

# Role of Laparoscopy in the Management of Giant Hiatal Hernia

Sajal Kumar

Senior Resident, Bhagwan Mahavir Hospital, New Delhi

**Abstract:** Giant hiatal hernia is defined as greater than one third of the stomach in the thoracic cavity<sup>1</sup> and representing 5 to 10 % of all hiatal hernia.<sup>8</sup> The hiatal opening in a patient with a large hernia is wide, with the right and left crura very thin and often separated by 5 cm or more.<sup>8</sup> The aim of this review is to analyze the role of laparoscopy in the management of giant hiatal hernia.

*Introduction:* Traditionally repair of giant paraesophageal hernia has been performed through open laparotomy or thoracotomy, with the advent of laparoscopy, nowadays giant hiatal hernia are performed with laparoscopy.

Several recent reports have shown that laparoscopic repair of paraesophageal hiatal hernia is feasible and effective, obtaining comparative result to open surgery.<sup>2</sup>

*Material and method:* A review of article was done through the internet using search engine Google, high wire press springerlink pubmed through the internet facility available in laparoscopy hospital in Delhi.—using

About 3500 articles available on the net, only selected article were screened for further reference. Operative procedure selected only from the center, where the study was done, are specialized in laparoscopic surgery.

**Keywords:** Giant hiatal hernia, Laparoscopy management, complication, recurrence.

## SURGICAL PROCEDURE

Preoperation work-up including careful history regarding patient symptom: I. Barium swallow X-ray, II. Upper gastrointestinal endoscopy, III. Esophageal manometry, IV. pH monitoring, should be done.

## Aim and Objective

The aim of the study was to evaluate the effectiveness and safety of laparoscopy in the treatment of giant hiatal hernia.

The following parameter were evaluated;

1. Operative time
2. Operative technique
3. Postoperative pain

4. Complication
5. Hospital stay
6. Functional index
7. Quality of life analysis

## OPERATIVE PROCEDURE

The surgical technique employed include:

- Standard five cannula technique
- Divide the lesser omentum to expose the right hilar pillar within the lesser sac
- Reduction of hernia by means of atraumatic grasper in a hand over hand fashion
- Complete excision of sac
- Primary closure of hiatal hernia defect with either suture approximation of crura or by different type of mesh application (for tension-free repair)
- After closing the hiatus a fundoplication (Nissen or Toupet) with or without collies gastroplasty will complete the operation depending upon the finding of intraoperative gastrointestinal endoscopic assessment of short esophagus and esophageal manometry.

## Review of Citation

M. Morino et al 2006,<sup>8</sup> Performed laparoscopic repair of giant hiatal hernia on 65 patients Oct 1991- April 2003.

- Primary (suture) closure of the hiatal defect was done in 14 cases
- Tension-free repair using a mesh was performed in 37 cases
- 14 patients underwent Collies – Nissen gastroplasty.
- There was no intraoperative complication and no conversion to open technique
- Mesh operation time was 130 min
- No motility
- One major complication (1.5%)
- An esophageal perforation
- Postoperative complication – 12 patients have transient subcutaneous emphysema in the neck that resolve spontaneously.

- Mean hospital stay was 4.8 day
- Transient dysphagia occurred in 7 patients
- Recurrent hernia present in 23 patients (35.4%)
- Recurrent rate was 77% in direct suture and 35% when mesh was used.

Recurrence of hiatal hernia according to type of surgical technique are given in Table 1:

**TABLE 1: Result of recurrences**

Surgical technique	Patients (N)	Recurrences N (%)	Reintervention N (%)
Direct suture	14	10(77)	5 (36)
PTFE	4	4 (100)	3 (75)
Polypropylene	23	7 (30)	1 (4)
Mixed (PTFE + Polypropylene)	10	2 (20)	1 (10)
Collies-Nissen	14	0	1 (7)

PTFE, Polytetrafluoroethylene  
Source: M. Morino et al<sup>8</sup>

No patients with a Collies-Nissen fundoplication experience recurrence.

R Parmeswaran et al 2006<sup>12</sup> performed laparoscopic repair of large paraesophageal hiatal hernia between Jan 2000 and July 2004 on 49 patients.

- The median age of these patients was 68 years
- The techniques used Nissen fundoplication
- There were two conversion to open surgery

- Major morbidity was atrial fibrillation, pulmonary embolism and splenectomy rate was 10.2%.
- Minor morbidity included – chest infection, jaundice, dysphagia, small pneumothorax rate was 20.4%
- Recurrence rate of 27 patients that is 66% patients.

LE Ferri et al 2005,<sup>13</sup> performed repair 60 cases paraesophageal hernia for reevaluation of result of laparoscopic repair against open laparotomy from 1990 to 2002.

- For this study 25 cases repaired with open transabdominal
- 35 cases repaired with laparoscopy
- Laparoscopic repair resulted in
  - Lower blood loss
  - Fewer intraoperative complication
  - Shorter length of hospital stay
  - Radiological recurrence was 44% for open and 23% for laparoscopic procedure
- Laparoscopic repair was associated with a significant reduction in time to oral intake, parental opioid use and length of hospital stay.

Anatomic recurrence was identified in 8 of 18 open and 7 of 31 that is (23%) patients in the laparoscopic group five recurrences occurred in the first 15 patients where only 2 of the last 20 patients have had recurrence.

James D Luketich et al<sup>5</sup>: In October 2000 performed laparoscopic surgery for giant hiatal hernia from July 1995 to February 2000 on 100 patients.

- There were three cases in which open conversion done due to adhesion

**TABLE 2: Operative and short-term outcome after open and laparoscopic paraesophageal hernia repair**

	Open	Laparoscopic	P value
<b>Operative</b>			
Time (min)	123 (30-153)	120 (65-190)	0.6
Blood loss (ml)	300 (50-1500)	50 (25-250)	<0.001
Complications n (%)	6/25 (24%)	2/35 (6%)	0.01
	Splenectomy *4 Liver laceration	Gastrotomy Bleeding (converted)	
	Esophageal Perforation		
<b>Short Term</b>			
Time to oral intake (days)	4 (2-35)	1 (1-3)	<0.001
Length of stay (days)	13 (6-86)	3 (1-6)	<0.001
Morphine (mg)	109 (50-243)	19 (0-175.6)	<0.001
Complications (postop) <sup>a</sup> n (%)	8/25 (32%)	5/35 (14%)	0.18
Minor (Class I)	5	4	
Major (Class II-IV)	3	1	

<sup>a</sup> Complication classification as proposed by Clavien et al<sup>14</sup>  
Source: L.E. Ferri et al<sup>13</sup>

- The median surgical time was 3.6 hours
- Median length of stay was 2 days
- The crural repair was primary in 96 patients and 4 had mesh repair
- 72 patients got Nissen fundoplication and 27 Collies-Nissen fundoplication
- Intraoperative complication includes:
  - Pneumothorax occurred in four (4) patients.
  - Esophageal perforation occurred in five (5) patients.
  - Gastric perforation occurred in three (3) patients.
- Major perioperative complication include stroke 1 patients, MI-1 patients, ARDS-1 patients, Pulmonary emboli-3 patients, reoperation for abscess 2 patients, recurrent hernia in one patient.
- Overall surgical death rate one (1) percent.<sup>5</sup>  
Andrew F Pierr, et al (2002)<sup>1</sup>; performed elective repair of giant paraesophageal hernia in 2003 patients between June 1995 to July 2001.
- Mean age was 67 year
- Laparoscopic procedure included
  - 69 patients Nissen fundoplication
  - 112 Collies-Nissen fundoplication
  - 19 other procedure
- Three patients got open conversion due to adhesion.
- Median length of hospital stay was 3 day
- Minor and major complication in 57, (28%) patients
- Postoperative esophageal leak was 3%
- Death 1%
- Recurrence hiatal hernia in 5 patients
- Result;
  - Excellent in 128 patients
  - Good result in 12 patients
  - Fair result in 7 patients
  - Poor result in 5 patients
- Based on postoperative follow-up and GERD questionnaire.

## DISCUSSION

There are now several study, report the outcome of laparoscopic management of giant hiatal hernia.<sup>5,10-14</sup> Probably the first successful repair was described by Sir Alfred Cushieri and coworker in 1991. Since then laparoscopic technique have been used increasingly in the approach to patients with paraesophageal hernia.<sup>11</sup>

Rate of recurrence after laparoscopic repair have been variable. Some studies have reported a high recurrence rate of 42%, in other study have reported lower recurrence rate. The anatomic recurrence rate in the series of R Parmeswaran et al (2006) was 17.85%, which is consistent with other series.

**TABLE 3: Review of various study with radiological follow-up data**

References	Patients (n)	Median Follow-up (mo)	Radiologic recurrence (%)
Hashemi (2000)	26	17	42
Weichmann (2001)	60	19	7
Khaitan (2002)	31	25	40
Diaz (2003)	116	30	32
Taragona (2004)	46	30	20
Aly (2005)	100	48	30
Current study (2005)	49	19	18

Source: R. Parmeswan et al.

Various methods have been used to reduce the rate of recurrence. Those are:

- Prosthetic mesh insertion
- Use of Teflon pledgetted horizontal mattress suture to encircle fiber bundle of both crus of diaphragm.
- In case of short esophagus found on intraoperative endoscopy.
  - Add an esophageal lengthening procedure during the crural repair, i.e. Collies-Nissen gastropasty to achieve a tension free intra abdominal repair, etc. the rate of recurrence is higher in the learning curve after which the failure rate diminished.<sup>13</sup>

Although laparoscopic repair of giant hiatal hernia is a technically challenging procedure but, with the gain of experience result is compared favorably to the open operation<sup>1,8,10,11</sup>.

Laparoscopic approach to paraesophageal hiatal hernia offer an excellent visualization of the hiatal region during the phase of hernia reduction the laparoscopic approach allow very precise identification of the anatomic structure and dissection is facilitated by pneumoperitoneum.

Laparoscopic repair of large hiatal hernia is now safe and effective technique for the management because patient population often consisting of elderly, debilitating patient, avoiding an open procedure, may prove beneficial. This is technically challenging procedure but as experienced gained and committed follow-up is performed. We believe this approach well provide an excellent option for patient with paraesophageal hiatal hernia.<sup>10</sup>

## CONCLUSION

Although technically demanding this approach provide better exposure of the surgical field than open transabdominal procedure and add the known general advantage of laparoscopy in term of reduced morbidity, shorter hospital stay rapid and

recurrence, and decreased pain medication. This advantage may be especially valuable in the paraesophageal hernia patient population because most patients are elderly and have multiple comorbid condition.

### ACKNOWLEDGEMENT

I specially thank Prof Dr RK Mishra for his guidance for completion of this review article.

### REFERENCES

1. Andrew F. Pierre, et al (Aug-2007). Result of laparoscopic repair of giant paraesophageal hernia: 2000 consecutive patient.
2. Giovanni Ganinotto. Objectives follow up after laparoscopic repair of large type III hiatal hernia assessment of safety and durability.
3. Bas PL Wijnhoven et al (Jan 2008). Laparoscopic repair of a giant hiatal hernia. How I do it.
4. Eduardo M Targarona et al (Dec. 2004). Mesh in the hiatus a controversial issue.
5. James D Luketich et al (Oct 2000). Laparoscopic repair of giant paraesophageal hernia: 100 consecutive case.
6. L Fei, G. del genio, et al (April 2006). Crura ultrastructural alternation in patient with hiatal hernia: Pilot study.
7. Frantzides CT et al. A prospective, randomized trail of laparoscopic polytetrafluoroethylene patch repair vs. simple cruroplasty for large hiatal hernia.
8. M. Morino et al (2006). Laparoscopic management of giant hiatal hernia factors influencing outcome.
9. Bryan A et al (July 2006). Wedge gastroplasty and reinforced crural repair: Important component of laparoscopic giant or recurrent hiatal hernia repair.
10. Wiechmann RJ et al. Laparoscopic management of giant paraesophageal herniation- Ann of thoracic surgery 2000.
11. Surgio Diaz et al (May 2002). Laparoscopic paraesophageal hernia repair a changing operation: medium term outcome of 116 patients.
12. R Paramswaran et al (2006). Laparoscopic repair of large paraesophageal hiatal hernia: quality of life and durability.
13. LE Ferri et al (2005). Should laparoscopic paraesophageal hernia repair be abandoned in favor of the open approach.
14. Clavien L A et al. Proposed classification of complication of surgery with example of utility in cholecystectomy.
15. Aly A, Munt J, Jamieson GG, Ludemann R, Deitt PG, Watson Di. Laparoscopic repair of large hiatal hernias. Br J Surg 2005;92: 648-53.
16. Buenaventura PO et al (2000). laparoscopic repair of giant paraesophageal hernia.
17. Hashemi M, et al (2000). Laparoscopic repair of large type III data hernia: objective follow-up reveals high recurrence rate.
18. Martin TR, et al (1997). Management of giant paraesophageal hernia.
19. Trus TL, et al (1997). Complications of laparoscopic paraesophageal hernia repair.
20. Wu JS, Dunnegan DI, et al (1999).