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A short historical survey

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Lumbar hernia. A short historical survey

Lumbar hernia is a rare form of abdominal hernia, which has been recognized later along the early development of the modern surgery. it has been, on many occasions, the object of heavy debate regarding its anatomical background and as well its etiology. The authors reports the historical aspects of this rare pathology, focusing on the earliest descriptions of hernia arising in lumbar regions, on the first reports of surgical repair, and on the anatomical description of the lumbar weakness areas, that are currently named Petit's triangle and Grynfeltt and Lesshaft's triangle.

KEY WORDS: Grynfeltt's hernia, Lumbar hernia, Petit's hernia.

The history of lumbar hernia

Lumbar hernia is a rare form of abdominal hernia, which has been recognized later along the early development of the modern surgery. It has been, on many occasions, the object of heavy debate regarding its anatomical background and as well its etiology.
During the XVII century several important treatises on surgery were published: they harboured the treasure of experience of pioneers in the founding of surgery as a scientific – and not only empirical – practice. In those times inguinal hernias were frequently treated by different procedures and the knowledge of this very common pathology was going on through a steadily increasing operative experience. "Rupture" of the peritoneum was considered the premise for the formation of hernias. Paul Barbette (1620 or 1623 - 1666) [1] (Fig. 1) is commonly credited with the first statement of the possibility that lumbar hernia could exist, asserting "**Experientia me docuit, peritoneum etiam in parte posteriori versus dorsum posse disrumpi et ibi herniam efficere**" (My experience taught me that the peritoneum may rupture also posteriorly, in the dorsal region, so giving rise to hernia).
Some decades before, Gerolamo Fabrizio da Acquapendente (1533-1619) [2] had stated that "**Signum herniis omnibus commune, est tumor in testibus**" (a sign common to all hernias is scrotal tumor). Even if he makes mention of the "**de umbilici prominentia**" and of the "**de rupto peritoneo tum in viris, tum in foeminis**", it is evident that, for him, "true hernias" are the inguinal ones; he does not make any mention of lumbar hernias throughout his monumental work. L. Heister [3], who published his Surgical Institutions in the mid of the XVIII century, devotes a large space to the treatment of hernias, without any mention of lumbar hernia (in the Venice edition - 1793 - almost 40 pages deal with the treatment of hernias).

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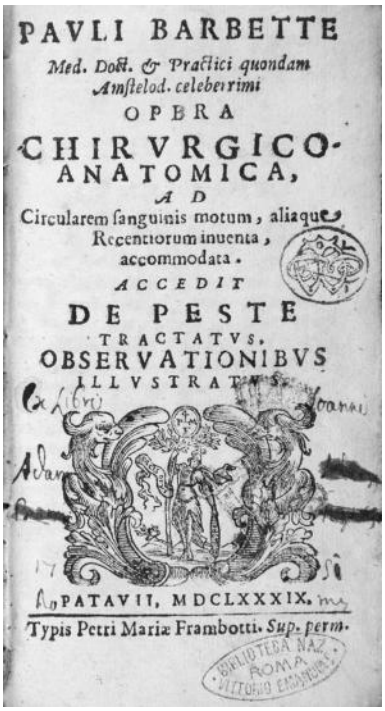
PAVLI BARBETTE
Med. Doct. & Practici quondam Amstelod. celeberrimi
OPERA
CHIRVRGICO-ANATOMICA,
AD
Circularem sanguinis motum, aliaque Recentiorum inuenta, accommodata.
ACCEDIT
DE PESTE
TRACTATVS.
OBSERVATIONIBVS
ILLVSTRATVS.
PATAVII, MDCLXXXIX.
Typis Petri Mariæ Frambotti. Sup. perm.

Fig. 1: Reproduction of the cover page of the treatise of Paul Barbette.

Also in the XIX century, treatises on surgery aiming at the education of young surgeons and students omitted to mention lumbar hernias [4] or made only some very short notice of them [5-9]. A similar trend is evident also in some treatises of surgery published in the early decades of the XX century, probably due both to the rarity of this pathology and to the scanty experience gained by a single Author.

Paul Sudek [10], from Hamburg, in the treatise on surgical operations edited in 1920 by Beer et al., on a whole of 120 pages on abdominal hernias, spent less than half a page to describe the nature and treatment of lumbar hernias. Other Editors of textbooks of surgery, however, in the same period, deemed it worth to devote a detailed attention to this topic [11,12]. The progress in the knowledge of this type of hernia is undoubtedly due to some surgeons who, prompted by the personal observation of one or few cases, on one side performed a careful review of the so far reported cases and on the other side performed or stimulated detailed anatomical studies, attempting to cross the results of the latters with the clinical and operative findings.

Nélaton [13] found, up to 1872, 21 cases, four of which complicated by strangulation. The first exhaustive review was published by Braun, from Heidelberg, in 1879 [14]; he carefully analyzed all cases up to then described through publication on books or journals, or reported to meetings, or directly and personally communicated to other Authors, quoting as precisely as possible the literary source; in several cases, Braun expressed comments on the etiology, attempting to build-up a classification, and as well, in some cases, doubts about the exactness of diagnosis. Of the 38 cases reviewed, 12 regarded male patients aged 11-70 years (mean 40.5 years) and 26 females aged 3-70 years (mean 38 years).

The first case was reported in 1731 by Croissant de Garengeot [15]: a pregnant woman, after an effort, developed a mass in the right lumbar region, between the last rib and the iliac crest; these events were complicated by strangulation; the surgeon arrived when the patient was no more alive, but he could observe that the mass, under manual compression, was reduced with gurgling sounds (worth of mention, de Garengeot practiced surgery in Paris, under the supervision of Jean Louis Petit, who elaborated the foreword to his celebrated treatises on surgical instruments and on surgical operations). The first successfully operated case should be credited to Ravaton [16], who, in January 1738, operated on a pregnant woman affected with a lumbar hernia with signs and symptoms of strangulation; after delivery, the mass became less tense but was not reducible; at operation, pus and enflamed omentum went out through the incision and it was necessary to reduce into the abdominal cavity three intestinal loops; the postoperative course was turbulent and the wound healed by second intention, but the patient was in very good conditions after slightly more than two months. From Braun's review it is evident that a certain number of cases were congenital, due to less or more pronounced malformation of the lumbar wall associated or not to visceral malformation. Trauma, direct or indirect, was the causative factor in many adult patients. Most of the cases reviewed by Braun were reevaluated by Mastin [17] in 1890 and by Goodman and Speese [18] in 1916: the latters were able to find records of more than 80 cases of lumbar hernia, of which 12 congenital, 33 acquired and the remaining consequent to local injury or disease. In 14 of the 33 cases of acquired lumbar hernia an indirect trauma, generally consequent to an unusual effort, was evident; and only in 4 of the 33 cases the patient was less than 40 years old; most of these hernias occurred in elderly individuals.

Anatomical aspects

The anatomical basis of lumbar hernia, that is the identification of the weak point(s) in the posterior abdominal wall through which herniation may occur, have been the object of long-lasting debate and as well of thourough anatomical investigations through precise dissection studies on bodies of both sexes and of different ages. In a certain number of cases, localized destruction of the abdominal wall, consequent to direct trauma (as at least in 8 of the cases reviewed by Braun – 14) or to an abscess [19] was clearly responsible of the production of a "hole"; but the attention of investigators was focused

mainly on the presence, if any, of pre-formed weak points.

Petit's hernia was considered as a synonym of lumbar hernia, going back to the celebrated report of Jean Louis Petit (1672-1750) [20]: a large mass protruding between the iliac crest and the false ribs, in a female patient, reducible with change of posture or by manual compression; it was complicated by strangulation with all the typical signs and symptoms. Petit diagnosed a lumbar hernia, through the aponeurosis of the transversus muscle, between the latissimus dorsi and the external oblique. No anatomical details, operative or post-mortem, were given by Petit and consequently some Authors have questioned the correct attribution of the eponym to the anatomical space. Petit should be credited for a brilliant diagnosis and probably also for an exact anatomical interpretation of the disease.

Lesshaft [21] studied the lumbar region in 108 adult cadavers and in 34 cadavers of embryos or newborns. Petit's triangle was often present in the formers (84/108) and seldom in the latters (9/34). The importance of the study of Lesshaft depends also on the fact that he substantially confirmed the anatomical study performed four years before by Grynfeltt [22] in Montpellier and of which he was apparently unaware.

Both Grynfeltt and Lesshaft identified a " weak " area, covered by the latissimus dorsi, which is nowadays commonly appelled triangle of Grynfeltt – Lesshaft. This space, also denominated trigonum lumbare superius, as opposed to the trigonum lumbare inferius or Petit's triangle, in the original description of Grynfeltt, is bounded by:

– the 12th rib superiorly;
– the quadratum lumborum muscle medially;
– the external oblique muscle laterally;
– the internal oblique muscle inferiorly.

The ground of the area is made by the aponeurotic fibers of the transversus muscle, which allow a passage for the lowest intercostals vessels and nerve: at this point, weakness results enhanced when the border of the internal oblique reclines more anteriorly than normal and consequently the point of perforation of the aponeurosis is fully uncovered.

According to Lesshaft, the space is bounded by:

– the extremity of the 12th rib and the border of the postero-inferior serratus muscle superiorly;
– the border of the erector trunci muscle medially;
– the external oblique muscle laterally;
– the internal oblique muscle inferiorly.

In 1902, Von Baracz and Burzynsky [23] attempted to define the exact configuration of both lumbar triangles through the dissection of the lumbar region in 38 bodies (76 lumbar regions). Initially, they established the lumbar region as the one bounded by:

– a line drawn along the spinous processes of the 5 lumbar vertebrae, medially;
– the perpendicular from the tip of the 11th rib to the iliac bone, laterally;
– the iliac bone itself, inferiorly;
– the 11th rib, superiorly.

The trigonum lumbare inferius or Petit's triangle was absent on both sides in 12 cases and on one side in 4 cases, being present in 63% of the lumbar region dissected. The base of the triangle is formed by the iliac crest; the border of the latissimus dorsi is oblique externally and upperward, while the border of the external oblique is generally almost vertical; the ground is formed by the internal oblique and may be muscular and fibrous or entirely fibrous; the muscular bundles of the internal oblique very seldom reach the erector trunci, but sometimes its tendinous aponeurosis reaches it. Deep to the internal oblique is the transversus abdominis. These muscular and fibrous layers are rather resistant and it is difficult to trespass them with a smooth instrument; there are no openings for vessels and/or nerves; however, in close proximity, just above the iliac crest, ileolumbar vessels find a passage through the tendinous part of the latissimus dorsi.

As for the trigonum lumbare superius or space of Grynfeltt and Lesshaft, its shape and size depend on several factors:

– the length of the 12th rib;
– if the muscular bundles or more often the tendinous aponeurosis of the internal oblique reach or not the lateral border of the erector trunci;
– the size of the postero-inferior serratus muscle;
– wether the fibers of the medial border of the internal oblique muscle insert on the tip of the 12th rib or above or beyond the rib;
– wether a tendinous arch is formed in the context of the aponeurosis of the transversus muscle;
– if the latissimus dorsi has accessory insertion on the 12th rib or only on the 11th rib;
– the size of the quadratum lumborum muscle.

As a consequence of the above variants, the space of Grynfeltt and Lesshaft, which resulted constantly present, may assume different sizes and configurations: triangular, rhomboidal, trapezoidal, frankly polygonal.

The aponeurotic ground of the space has a variable thickness, being thinnest at its cranial limit, where there is the passage for the 12th intercostals vessels and nerve. When the 12th rib is short, the 11th intercostal space becomes a part of the space of Grynfeltt and Lesshaft and the passage of the 11th intercostal vessels and nerve adds to the weakness of the region.

The controversy on the relevance of the lumbar triangles as predisposing weak points for lumbar hernias was longlasting, even because the percentage of acquired hernias, that could be defined spontaneous (not consequent to direct trauma or localized disease), was rather low.

In the review of Von Baracz [24], 8 cases were consequent to an abscess, 14 to trauma, 4 were "spontaneous"; however, a certain number of traumatic hernias were consequent to an indirect trauma or an effort.

Some Authors [23,25] discredited the role of Petit's triangle and others [14,19] the role of the triangle of Grynfeltt and Lesshaft.

As a matter of fact, however, both the triangles may play a significant role, even if this is not, clearly, the rule for all lumbar hernias. In particular, Coley [11] reevaluated the importance of Petit's triangle on the basis of precise operative findings. According to Goodman and Speese [18] in 15 cases among those operated on account of a lumbar hernia acquired but not related with local injury or disease, the site of the "opening" was clearly identified as the Petit's triangle 9 times and as the space of Grynfeltt and Lesshaft 6 times.

Riassunto

L'ernia lombare è una rara forma di ernia addominale, riconosciuta alquanto tardivamente nel corso dell'evoluzione della moderna chirurgia. Più volte, ha costituito motivo di accesi didattiti in merito sia al substrato anatomico sia all'etiologia. Gli autori descrivono gli aspetti "storici" di questa rara patologia, puntualizzandone le prime descrizioni, i primi reperti operatori ed altresì le ricerche anatomiche volte alla identificazione delle zone "deboli" predisponenti, oggi comunemente note come triangolo di Petit e triangolo di Grynfeltt-Lesshaft.

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