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POINT OF VIEW

Spigelian hernia in Spain. An analysis of 162 cases

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INTRODUCTION

Spigelian hernia is a rare defect of the abdominal wall. Incarceration and strangulation are frequent complications. Its diagnosis and treatment are still not standardized. The objective of this work is to review the Spanish bibliography up to 2003, and to bring this hernial pathology up to date. We analyze the number of total published cases, their series, etiopathogenesis, diagnostic procedures, differential diagnoses, and therapeutic alternatives, and the contributions of the video-endoscopic approach. The literature review included 37 papers from Spain with 162 cases, including the personal experience of the authors (16 plus 5 cases).

HISTORICAL BACKGROUND

The Flemish anatomist and surgeon Adrian van der Spiegel (1578-1625) published an anatomical description of the semilunar line (1). In 1764, J. T. Klinkosch described a spontaneous lateral ventral hernia specifically located in the semilunar line (Spigelian line) (2). Spigelian hernia (SH) is infrequently referred to in the worldwide literature. Spangen's review, in 1993, gathered a total of 979 published cases (3). In Spain, Gómez-Ferrer Bayo and Carbonell Antolí first published an article on this pathology in 1965 (4). Later, in 1970, the *Barcelona Quirúrgica* journal collected another reference to SH by Sueiras Fechtenburg (5). The review conducted by Martínez Díez, in 1975, gathered 9 personal cases and two contributions (6). Other authors have continued adding new cases, these being generally in short series (Table I).

Table I. Large Spanish series of Spigelian hernia patients

Author	*Year*	*No. of cases*
Moreno-Egea et al. (5)	2002	27
Moles et al. (7)	2000	16
Dabán et al. (8)	1992	14
Ríos et al. (9)	1999	11
Novell et al. (10)	1987	10
Pérez Palma et al. (11)	1989	10
Guirao et al. (12)	2000	9
Fernández et al. (13)	1989	7
González-Uriarte et al. (14)	2000	7
Docobo (15)	1997	5
Lesaga et al. (16)	1991	5

The Spanish literature review and presentation of a 27-patient series by Moreno-Egea et al., in 2002, should be emphasized (5). Finally we quote a worldwide literature review by Moles and Marín in 2003 (17). In the present Spanish review, we studied 162 cases from the literature, included in 37 papers from 1965 to June 2003.

DEFINITIONS

Spigelian hernia is the protrusion of a peritoneal sac or organ, or of preperitoneal fat, through a congenital or acquired defect in Spiegel's aponeurosis (18). These hernias have been described with the names of spontaneous lateral ventral hernia, joint tendon hernia, semilunar line hernia, and ventral interstitial hernia (10,19). The semilunar line runs from the dorsal muscle transition to the

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aponeurosis in the transverse muscle of the abdomen; it has a lateral convexity between the eighth or ninth costal cartilages and the pubic spine (20). Spiegel's aponeurosis is located between the semilunar line and the external edge of the muscle (21), and SH protrudes through this potentially weak structure. There are two types of SH. Higher SHs are located above the inferior epigastric vessels. Lower SHs include hernias located caudally to these vessels (22). The latter are much rarer and they can be confused with ascending direct inguinal hernias, which protrude below the joint tendon.

ANATOMY

A fact to emphasize is that the fibers of the lesser oblique and transverse muscles in the supra-umbilical region intersect at right angles, making the formation of hernias difficult. Nevertheless, muscle fibers are infra-umbilically almost parallel, thus having less resistance and an increased herniation risk (16). Most hernial orifices occur in the Spigelian hernia belt of Spangen, which is a transverse strip at 0 to 6 cm over the interspinal line (23); in this zone Spiegel's aponeurosis is wider. Almost all SHs are located below the major oblique muscle, among the different muscular layers of the abdominal wall, and called interstitial and hidden hernias (4). In the superficial variety the hernial sac crosses the major oblique aponeurosis and becomes subcutaneous. We have found this subcutaneous location in 0.8% of reviewed cases (1 in 117). The deep variety is less frequent, with the single hernial sac crossing the aponeurosis of the transverse muscle and remaining below the smaller oblique muscle (15). A hernial sac is almost always present.

During surgery the sac was empty in 34.4% of cases (43 of 125). The most frequent hernial contents are the greater omentum (39.1%), small intestine (33.7%) and colon (13.5%). Other intra-saccular organs described include: gallbladder, stomach, Meckel's diverticulum, appendix, epiploic appendix, ovary, uterine leiomyoma, and saccular endometriosis. Also there are references to combined cases of small intestine and omentum, sigmoid and omentum, etc. The hernial orifice is usually small, less than 2 cm in 57% of the reviewed cases; it is oval or rounded in form with well-defined edges (24), which may facilitate hernial strangulation.

INCIDENCE

Spigelian hernia is rare, and represents 0.1-2% of all abdominal wall hernias (25). There is a certain predisposition in females. We found in our review 104 women and 58 men, with a female: male ratio of 1.7/1. Regarding the affected side, we compiled 52 right hernias, 88 left hernias and 4 bilateral hernias. The average age of the reviewed cases was 60.3 years, with a range of 17-92 years (Table II). In the worldwide literature we found thirty cases of children younger than 16 years operated on for Spigelian hernia (17). Scopinaro described for the first time (1935) a SH in a boy aged six days, who died from incarceration (26). Several cases of congenital SH associated with non-descended testicle have been described (24).

Table II. Clinical characteristics of 162 patients with Spigelian hernia

Average age (years)	60.3 (17-92)
< 40	10.3%
40 - 49	10.3%
50 - 59	22.0%
60 - 69	25.9%
70 - 79	24.6%
> 80	6.4%
Sex (M / F)	58/104
Localization	
Right	52
Left	88
Bilateral	4
Predisposing factors	
Previous surgery	39
Obesity	21
Chronic bronchopathy	19
Multiparity	14
Constipation	5
Ascites	1
Rapid weight loss	1
Preoperative diagnosis	81.2%
Emergency surgery	40.1%
Relapse	1

ETIOPATHOGENESIS

Vascular-nervous theory

Proposed by Astley Cooper, according to which the hernial sac emerges through increased-in-size orifices in Spiegel's aponeurosis by the penetration of the deep iliac artery, a branch of the inferior epigastric artery, or branches of the abdomino-genital nerves (12). However, neuro-vascular bundles have rarely been found in the vicinity of the hernia, which is why this theory is not satisfactory.

The musculo-aponeurotic fasciculation theory

Defended by Zimmerman et al., according to which the lesser oblique and transverse muscles have a fascicular disposition with fibro-adipose zones of reduced resis-

tance. These defects or cracks are found in 6% of cases and provide sites for a possible herniation (27). Preperitoneal fat would infiltrate the deep musculature and weaken it, thus opening the way for the hernia and a stressing of the underlying peritoneum. This is the most accepted theory by authors worldwide.

Embryologic transition theory

The semilunar line, like the white line, has a zone of lower resistance between the anterior rectal muscles derived from the mid mesoderm, and the long muscles derived from the inferior thoracic and lumbar myotomes.

Theory of Watson and Iason

A weakness at the junction of Douglas' line with the semilunar line is the origin of these hernias (13). The concept of only one weak point from stress in the line is incompatible with the multiple sites where SH may appear (Table III).

Table III. Etiological theories for Spigelian hernia

Cooper's vascular-nervous theory
Musculo-aponeurotic fasciculation theory of Zimmerman et al.
Embryologic transition theory
Theory of Watson and Iason

PREDISPOSING FACTORS

Predisposing factors include those that produce an increase in intra-abdominal pressure: obesity, chronic bronchopathy, multiparity, constipation, ascites, and repeated muscular strain (3). Other implicated factors are peritoneal dialysis, rapid weight loss, and previous abdominal incisions (28). It is possible that the contraction of a scar next to a weak area in Spiegel's aponeurosis may increase the risk of hernia. Most SHs occur in the aged in association with the wearing down of connective tissue. Some neonatal cases have been related to congenital muscular defects (29).

CLINICAL DIAGNOSIS

Symptoms

Some SHs are asymptomatic and show up during an abdominal exploration or an operation. We found 4 well-documented asymptomatic cases among 148. The clinical picture is manifold and confusing, and depends on the saccular content. Delayed diagnosis is frequent. The most frequent symptoms are abdominal pain and a sensation of mass. Pain is nonspecific and increases with effort or strain, cough, and Valsalva's maneuver, whilst improving in selected positions (7). Pain was present in 89 of our 148 cases. The picture can be accompanied by a sensation of abdominal mass, which is sometimes reduced depending on the posture or pressure, located at the external edge of the rectal muscle. Of 148 cases reviewed, 85 patients had been thought to have a mass. Other symptoms include nausea, vomiting, local hyperesthesia, and altered intestinal rhythm (30). The rate of complications is high (31,32) due to delayed diagnosis and the small hernial orifice. In this review (162 cases) there were complications in 35.5% of cases, with the following distribution: incarceration 10.4%, strangulation 6.7%, intestinal obstruction 12.9%, and subocclusion 5.5%. Other potential complications include strangulated hernias of Richter's type and pyo-stercoral abscess by strangulation with perforation.

Physical examination

A soft, deep mass may be felt when the hernia is large. A gurgling sensation will be perceived when the hernia is manually reduced (33), and sometimes the hernial orifice may be felt. The hernia was palpable in 73 (80.2%) of 91 cases analyzed. If the hernial sac progresses in a caudolateral direction it may be felt outside the Spigelian zone, thus making the diagnosis difficult (23). When hernias are small they are not usually palpable, these being interstitial cases presenting in the obese. Sometimes when exploring a standing patient a sensation of resistance or a tender point is detected at the hernial orifice. Repeated explorations are necessary due to the difficulties of clinical diagnosis in these hernias.

DIAGNOSTIC PROCEDURES

Simple radiography

Authors, such as Ríos et al., remind us that a simple radiological study is a mandatory, although often inconclusive start point (9). This technique can demonstrate images of intestinal loops in an extra-abdominal location, with tangential views being very useful (34). Sometimes during orthostatism a hydro-air level may be observed (35). Simple abdominal radiology offers the radiological signs of intestinal obstruction (36) in strangulated hernias. Nevertheless this conventional examination is incapable of demonstrating epiploic content within the hernial sac (21).

Barium radiology

Studies with contrast material are of diagnostic utility when the hernial sac contains intestine, as occurred in the case of Cebollero et al. (37). Sometimes the pressure exerted by a contrast material can reduce the hernia. Oblique views are advisable to demonstrate these hernias (34), with an intestinal loop full of contrast material being observed outside the peritoneal cavity. Pérez Nevado et al. insist on the diagnostic value of an opaque enema, with radiological signs such as a greater impression of the proximal branch of the herniated loop, "peak signal", and the intermittent character of the radiological appearance of SH (27). Of 20 diagnostic barium studies (opaque enema and transintestinal) six cases were of positive diagnostic value.

Ultrasonography

The introduction of echography (ultrasounds) translated into important advances in the diagnosis of these hernias by demonstrating musculo-aponeurotic defects in the semilunar line (38). In 1989, Pérez Palma et al. published several cases diagnosed with ultrasounds (11). Because of its innocuity and simplicity it is recommended as a second technique after simple radiology in cases of suspected SH, mainly in emergencies (39). The hernial orifice is shown as an interruption in the line of echoes along Spiegel's aponeurosis (14). Valsalva's maneuver allows an appreciation of the sliding movement of sac contents through the hernial orifice. A typical "hour glass-like" image can be observed in intestinal loops when crossing the aponeurotic defect (39). Of 32 ultrasound studies reviewed in the Spanish literature a correct diagnosis was provided in 22 cases.

Computed tomography

In 1984, Carvajal et al. used computed tomography (CT) to diagnose a SH preoperatively (30). Since then most authors consider CT as the complementary test of choice when faced with the suspicion of SH, since it provides most demonstrative images of the parietal defect, the location and the contents of the sac (35). CT clearly delimits the different muscular layers of the abdominal wall, thus showing the hernia located between the anterior rectum and the transverse muscle of the abdomen (20). CT is the complementary exploration that provides really positive diagnoses. Of 26 reviewed tomographies of the abdominal wall, a correct diagnosis was arrived at in 23. Exact preoperative diagnosis facilitates a suitable approach and improves prognosis.

DIFFERENTIAL DIAGNOSIS

The differential diagnosis of SH must be made with the following pathological conditions: hemangiomas, fibromas, sarcomas, pseudo-hernia, myotendinitis, lipomas, Dercum's disease, metastases, other abdominal hernias, seromas, abscesses, desmoid tumors, and hematomas. It is also necessary to consider the following intra-abdominal diseases: diverticulitis, colonic tumors, peritoneal or epiploic tumor-like implants, pelvic neoplasm, ectopic pregnancy, ovarian cyst, intestinal obstruction, appendicitis, genito-urinary disorders, and cholecystitis (31,38). Abdominal ultrasonography and tomography are very useful in the ruling out of differential diagnoses.

TREATMENT

Treatment is surgical to prevent the frequent complications that may occur. Of 162 cases reviewed, 65 (40.1%) needed urgent surgery. The lateral approach route is most used (6), and is recommended for palpable hernias. The local approach route was used in 78 of 110 cases (Table IV). The major oblique is opened in the direction of its fibers. The sac is secured and dissected to its neck, thus avoiding the escape of hernial contents. The sac is opened and the vitality of viscera is noted, with later extirpation of the peritoneal sac and reconstruction of the wall by individual layers (29). Midline laparotomy is useful for strangulated hernias, since it allows an easy manipulation of hernial contents and a deep orifice (40). With this approach the abdominal cavity, the wall, and the opposite side can be explored. This route was used in 9 of 110 cases. Spangen proposed the preperitoneal route for non-palpable hernias. This approach, through a vertical incision, allows good visualization, a preperitoneal exploration, and the treatment of other associated hernias, and is appropriate for an exploratory laparotomy (22). The preperitoneal route is scarcely used in Spain.

Table IV. Approaches for Spigelian hernia

Route	*No. of cases*
Local	78
Midline	9
Preperitoneal	–
Endoscopic	23
Total	*110*

Some authors have proposed a reinforcement of the wall by imbricating the external oblique aponeurosis in the Mayo fashion; a plastia of the rectal sheath or a fascia lata flap (41). Using a prosthesis of synthetic material when the aponeurosis is atrophic or defects are big, and in relapsed cases is often advisable (40). A mesh is placed between the peritoneum and the wide muscles, between two muscular sheets or in a plug form. Hernial re-

currence is exceptional. In Spain, Daban et al. communicated one case (8).

Endoscopic surgical techniques

Since 1992, the endoscopic approach began to be used in the treatment of SH. In Spain, Salvador et al. published an intra-abdominal endoscopic repair in 1995 (42). Two varieties of endoscopic surgical treatment exist: transperitoneal and extraperitoneal. In the transperitoneal route, most authors close the defect by stapling prosthetic material to the abdominal wall, with or without previous suture of the hernial orifice (36). If a SH is incidentally discovered during an endoscopic exploration then repair by this route is advised in order to avoid the high risk of complications these hernias entail. The transperitoneal technique allows an exploration of the contralateral side and the abdominal cavity, and an excellent operative visualization (43). The endoscopic approach avoids the opening of the major oblique aponeurosis; it diminishes postoperative pain and the risk of dehiscence (42). Other advantages include a reduction of infection and earlier return to normal activity (44).

Moreno-Egea et al. introduced an extraperitoneal endoscopy technique in 1998 (45). This approach involves a balloon-mediated dissection, and does not require general anesthesia, thus allowing its performance on an outpatient basis and avoiding the potential morbidity of the intraabdominal route (46,47). In Spain, 23 procedures for Spigelian hernia using endoscopic techniques have been described in five different centers since 1995.

CONCLUSIONS

Being interstitial, the diagnosis of SH is difficult on many occasions. SH often has serious complications. There are few publications on this pathology among Spanish authors. These hernias are interesting and challenging for general practitioners, gastroenterologists, radiologists, and surgeons alike –those who may suspect the presence of SH when faced with atypical abdominal pain. Both sonography and CT are helpful diagnostic tools. Treatment is surgical, with excellent results. The videoendoscopic approach may contribute benefits with a reduction in hospital stay time, postoperative analgesia, and surgical wound infection.

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