Role of Laparoscopy in the Management of Giant Hiatal Hernia

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Abstract: Giant hiatal hernia is defined as greater than one third of the stomach in the thoracic cavity and representing 5 to 10% of all hiatal hernia. 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. 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.

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. 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
- Deviding 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


- 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 days.

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>
<thead>
<tr>
<th>Surgical technique</th>
<th>Patients (N)</th>
<th>Recurrences N (%)</th>
<th>Reintervention N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direct suture</td>
<td>14</td>
<td>10 (77)</td>
<td>5 (36)</td>
</tr>
<tr>
<td>PTFE</td>
<td>4</td>
<td>4 (100)</td>
<td>3 (75)</td>
</tr>
<tr>
<td>Polypropylene</td>
<td>23</td>
<td>7 (30)</td>
<td>1 (4)</td>
</tr>
<tr>
<td>Mixed (PTFE + Polypropylene)</td>
<td>10</td>
<td>2 (20)</td>
<td>1 (10)</td>
</tr>
<tr>
<td>Collies-Nissen</td>
<td>14</td>
<td>0</td>
<td>1 (7)</td>
</tr>
</tbody>
</table>

PTFE, Polytetrafluoroethylene
Source: M. Morino et al

No patients with a Collies-Nissen fundoplication experience recurrence.

R Parmeswaran et al 2006 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 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.


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

<table>
<thead>
<tr>
<th>Operative</th>
<th>Open</th>
<th>Laparoscopic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time (min)</td>
<td>123 (30-153)</td>
<td>120 (65-190)</td>
<td>0.6</td>
</tr>
<tr>
<td>Blood loss (ml)</td>
<td>300 (50-1500)</td>
<td>50 (25-250)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Complications n (%)</td>
<td>6/25 (24%)</td>
<td>2/35 (6%)</td>
<td>0.01</td>
</tr>
<tr>
<td>Splenectomy*4</td>
<td></td>
<td>Gastrotomy</td>
<td></td>
</tr>
<tr>
<td>Liver laceration</td>
<td></td>
<td>Bleeding (converted)</td>
<td></td>
</tr>
<tr>
<td>Esophageal Perforation</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Short Term</th>
<th>Open</th>
<th>Laparoscopic</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time to oral intake (days)</td>
<td>4 (2-35)</td>
<td>1 (1-3)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Length of stay (days)</td>
<td>13 (6-86)</td>
<td>3 (1-6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Morphine (mg)</td>
<td>109 (50-243)</td>
<td>19 (0-175.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Complications (postop)* n (%)</td>
<td>8/25 (32%)</td>
<td>5/35 (14%)</td>
<td>0.18</td>
</tr>
<tr>
<td>Minor (Class I)</td>
<td>5</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Major (Class II-IV)</td>
<td>3</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

* Complication classification as proposed by Clavien et al
Source: L.E. Ferri et al
TABLE 3: Review of various study with radiological follow-up data

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

Source: R. Parmeswan et al.

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

- Prosthetic mesh insertion
- Use of Teflon pledgeted horizontal mattress suture to encircle fiber bundle of both crus of diaphragm.
- In case of short esophagus found on intraoperative endoscopy.
  - Add an esophageal lengthing procedure during the crural repair, i.e. Collies-Nissen gastroplasty 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.13

Although laparoscopic repair of giant hiatal hernia is a technically challenging procure but, with the gain of experience result is compared favorably to the open operation1,8,10,11. 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 belief this approach well provide an excellent option for patient with paraesophageal hiatal hernia.10

CONCLUSION

Although technically demanding this approached provide better exposure of the surgical field than open transadominal 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

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