Open vs Laparoscopic Repair of Spigelian Hernia

A Prospective Randomized Trial

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Hypothesis: The elective treatment of a spigelian hernia is still under discussion, fundamentally owing to its rarity. The purpose of the study is to analyze the elective surgical treatment of spigelian hernia.

Design: A prospective, randomized controlled trial.

Setting: University teaching hospital.

Patients and Interventions: Two surgeons performed 11 conventional and 11 laparoscopic repairs for a spigelian hernia, alternating roles as primary surgeon and assistant. Each time the type of technique was randomly chosen using a computerized program.

Main Outcome Measures: Epidemiological, clinical, and surgical factors are analyzed according to treatment, ie, the open or laparoscopic approach.

Results: The statistical study shows no significant differences for epidemiological or diagnostic factors, but it does show significant advantages for laparoscopy in terms of morbidity ($P < .05$) and hospital stay ($P < .001$).

Conclusion: The approach using extraperitoneal laparoscopy is the technique that offers best results in the elective treatment of spigelian hernia.

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SPIGELIAN HERNIAS are a rare defect of the abdominal wall located on the outer edge of the crescent line in the area that joins the fascia of the anterior rectus muscle to the sheaths of the wide muscles of the abdomen.\textsuperscript{1} Elective treatment can be administered by open or laparoscopic surgery, but, to our knowledge, we still have no study that compares the 2 techniques, because among other reasons most surgeons lack this type of experience.\textsuperscript{2-7} The aim of this study is to analyze by surgical approach (ie, open or laparoscopic) the results obtained in the elective treatment of spigelian hernias in a university teaching hospital’s abdominal wall and laparoscopy units.

METHODS

STUDY DESIGN

Between January 1, 1997, and December 31, 2001, all patients diagnosed preoperatively as having a spigelian hernia were assessed at the Abdominal Wall Unit and Laparoscopy, J. M. Morales Meseguer Hospital, Murcia, Spain, and included in a randomized prospective study. The protocol of the study was approved by the hospital’s ethics committee. Informed consent was obtained from the patients before enrollment in the study. Twenty-two patients with spigelian hernia were duly informed of the possible options of treatment. The surgical option for each patient was selected at random as either an open or a laparoscopic repair (each group consisted of 11 patients) using a computerized program. During the preoperative study the intra-abdominal laparoscopic approach was selected for 3 patients because they had another associated operable pathologic condition (2 patients had cholelithiasis and 1 patient had a multirecurrent inguinal hernia). We considered the need for emergency surgery (6 cases) and the high risk for general anesthesia (1 case) as exclusionary criteria.

SURGICAL INTERVENTIONS

Anterior Hernioplasty

While the patient was under epidural anesthesia, a horizontal incision was made above the tumor and the subcutaneous tissue was dissected down to the aponeurosis of the external oblique muscle. A cut was made in the direction of the fibers, the peritoneal sac was located, and after circumferential dissection, the peritoneal cavity was entered. A polypropylene mesh was placed in the preperitoneal space, overlapping the defect by some 3 cm, and fixed with loose sutures. The aponeurosis of the external oblique muscle was closed by continuous suture, and the subcutaneous tissue and skin were brought together using staples.
Clinical and Surgical Features of 22 Patients Undergoing Elective Surgery for Spigelian Hernia According to Surgical Approach*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Open Approach (n = 11)</th>
<th>TEP (n = 8)</th>
<th>IA (n = 3)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex, M/F</td>
<td>3/8</td>
<td>3/5</td>
<td>2/1</td>
<td>.62</td>
</tr>
<tr>
<td>Age, median (year)</td>
<td>58.63 (17-82)</td>
<td>60.7 (39-92)</td>
<td>60.3 (41-73)</td>
<td>.44</td>
</tr>
<tr>
<td>Location of hernia, R/L side</td>
<td>3/8</td>
<td>2/6</td>
<td>1/2</td>
<td>2.9</td>
</tr>
</tbody>
</table>

**Associated factors**

<table>
<thead>
<tr>
<th></th>
<th>Open Approach (n = 11)</th>
<th>TEP (n = 8)</th>
<th>IA (n = 3)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior surgery</td>
<td>4/36.4</td>
<td>1/12.5</td>
<td>1/33.3</td>
<td>.9</td>
</tr>
<tr>
<td>Trauma</td>
<td>5/45.5</td>
<td>1/12.5</td>
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<td></td>
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<tr>
<td>Obesity</td>
<td>2/18.2</td>
<td>3/37.5</td>
<td>1/33.3</td>
<td>.08</td>
</tr>
<tr>
<td>COPD</td>
<td>3/27.3</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Associated hernia</td>
<td>3/27.3</td>
<td>3/37.5</td>
<td>1/33.3</td>
<td></td>
</tr>
<tr>
<td>Operating time (range), min</td>
<td>45/27-65</td>
<td>42/30-56</td>
<td>40/29-51</td>
<td>.05</td>
</tr>
<tr>
<td>Morbidity</td>
<td>4/36.4</td>
<td>0</td>
<td>0</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>Hospital stay</td>
<td>5.2 (2-9)</td>
<td>1/5-9 h</td>
<td>1.4 (1-2)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>SWA</td>
<td>1</td>
<td>8</td>
<td>2</td>
<td>&lt;.001</td>
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<tr>
<td>Recurrence</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>NS</td>
</tr>
</tbody>
</table>

*Data are given as absolute value (percentage) unless otherwise indicated. TEP indicates total extraperitoneal; IA, intra-abdominal; R, right; L, left; COPD, chronic obstructive pulmonary disease; and SWA, surgery without admission to the hospital.

†Value indicates that the time of the associated surgical intervention was excluded.

Totally Extraperitoneal Laparoscopy

This approach was performed using a distension balloon trocar (SPACEMAKER II Surgical Balloon Dissector; GSI Inc, Cupertino, Calif) and two 5-mm trocars in a midline, one just above the pubis and the other in the midline above it. A 15 × 5-cm polypropylene mesh was used to overlap the defect widely and was fixed with staples (Tacker; Origin, Calif).8,9

Intraperitoneal Laparoscopy

The pneumoperitoneum was created using a Veress (Ethicon Inc, Somerville, NJ) needle, and we inserted a 10-mm trocar for the telescope and two 5-mm trocars in a line along the left or right flank; afterward, the margins of the hernial defect were determined and the contents reduced. The Parietex composite double-layer mesh (Sofradim; Parietex, Villefranche sur Saone, France) was referenced at each end with a long-cut suture and inserted through the 10-mm trocar and unfolded near the hernial defect. Using a Gore-Tex suture passer (W. L. Gore & Associates, Flagstaff, Ariz), the abdominal wall was punctured in the predetermined locations and the threads pulled out through the abdominal wall and made taunt. Finally, it was fastened with 8 sutures placed 1 cm from the end and midway between them using a helicoidal suture apparatus (Tacker).10

At the end of surgery, drainage of the abdominal wall was required when there was a risk of secondary hemorrhagic effusion despite rigorous hemostasis subsequent to extensive dissection. The patients’ conditions were assessed at 6:30 PM on the day of the surgical procedure and the patients were discharged if they were fully ambulatory, tolerated a normal diet, and satisfied with the relief of pain. Both techniques were done by just 2 consultant surgeons (A.M.-E. and a colleague).

**MAIN OUTCOME MEASURES**

The following factors were assessed: (1) epidemiological (age, sex, associated diseases, prior abdominal surgery, location, and other associated hernias); (2) diagnostic (clinical or radiological); and (3) treatment (operating time, intraoperative and postoperative complications, hospital stay, and recurrences). After discharge from hospital all of the patients were examined in the Abdominal Wall Unit at 7 days; at 1, 6, and 12 months; and yearly thereafter. Follow-up averaged 3.4 years (range, 1-6 years) and was completed in all patients, including history, physical examination, and ultrasonography.

**STATISTICAL ANALYSIS**

Descriptive statistics were used for the distribution of frequencies and medians for the quantitative variables. Continuous, normally distributed data are expressed as mean (range). The surgical outcomes between the 2 groups were compared using the Pearson χ² and Fisher exact tests. P values reported are 2-tailed. P < .05 was considered to indicate statistical significance.

**RESULTS**

The characteristics of the patients undergoing elective surgery for spigelian hernia are given in the Table according to the technique used. Spigelian hernias occurred more frequently in the fifth and sixth decades of life (mean age, 59.9 years), more often in women (14 women [63.6%]), and on the left side (16 patients [72.7%]). No risk factors were detected in 6 patients (27.2%). The preoperative diagnosis was exclusively clinical in 6 patients and confirmed with ultrasonography in the rest. In 6 patients of the laparoscopic group, the diagnoses were completed with computed tomographic scan, including evaluation of the hernial contents and its anatomical limits with the defect, as well as signs of bowel ischemia. None of the patients of either series were initially seen with hernial incarceration, although in 1 case in the laparoscopic series, the peritoneal sac included an entrapment (nonobstructive) of the sigmoid colon (diagnosed by physical examination and computed tomography), which was reduced without complications (Figure). All of the laparoscopic procedures were completed without the need for conversion to open surgery. Intraoperative complications did not occur. The postoperative course of all patients was uneventful. In the conventional hernioplasty group, 2 aspiration drains were
placed and 4 postoperative hematomas were detected, which did not require any special treatment. None of the patients required analgesic treatment after the seventh postoperative day or readmission to hospital. No other complications were detected (ileus, neuralgia, wound infection) and no deaths occurred during follow-up in either group. The statistical study showed no significant differences for epidemiological or diagnostic factors, but it did show significant advantages when using laparoscopy in terms of morbidity ($P < .05$) and hospital stay ($P < .001$).

The elective treatment of spigelian hernias is by open surgery or by laparoscopy. There is no reference in the literature than can direct us favorably toward one technique or the other, due among other reasons to the rarity of such hernias (1%–2% of all abdominal wall hernias) and to the lack of experience for most surgeons. To our knowledge, our study is the first to analyze this problem in an abdominal wall unit. Diagnosis of spigelian hernia must be based on a proper clinical history and a thorough physical examination, and it is advisable to perform an ultrasonogram or computed tomography in cases in which there is diagnostic doubt. Imaging techniques give us the exact location of the defect, size, environment, and sac contents, ie, important information for properly choosing the surgical approach. If a preoperative diagnosis can be established properly, we can consider a surgical treatment suited to the characteristics of the patient and the type of hernia. But which is the best technical option—closure using direct approximation, muscle plasties, prosthesis, or intra-abdominal or extraperitoneal laparoscopy?

The results published with open hernioplasty are good if referred to recurrences, but they require an ample incision and dissection of the affected area for correct repair and leave a permanent scar that affects the future behavior of the abdominal wall, both aesthetically and physiologically. Owing to possible morbidity (pain, need for drainage, bleeding, etc) open surgery is usually performed with hospital admission. The first intra-abdominal laparoscopic correction was performed by Carter and Mizes in 1992. Although the intra-abdominal approach allows us a simple and solid repair, it converts parietal surgery into intracavitary surgery with the possible added risk of a visceral lesion and postoperative obstruction, the only advantage being that it can be done at the same time as other surgical interventions. The results of the first total extraperitoneal laparoscopic approach was published by Moreno-Egea et al in 1999. This technique repairs the defect at the source on the abdominal wall and offers the benefits of laparoscopy in general (ie, minimally invasive approach) and avoids the disadvantages of the intra-abdominal route.

This study shows that although results in terms of recurrence do not depend on technique, results in terms of morbidity and hospital stay do, such that the extraperitoneal laparoscopic technique significantly reduces patient morbidity and hospital stay and can be performed as an outpatient procedure. For patients diagnosed as having non-complicated spigelian hernia we recommend (1) the total extraperitoneal laparoscopic approach as the technique of choice; (2) the intra-abdominal laparoscopic approach when there is another process requiring associated surgery in the same intervention; and (3) anterior hernioplasty in cases of complication or emergency. In conclusion, the total extraperitoneal laparoscopic approach gives the best results in the elective treatment of spigelian hernia.

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REFERENCES