

# Laparoscopic intraperitoneal mesh fixation with fibrin sealant of a Spigelian hernia

## Laparoskopische intraperitoneale Meshfixierung einer Spiegelschen Hernie mit Fibrinkleber

### Abstract

Spigelian hernia is a rare clinical entity and has a subtle clinical presentation with vague abdominal pain, which can cause an important delay in diagnosis. Given the relatively high risk of incarceration the diagnosis of Spigelian hernia is an indication for surgical repair. Laparoscopic Spigelian mesh herniorrhaphy has gained recognition as an effective tension-free method and is associated with lower recurrence. Appropriate fixation techniques are however required to reduce complications such as nerve irritation, hematoma, and postoperative chronic pain. In this case report we describe a novel approach in laparoscopic mesh repair of Spigelian hernia, securing a lightweight composite mesh with fibrin sealant. This fixation seems to be a reasonable, feasible alternative to the standard tissue-penetrating mesh fixation.

**Keywords:** Spigelian hernia, laparoscopic mesh repair, fibrin sealant

### Zusammenfassung

Bei der Spiegelschen Hernie handelt es sich um eine seltene klinische Entität, die sich eher subtil mit unklaren Bauchschmerzen präsentiert, was wiederum zu einer maßgeblichen Verzögerung in der Diagnosestellung führen kann. In Anbetracht der verhältnismäßig großen Inkarzierungsgefahr ist die Diagnose einer Spiegelschen Hernie auch gleichzeitig eine Indikation zur operativen Versorgung. Die laparoskopische Versorgung der Spiegelschen Hernie mittels Mesh-Technik setzt sich immer mehr als eine effektive, spannungsfreie Operations-Methode durch und ist mit einer niedrigeren Rezidivrate assoziiert. Geeignete Netz-Fixierungsverfahren sind jedoch notwendig, um Komplikationen wie Nervenirritationen, Hämatome und postoperative chronische Schmerzen zu reduzieren. Dieser Fallbericht beschreibt einen neuen Ansatz der laparoskopischen Versorgung der Spiegelschen Hernie, indem Fibrinkleber zur Lagefixierung eines leichtgewichtigen Composite Meshes eingesetzt wurde. Dieses Fixierungsverfahren scheint eine sinnvolle, praktikable Alternative zu den bisherigen gewebeinfiltrierenden Netzfixierung zu sein.

**Schlüsselwörter:** Spiegelsche Hernie, laparoskopische Netzversorgung, Fibrinkleber

### Introduction

Spigelian hernia is the congenital or acquired protrusion of peritoneal fat, a sac of peritoneum or an organ through the Spigelian aponeurosis. The Spigelian aponeurosis is the aponeurotic portion of the transverse abdominal muscle found between the semilunar line laterally and the lateral edge of the rectus muscle medially. Although herniation through the Spigelian aponeurosis can occur

at all levels of the abdominal wall, it occurs most commonly below the level of the umbilicus. According to the literature, Spigelian hernia affects 1–2% of the population with hernia defects, with a slightly increase in women. It presents usually between the fourth and seventh decades of life but has been also described in the pediatric population [1], [2].

Many of these patients have had previous operations or have chronic conditions leading to elevated intra-abdom-

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inal pressure (obesity, pulmonary disease, prostatic hypertrophy, multiple pregnancies). The diagnosis of a Spigelian hernia by history and physical examination is difficult because its clinical manifestation is protean. Patients may present with local abdominal swelling and vague complaints of abdominal pain are common. Little can be uncovered by the patient's history that is specific for the diagnosis. In the initial stages of development, Spigelian hernias are often difficult to diagnose by physical examination because the hernia originates inferior to an intact external aponeurosis. Fifteen years ago the physical examination fails to establish the diagnosis in up to 50% of the cases [3].

Both ultrasound and computed tomography (CT) are useful in making the diagnosis of Spigelian hernia [4], [5]. Nevertheless, it has been reported that many Spigelian hernias may remain undiagnosed and that the preoperative diagnosis could be established only in 75% of the cases [6], whereas a study from Great Britain reported only 53% of the cases to have the correct preoperative diagnosis [7]. Treatment is therefore frequently delayed. In consideration of the fact, that the fascial defect is often small (1–2 cm in diameter) with a fibrous edge, Spigelian hernias are associated with high complication rates. Incarceration is comparatively frequent, with an incarceration ratio of around 20% [7]. Therefore, the presence of a Spigelian hernia is the indication for its surgical repair. Repair of Spigelian hernia has traditionally been performed with an open surgical technique either by direct aponeurotic approximation or by applying a prosthetic patch. There is however the advantage of lower recurrence rates using prosthetic mesh in comparison of suture repair [8], [9].

The open mesh repair is still the most common method, but the laparoscopic approach to Spigelian herniorrhaphy is becoming more popular. Moreno-Egea et al. published the first prospective randomized trial of comparing open versus laparoscopic repair of Spigelian hernia [10]. There were no significant differences for epidemiological or diagnostic factors, however significant advantages for laparoscopy in terms of morbidity and duration of hospital stay could be found.

There are not only controversies in the operative technique used for mesh repair but also in the method of fixation. Mesh fixation using atraumatic means was first described by Jourdan and Bailey in 1998 using cyanoacrylate glue [11]. More recently, fixation using fibrin sealant has been described with positive results not only in animal models but also in humans [12]. In this context we describe a novel surgical approach in a case where fibrin sealant was used to fix a prosthetic patch laparoscopically in Spigelian hernia repair.

## Case description

A 27-year-old Caucasian male reported recurring vague pain in the right lower abdomen since 3 weeks. In the patient's history there was a sports accident 3 weeks prior to the occurrence of the symptoms with no serious injuries, only a hematoma of the right flank was visible. There was no nausea, vomiting or constipation. The patient hadn't had any surgical intervention on the abdomen and there was no history of other diseases. On admission the patient was in good clinical conditions without fever. The abdominal examination revealed a minimal palpable soft swelling on the right side, below the umbilicus and lateral of the rectus abdominis muscle. The mass had a maximum diameter of 1 cm and was reducible. It hasn't been noticed by the patient so far and was not aching neither was there a tenderness. Bowels sounds were normal and peristaltic was present. Abdominal ultrasound revealed a small fascial defect of 2 cm in diameter. During Valsalva manoeuvre a protrusion of a peritoneal sac, but no organs could be demonstrated (Figure 1).

An elective laparoscopic surgery followed. Under endotracheal anesthesia, in supine position, a small incision was made beneath the left costal arch. The abdomen was insufflated with carbon dioxide and a 10-mm, 30-degree, laparoscope was inserted into the abdomen. A full laparoscopic exploration of the abdomen with attention focused on both inguinal regions and the contralateral Spigelian aponeurosis was completed without finding other defects. A small cleft-like defect could be seen in the right Spigelian aponeurosis, which confirmed the diagnosis of Spigelian hernia. A peritoneal flap was created (Figure 2) and the sac was dissected circumferentially. This dissection revealed that the defect was considerably larger than first suspected. A 15 x 10 cm piece of a composite polypropylene/polyglactin mesh (Vypro II, Ethicon, Nordersted, Germany) was positioned to cover the defect and reinforce the Spigelian aponeurosis. The mesh was then fixed with 2 ml of a fibrin sealant (Tissuecol Baxter, Unterschleißheim, Germany) (Figure 3). The peritoneal flap was approximated with a continuous absorbable suture. Abdomen was deflated and the skin at all trocar sites, was closed with absorbable suture.

No postoperative complication occurred and the patient was discharged after 48 hours. In the follow-up after 3 weeks and again after 8 months, no recurrence was detectable and adequate tissue integration could be observed (Figure 4). During the whole postoperative period there was no occurrence of hematoma or chronic pain.

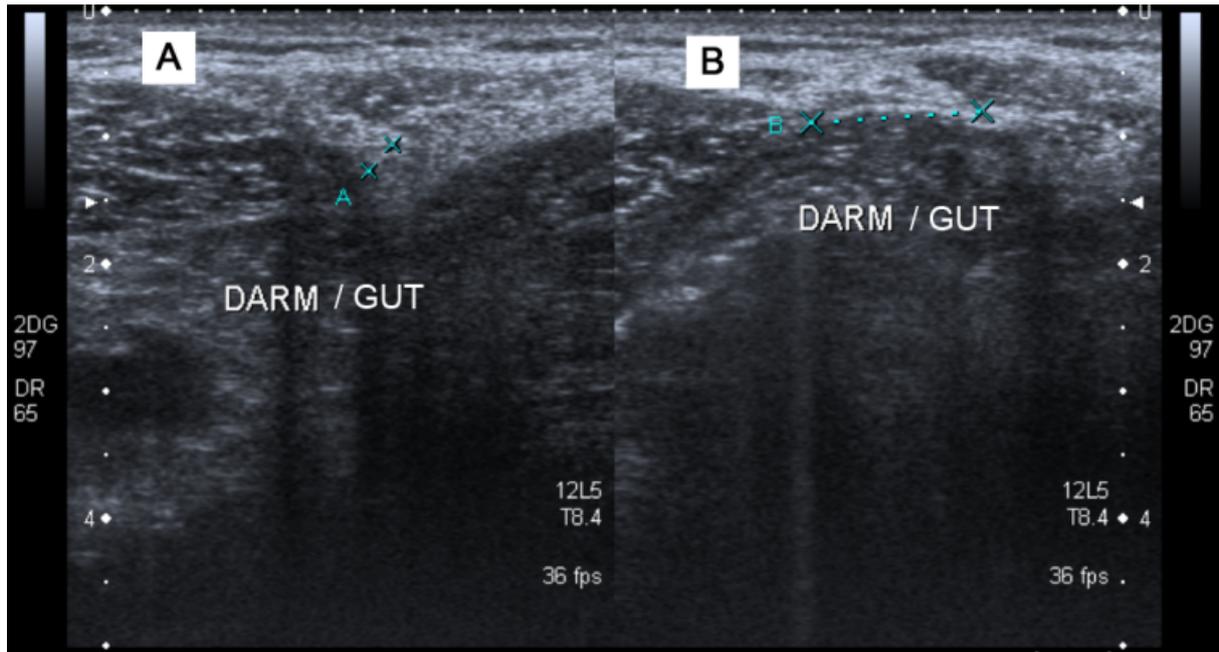


Figure 1: Ultrasound image of Spigelian hernia. Defect is shown (A) without (B) with Valsalva maneuver.

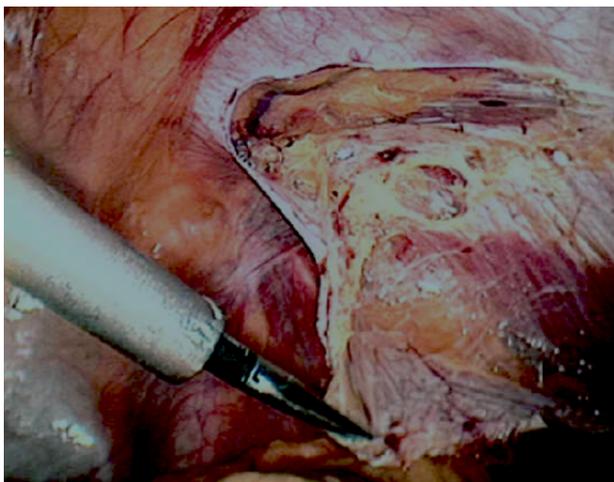


Figure 2: Spigelian hernia defect without any contents, after creation of peritoneal flap

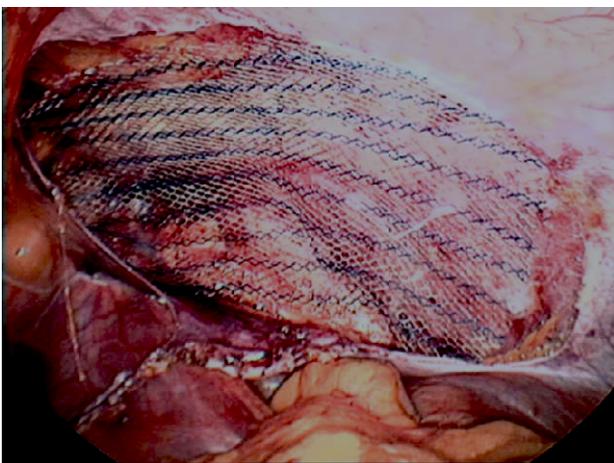
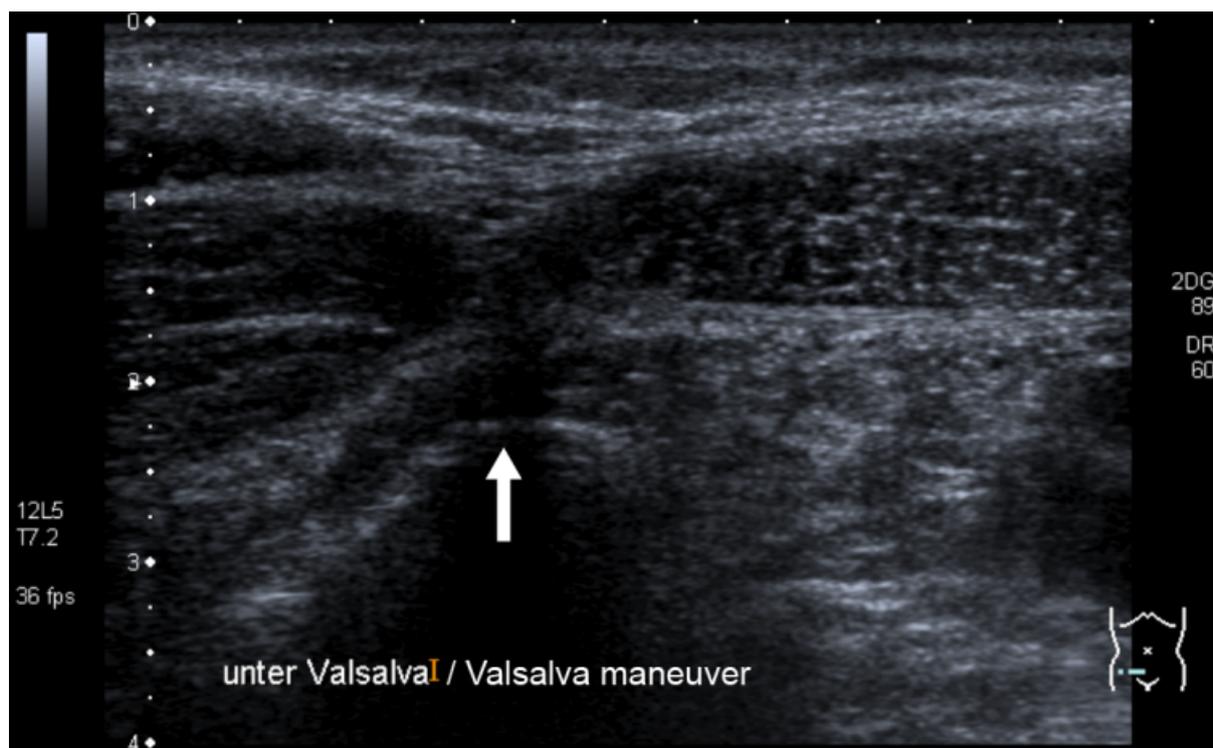


Figure 3: Defect reinforced with a lightweight multifilament polypropylene/polyglacrin mesh. Fixation with fibrin sealant.

## Discussion and conclusion

With an increasing number of cases of Spigelian hernia reported, the awareness of this rare entity raises as an important differential diagnosis. The difficulty is no longer the correct preoperative diagnosis but also the adequate surgical approach. However, the ideal prosthetic material for Spigelian hernia repair has yet to be described. Each prosthetic material has unique advantages and disadvantages. Reducing the density of polypropylene (PP) and creating a light weight mesh theoretically induces less foreign-body response, results in improved abdominal wall compliance, causes less contraction or shrinkage of the mesh, and allows for better tissue incorporation [8]. In our case we used the Vypro II mesh (Ethicon), a new generation of mesh that is a partly absorbable light-weight multifilament mesh, composed of approximately equal parts of non-absorbable polypropylene and absorbable polyglacrin. A study in a rat model could show a pronounced reduction concerning the colonization of the interface with macrophages in the polypropylene/polyglacrin mesh compared to the polypropylene and polyethylene terephthalate groups [13]. Furthermore a time-dependent decrease of infiltration of mast cells at the tissue graft could be observed in the Vypro II mesh. Interestingly they found a less pronounced inflammation reaction in the Vypro II mesh compared to the pure PP mesh in long-term tissue response, suggesting even an anti-inflammatory property of polyglactin multifilaments.

There are not only controversies in hernia repair concerning prosthetic materials but also in the method of fixation. In the current case we used fibrin sealant as an alternative to the common suture or stapler mesh fixation in Spigelian herniorrhaphy. Fixation using glue decreases the time of procedure and minimalizes the risk of certain complications, such as nerve entrapment and hematoma [12],



**Figure 4:** Ultrasound image 8 months after the operation during Valsalva maneuver. No recurrence. Mesh is shown (indicated by arrow).

[14]. Furthermore a significant decrease in the rate of postoperative chronic pain with fibrin sealant compared with tack staples was reported.

In conclusion, not only the kind of mesh that is used, but the appropriate fixation technique also requires further exploration to reduce complications such as nerve entrapment, hematoma, and postoperative chronic pain. We therefore performed a novel approach in laparoscopic mesh repair of Spigelian hernia using fibrin sealant with a lightweight multifilament polypropylene/polyglacine mesh. This fixation method is easy to use with a high efficacy and could be a reasonable, feasible alternative to the standard tissue-penetrating mesh fixation in Spigelian hernia repair.

## Notes

### Competing interests

The authors declare that they have no competing interests.

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