Controversies in the Current Management of Lumbar Hernias

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Background: Abdominal wall surgery has changed dramatically in recent years. The current management of lumbar hernias should reflect the development of modern imaging techniques and new forms of noninvasive treatment.

Objective: To review and update knowledge on lumbar hernias.

Data Sources: Literature review using MEDLINE with the key words “lumbar hernia” for the years 1950 through 2004. For an analysis prior to this date (1750-1950), we used cases reported by Thorek. Our own study of 28 patients was also included.

Study Selection: All articles reporting clinical cases on lumbar hernia.

Data Extraction: Two reviewers analyzed the epidemiological, clinical, and treatment data of the articles.

Data Synthesis: One hundred thirty-five clinical case articles and 8 studies with more than 5 patients, together with our personal experience of 28 cases, were analyzed. Nine percent of acquired lumbar hernia cases presented for emergency surgery, which means that a clinical diagnosis was completed with computed tomography in more than 90% of the cases. None of the published classifications has a therapeutic orientation. We present an original classification based on 6 categories and 4 types. In our study, there was a predominance of incisional hernias (79%), with no difference with regard to sex or location but with a predominance in the upper space (47%). Laparoscopic treatment accounts for 9% of the publications’ cases and there is only 1 prospective comparative study.

Conclusions: The use of a complete classification and tomography must be standard practice in the preoperative protocol of patients with lumbar hernia. The laparoscopic approach seems to be the best option for treating small or moderate defects; open surgery can be reserved for large defects and to salvage failures with the laparoscopic approach.

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LUMBAR HERNIA IS A RELATIVELY rare defect of the posterior abdominal wall, with approximately 300 cases reported in the literature. According to Hafner et al,¹ a general surgeon will only have the opportunity to repair 1 lumbar hernia case in his or her lifetime. Today, this situation in many centers has changed with the creation of functional units where patients can be centralized and surgeons can gain a greater amount of experience in a short period of time. Moreover, abdominal wall surgery has changed dramatically over the last decade with the introduction of new diagnostic techniques, the use of prosthetic materials, and the development of laparoscopic surgery. The current management of lumbar hernias should reflect these changes, but there is still controversy over the classification of defects, the appropriate preoperative diagnosis with or without the use of computed tomography (CT), and the treatment of choice for these hernias.

In an attempt to address these points of controversy, we conducted a MEDLINE search for articles published from 1950 to 2004 using the keywords “lumbar hernia.” To complete the historical study prior to 1950 (1730-1950), we used tables published by Thorek² (Figure 1). An analysis was made of 135 clinical case articles and 8 studies with more than 5 patients, together with our personal experience of 28 cases.

HISTORICAL NOTES

P. Barbette was the first to suggest the existence of these hernias in 1672, but the first publication was by R.J.C. Garangeot in 1731. In 1750, H. Ravaton performed the first surgical treatment of a strangulated lumbar hernia in a pregnant woman. The description of the anatomical limits of the inferior lumbar space was made by Petit (1783) and a description of the superior space was made by Grynfeltt (1866). In 1890, J. Macready observed 25 cases. Two of those cases involved the superior lumbar space, which he called the “triangle of Grynfeltt-Lesshaft.” In 1916, Goodman pointed out the predominance of the inferior space as the most

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common site of lumbar hernias, but studies after 1920 show that the superior location is more common (Virgilio, 1925; Watson, 1948; and Thorek, 1950\textsuperscript{2,3}).

**APPLIED SURGICAL ANATOMY**

The lumbar region is defined superiorly by the 12th rib, medially by the erector spinae muscle, inferiorly by the crest of the iliac bone, and laterally by the external oblique muscle. Knowledge of the composition of the abdominal wall at this level is important for a correct orientation both during open surgery and in the laparoscopic approach: (1) skin; (2) superficial fascia; (3) superficial muscle layer, comprising the latissimus dorsi and external oblique; (4) thoracolumbar fascia; (5) middle muscle layer, with the sacrospinal, internal oblique, and serratus posterior inferior muscles; (6) deep muscle layer, which contains the quadratus lumborum and psoas muscles; (7) transversalis fascia; (8) preperitoneal fat; and (9) peritoneum. This area contains 2 well-defined areas of weakness.\textsuperscript{3}

**Superior Lumbar Triangle**

The Grynfelt-Lesshaft triangle is larger and more constant than the inferior lumbar space and is probably the most common location for spontaneous hernias. It is an inverted space bordered at the base by the 12th rib and lower edge of the serratus posterior inferior muscle; the posterior side is formed by the sacrospinal muscle; the anterior is formed by the internal oblique muscle; the roof is formed by the external oblique and latissimus dorsi; and the floor consists of the transversalis fascia and aponeurosis of the transversalis muscle of the abdomen. Three areas of weakness can be found in this space: immediately below the rib where the transversalis fascia is not covered by the external oblique muscle, in the area of fascial penetration of the 12th dorsal intercostal neurovascular pedicle, and between the inferior edge of the rib and the ligament of Henle. The predisposition to herniation in this space is extremely variable and depends on the following: size and form of the triangle; length and angulation of the rib; size and form of the quadratus lumborum and serratus posterior muscles; insertion of the latissimus dorsi between the 11th and 12th ribs; union of the posterior fibers of the latissimus dorsi and external oblique; variable insertion of the fibers of the external oblique above the 12th rib; and whether the internal oblique muscle is muscular or aponeurotic at its insertion above the 12th rib (a tall, thin person with angled final ribs will have a smaller superior lumbar space than a short, obese person with horizontal ribs).

**Inferior Lumbar Triangle**

The Petit triangle is smaller and bordered by the crest of the iliac bone at the base, the external oblique muscle laterally, and the latissimus dorsi muscle medially; the floor is formed by the lumbodorsal fascia adjacent to the aponeurosis of the internal oblique and transversalis muscle. Occasionally the edges of the latissimus dorsi and external oblique muscles may be adjoining and close the space. Predisposing factors to herniation in this space may be alterations in the origin of the external oblique muscle and a more medial latissimus dorsi giving rise to a larger triangle base (common in women with wide hips), tapering of the internal oblique muscle or its not being completely tendinous, and the presence of the Hartmann fissure at the vertex of the triangle. Unlike the superior space, the inferior space is not penetrated by nerves or blood vessels that weaken the floor.

**Diffuse Lumbar Hernias**

Occasionally the defects assume considerable sizes and are not limited by the previously mentioned spaces. They are usually the result of surgical incisions or violent traumas, particularly car crashes. In such cases, the lumbar spaces usually move into the parietal cicatricial defect and extend beyond the boundaries of the anatomical lumbar space to invade the edge of the anterior rectus muscle.\textsuperscript{4}

**ETIOPATHOGENESIS**

Lumbar hernias may be congenital and acquired. Congenital hernias appear during infancy as the origin of a defect in the musculoskeletal system of the lumbar region and are associated with other malformations. Acquired lumbar hernias are usually primary—or spontaneous—and secondary, depending on the existence of a causal factor such as surgery, infection, or trauma. Pre-disposing factors in spontaneous acquired lumbar hernia are age, obesity, extreme thinness, chronic debilitating disease, muscular atrophy, intense slimming, chronic bronchitis, wound infection, and postoperative sepsis.
They are also usually associated with strenuous physical activity. It seems that the loss of fatty tissue facilitates the rupture of the neurovascular orifices that penetrate the lumbodorsal fascia; situations related to increased intra-abdominal pressure would act as factors that trigger the appearance of these hernias.

Secondary acquired lumbar hernias may have multiple pathogenic mechanisms: direct contusion, crushing, fractures of the iliac crest, surgical lesions or infections of the pelvic bones and ribs, hepatic abscesses, infected retroperitoneal hematomas, and infectious processes that may alter the integrity of the lumbodorsal fascia.

**Incisonal Acquired Lumbar Hernias**

Incisional acquired lumbar hernias were described by Kelton in 1939, with H.L. Kretchmer publishing the first study of 11 cases following renal surgery in 1951. The operations most frequently associated with this type are nephrectomy, abdominal aorta aneurysm surgery, resection of abdominal wall tumors, iliac bone donation, and latissimus dorsi flaps in plastic surgery.5-7 The prevalence of lumbar hernia after lumbotomy is approximately 20% to 30%.4-6 Its pathogenic mechanism may be explained by dissection of the subcostal nerve, which involves muscular atrophy—a gradual thinning of the muscle and fascia, which acts as a predisposing factor to hernia appearance.9-11

**Traumatic Acquired Lumbar Hernias**

An article describing traumatic acquired lumbar hernias was initially published by C.D. Selby in 1906. In 1996, M.C. McCarthy defined traumatic acquired lumbar hernia as a lesion caused by the use of seat belts.12 Thompson et al13 described the ensemble of lesions comprising the seat belt syndrome in young women suffering from a crash as automobile passengers: fracture-subluxation of the first lumbar vertebra, jejunal perforation, extensive mesenteric laceration, and lumbar hernia.14-16

The percentage of congenital and acquired hernias (80%) has not varied with time, although the etiological agents of acquired lumbar hernias have indeed changed: infectious hernias have decreased considerably (from 17% to 2%), whereas incisional hernias have increased from 10% to 31% (Figure 1). Pathogenically, lumbar hernias are defined as the protrusion of preperitoneal or intraperitoneal contents into the lumbar area. The herniary sac may be absent (subfascial fat hernias), have a sliding peritoneum component, or be totally intraperitoneal; and the visceral contents are extremely variable, with reports of hernias containing the colon, omentum, small bowel, kidney, spleen, or stomach.

**CLASSIFICATION**

It is not easy to classify lumbar hernias owing to their uncommon nature, variable location, and difficult diagnosis. Classifications proposed in the literature have a unifactorial, epidemiological nature, not a therapeutic orientation23:

According to location: (1) superior lumbar (Grynfelt-Lesshaft triangle, lumbocostal, or costoiliac of Larrey); (2) inferior lumbar (Petit triangle, suprailiac of Huguier, or lumbocostal); and (3) diffuse (postoperative, costal incisional, or traumatic).

According to contents: (1) extraperitoneal (with no peritoneal sac); (2) paraperitoneal (peritoneum sliding and adhering to the viscera); and (3) intraperitoneal (with a complete peritoneal sac around the visceral contents).

According to etiology: congenital or acquired; and traumatic, infectious, or surgical.

We propose a classification with a therapeutic aim, which identifies 4 types of hernia based on 6 criteria: size, location, contents, muscular atrophy, origin, and existence of previous recurrence (Table 1). The presence of 2 criteria is sufficient to define the type of hernia (Figures 2, 3, and 4).

**DIAGNOSIS**

Lumbar hernias may be acute or chronic, and their name will depend on the hernia size and contents. We must not forget that occasionally they do not cause symptoms; there are no systems that are pathognomonic of these hernias:

Posterior lateral tumor: the most common clinical manifestation is a palpable mass that increases with coughing and strenuous activity, usually reducible and tending to disappear with the patient in the decubitus supine position. Occasionally it can grow to a large size and alter the symmetry of the patient’s torso.17

Back pain or lumbago: the patient usually reports unspecific abdominal discomfort, fatigue, or back pain along

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>A&lt;5</th>
<th>5-15</th>
<th>&gt;15</th>
<th>A&lt;5</th>
<th>5-15</th>
<th>&gt;15</th>
</tr>
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<td></td>
<td></td>
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<tr>
<td>Contents</td>
<td>EP fat</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td></td>
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</tr>
<tr>
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<td></td>
<td></td>
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</tr>
<tr>
<td>Recurrence</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Surgical approach</td>
<td>Open approach EP, TEP laparoscopy</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Abbreviations: EP, extraperitoneal; IP, intraperitoneal; TEP, total extraperitoneal.

*The presence of at least 2 criteria is necessary for defining a type.
the area of distribution of the sciatic nerve. According to Light,\textsuperscript{18} it is a diagnosis to consider in young women and athletes with back pain.

Bowel obstruction: manifests itself with nausea, vomiting, abdominal distension, and palpation of an irreducible mass. Radiology can reveal the presence of air-fluid levels. Strangulation is uncommon but can occur with constriction of the neck of the sac; may also be caused by volvulation of the contents.\textsuperscript{19-22}

Urinary obstruction: if the contents are renal, patients can experience urinary symptoms such as hematuria, oliguria, and colicky pain.\textsuperscript{23,24}

Other rare forms of manifestation reported in publications are pelvic mass and retroperitoneal and gluteal abscess.\textsuperscript{25-27}

In the literature we did not find any changes with time in the form of manifestation: 91\% of lumbar hernias are nonemergency and 9\% are acute, such as bowel obstruc-
tion. In most cases, therefore, there is no clinical impediment to completing an adequate preoperative study. We must not forget to establish a differential diagnosis with other more common processes, such as lipomas (soft, mobile tumors not attached to muscle layers), fibromas (attached to fascia or muscle; firm, neither reducible nor painful; moving with contraction of the muscle group), hematomas (suspected by the existence of a history of trauma and local ecchymosis; they are irreducible and common in athletes or in those being treated with anticoagulants), abscesses (with associated pain, edema, cellulitis, fever, and leucocytosis), kidney tumors (irreducible, dull on percussion and not painful), muscle hernia (very rare; disappearing when the muscle is relaxed), panniculitis (a more widespread process associated with manifestations of rheumatism and occasionally a history of repeated episodes of multiple small nonsuppurative subcutaneous nodules), and pannicular lumbosacroiliac hernia (herniation of the subfascial fat, which can cause lumbar pain but disappears with regional infiltration of local anesthetics). None of these processes can cause symptoms of bowel obstruction.1-3

Muscular Atrophy or Pseudohermia (Type D)

A special situation arises in cases of muscular atrophy of the posterior lateral abdominal wall. Parietal thinning may bring about a deformity that cannot be distinguished from a real hernia, with palpation of a reducible tumor (suggesting bowel contents) and local discomfort during ambulation and physical exercise. Thus, muscular atrophy behaves physiologically like a hernia and only a proper imaging study (CT) will confirm diagnosis. Some authors have published cases of patients who underwent surgery in error for lumbar hernia to reveal muscular atrophy during the operation.17,28,29

Imaging Diagnosis

Since 1987 when Baker et al30 demonstrated the utility of CT in the diagnosis of lumbar hernia, another 12 specific publications (7% of all the studies published) have supported the use of imaging diagnosis for reliably assessing the anatomical relationships of the lumbar area, differentiating muscular atrophy from a real hernia, identifying the contents, and ruling out the possibility of a tumor by facilitating a more rational therapeutic decision.31-34 Although diagnosis must be clinical, based on the patient’s history, symptoms, and physical signs, today, except in cases of emergency manifestation or in centers not equipped with adequate radiological facilities or experiencing financial difficulties, the use of CT must be regarded as a routine exploratory technique in the preoperative evaluation of patients with lumbar hernia.

TREATMENT

Indication for Surgery

The natural evolution of these hernias is a steady growth in size, becoming more and more symptomatic. Most surgeons, therefore, think hernias should be repaired in all except high-risk patients. As surgical correction is always more difficult in advanced cases, surgery must be indicated as early as possible.11 Bolkier et al29 justify a cosmetic indication because of local deformity in cases of muscular atrophy. Currently there are no reliable data in the literature to either justify or dismiss this option. In this case, we think it should be a combined decision depending on the surgical team (experience), the patient (eg, age, work activity, associated diseases, previous surgeries, and American Society of Anesthesiologists risk), and type of hernia. When symp-

Figure 4. Type C lumbar hernia. A 20-cm defect with visceral contents and previous recurrence with an intra-abdominal mesh. A, Computed tomographic image. B, Surgery image. C, Open repair with a double mesh (inlay and onlay).
toms of incarceration or strangulation exist, it should be indicated in the emergency department.

Historical Notes

The first repair was published by E. Owen in 1888. In 1907, C.N. Dowd introduced the use of musculoaponeurotic rotation flaps to cover the defect using the gluteus major and medius muscles. Since then, the use of flaps has also been reported with the latissimus dorsi muscle (J.H. Rishmiller, 1917) and fascia lata (I.S. Ravdin, 1923). The use of mesh as an element of repair was proposed by Thorek in 1950 (tantalum) and Hafner in 1963 (Marlex). The transabdominal laparoscopic approach was introduced by Burick and Parascandola in 1996; 3 years later Woodward et al described the total extraperitoneal approach using a balloon dissector. There are currently 14 references describing this approach (9% of all the publications) and an article of 7 cases published by Arca et al in 1998. Despite the multiple techniques described, there is still no recommendation consensus for any of these approaches. The anterior approach is quite traumatic and requires a major dissection to define the damaged planes and locate the defect, but it has the advantage of enabling us to perform a complete parietal reconstruction. The laparoscopic approach has the advantage of being minimally invasive (less pain, shorter length of hospital stay, and fewer wound complications); it also avoids major dissections, allows exact location of the lesion, and offers an excellent visualization, thus avoiding possible lesions to neighboring structures (eg, ureter, colon, nerves). However, the laparoscopic approach does not allow for parietal reconstruction or repair under controlled tension. In cases of associated muscular atrophy or major deformity, we believe that repair must be done under a certain degree of tension to guarantee an adequate aesthetic and functional result, an aim that we can achieve with a double mesh technique (type D). It is therefore important to obtain the patient’s proper consent and to guarantee surgical expectations. From experience we advise a hernioplasty via the anterior approach or using extraperitoneal laparoscopy on small defects with extraperitoneal contents (type A); the transabdominal approach on moderate defects with paraperitoneal or intraperitoneal hernias (type B); and an anterior repair with a double mesh in cases of recurrence or diffuse hernias larger than 15 cm (type C). Autoplasties or the use of mesh plugs should not currently be recommended because the quality of the affected tissues cannot be assessed reliably during surgery. Repair should always be done with the mesh extended, a maximum overlap around the perimeter (>6 cm), and adequate fixation.

### Reasons for Choice

Before choosing a technique we should establish a complete diagnosis (ie, know the size, location, and contents of the defect); for this reason, it is advisable to have CT available to plan the surgery properly. By knowing the benefits of each technique, we believe our classification can help us decide whether to choose a classic or laparoscopic approach and will enable us to compare future studies. The anterior approach is quite traumatic and requires a major dissection to define the damaged planes and locate the defect, but it has the advantage of enabling us to perform a complete parietal reconstruction. The laparoscopic approach has the advantage of being minimally invasive (less pain, shorter length of hospital stay, and fewer wound complications); it also avoids major dissections, allows exact location of the lesion, and offers an excellent visualization, thus avoiding possible lesions to neighboring structures (eg, ureter, colon, nerves). However, the laparoscopic approach does not allow for parietal reconstruction or repair under controlled tension. In cases of associated muscular atrophy or major deformity, we believe that repair must be done under a certain degree of tension to guarantee an adequate aesthetic and functional result, an aim that we can achieve with a double mesh technique (type D). It is therefore important to obtain the patient’s proper consent and to guarantee surgical expectations. From experience we advise a hernioplasty via the anterior approach or using extraperitoneal laparoscopy on small defects with extraperitoneal contents (type A); the transabdominal approach on moderate defects with paraperitoneal or intraperitoneal hernias (type B); and an anterior repair with a double mesh in cases of recurrence or diffuse hernias larger than 15 cm (type C). Autoplasties or the use of mesh plugs should not currently be recommended because the quality of the affected tissues cannot be assessed reliably during surgery. Repair should always be done with the mesh extended, a maximum overlap around the perimeter (>6 cm), and adequate fixation.

### Table 2. Descriptive Articles Published With More Than 5 Cases

<table>
<thead>
<tr>
<th>Case Characteristics</th>
<th>Hafner et al1</th>
<th>Light8</th>
<th>Geis and Hodakowski2</th>
<th>Zhou et al46</th>
<th>Moreno-Egea et al (current article)</th>
</tr>
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<tbody>
<tr>
<td><strong>No. of cases</strong></td>
<td>9</td>
<td>20</td>
<td>6</td>
<td>11</td>
<td>28</td>
</tr>
<tr>
<td><strong>Mean age, y (range)</strong></td>
<td>61 (43-87)</td>
<td>36 (15-57)</td>
<td>60 (42-67)</td>
<td>62 (49-78)</td>
<td>63 (44-80)</td>
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<td>2/18</td>
<td>4/2</td>
<td>9/3</td>
<td>13/15</td>
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<tr>
<td><strong>Etiology, No. (%)</strong></td>
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<td></td>
<td></td>
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<td></td>
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<tr>
<td>Spontaneous</td>
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<td>20</td>
<td>3</td>
<td>11</td>
<td>3</td>
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<tr>
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<td>NA</td>
<td>22 (79)</td>
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<td>1</td>
<td>NA</td>
<td>3</td>
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<tr>
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<tr>
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<td>1</td>
<td>1</td>
<td>3 (11)</td>
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</tbody>
</table>

**Abbreviation:** NA, not applicable.

*Non-descriptive studies are not included.
Finally, the results of lumbar hernia treatment are difficult to analyze because of the limited experience of each surgeon (Table 2). T. H. Hancock published the first case of recurrence in 1920. Since then recurrences have been reported with all the technical options described: simple closure, muscular plasters, or plasters with meshes. This should serve for us to reflect on the importance of making a correct preoperative assessment of the patient and an adequate choice of surgical technique. These results particularly stress the need for centralizing the pathology in experienced teams or units to be able to offer society and our patients the best possible results.

CONCLUSIONS

The use of a complete classification is important for assessing patients adequately and improving our knowledge in the future. Computed tomography should be included in the preoperative protocol of these patients. The laparoscopic approach seems to be the best option for small or moderate defects. Open surgery can be reserved for large defects (traumatic or diffuse) and in cases where the laparoscopic approach has failed.

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