guidelines proposed for patient selection for outpatient surgeries can vary depending on the disease in consideration and the geographical regions and communities. Contraindication to general anesthesia, previous lower abdominal surgery, obesity, patient's preference, linguistic problems, travel distance of one hour to the hospital, hernia size, complicated hernias, bilateral hernias, and

recurrent hernias have been the factors considered in patient selection for outpatient TEP repair in previous studies.<sup>7,8,11</sup> Based on our past experience in outpatient laparoscopic cholecystectomy,<sup>19</sup> we proposed similar selection criteria in which ready access to a hospital after discharge (preferably <20 km if not having a good personal conveyance facility) was also included. Patients with recurrent and complicated hernias were excluded. Complete inguinoscrotal hernias, which were reducible, were not excluded from the study. Though bilateral hernias were initially excluded in our study, in the latter part of the study we attempted outpatient TEP in 3 cases of bilateral hernias, out of which one patient required admission for urinary retention. Bilateral hernias, medical causes, surgical reasons, social logistics including excessive distance from the hospital have been the reported causes for in-hospital admission.<sup>7,8,14</sup> Four patients in our series required admission for minor postoperative complaints or logistical reasons. The unanticipated admission/readmission rate represents a quality index that measures the success of outpatient surgeries. In addition to proper patient selection, definition of accurate discharge criteria can decrease admission/readmissions after outpatient surgery. No readmissions were necessary in our study.

Generic guidelines for safe discharge from ambulatory surgery include stable vital signs, return to baseline orientation, ambulation without dizziness, minimal pain and minimal bleeding at the surgical site, which has been put in a simple cumulative index and called a modified postanesthetic discharge scoring system (MPADSS).<sup>16</sup> Though a disease-specific definition of discharge norms after outpatient surgery is called for, a uniform consensus on the important decisive factors is lacking in published series of outpatient TEP repairs.<sup>7-14</sup> We have found MPADSS criteria for discharge to be satisfactory.

Complications and the lengthy operative duration in addition are also important portends of unanticipated admission.<sup>8</sup> Overall, major intraoperative complications are rarely seen in hernia surgery, though such may not be applicable in laparoscopic repairs.<sup>5,6</sup> We had no major intraoperative complications. Peritoneal rents were seen in 4 patients in our series, but the procedure could be completed without conversion in all patients. Peritoneal tears not only increase operative time but also at times prompt a conversion to other procedures, namely TAPP and open repairs.<sup>20-22</sup>

Most of our patients tolerated moderate physical exercise within preoperative norms in one week. Ninety-seven percent of our patients resumed normal outdoor activities within a week. The median time to return to routine

indoor and outdoor activity as well as to the workplace corroborates other reports in the literature.<sup>7-14</sup>

Reports on outpatient laparoscopic herniorrhaphies have used discharge in an outpatient setting as the main outcome measure,<sup>7-14</sup> and studies on postoperative quality of life following outpatient laparoscopic hernia repair are lacking. An objective evaluation of the quality of life of these patients is desirable especially in our setting, which has a number of limitations. SF-36 has been the commonly used questionnaire for measuring QOL after hernia surgery<sup>12,23,24</sup>; however, we have used the modified SF-12 questionnaire, which is a simplified version of the original SF-36 and has been found to be a practical alternative to SF-36 in measurements related to physical and mental components of quality of life in inguinal hernia surgery and has been cross-validated in a number of countries.<sup>25,26</sup>

The greatest change in the immediate postoperative period was observed with respect to the physical components of quality of life viz physical functioning, role of the physical component, bodily pain, and general health with little or no significant change in the mental health components in our study. However, a significant improvement was seen in the physical component of general health and also an improvement in the physical component over preoperative baseline values at one month, suggesting that an overall advantage in quality of life scores may be seen in longer follow-up evaluations. In other reports in the literature, an improvement in the physical components of quality of life above preoperative values has been observed 3 months after hernia surgery.<sup>12</sup> An earlier recovery in quality of life scores has been noted in laparoscopic compared with open hernia operations at a follow-up of one month.<sup>24</sup> Chronic groin pain has been previously reported to be a cause of constant low SF-36 scores in studies evaluating quality of life after open Lichtenstein repair.<sup>27</sup> Chronic groin pain was not reported in any of our patients; however, persistent low scores in the physical component were observed in one patient in our series who had seroma requiring repeated aspirations. Most of our patients could be contacted by telephone and complied with clinical follow-up recommendations.

## CONCLUSION

Our results suggest that, given the limitations of a developing nation, it is possible to integrate outpatient TEP into routine hospital services with negligible complications and minimal admission rates and without a significant impact on physical or mental quality of life scores. This is provided guidelines for proper patient selection and dis-

charge criteria are adhered to, and provision for hospital admission is made available if the need so arises. The use of cost-minimization strategies like the use of the unstapled technique, reusable trocars and instruments, use of indigenous balloon dissectors, along with outpatient discharge may help in wider acceptability of outpatient laparoscopic hernia repairs in developing countries.

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