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Complex Incisional Hernia – Easy To Diagnose But What To Do After?

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ABSTRACT

Introduction. Loss of domain represents a defect in abdominal wall or loss of continuity of fascial closure, with more than 20% of the peritoneal cavity content under the skin in a serous sac, where the reconstruction involves additional reconstructive techniques. Clinical Case. A 63-year-old active smoker with multiple comorbidities such as COPD severe form with the need for oxygen at home (may be an absolute contraindication) and surgical history of open umbilical hernia repair with a rapid development of loss of domain hernia (2 weeks after surgery) was prepared preoperatively with Botulinum Toxin type A and Preoperative Progressive Pneumoperitoneum. Discussion. Despite comorbidities, by optimizing the abdominal wall with Botulinum Toxin type A and Preoperative Progressive Pneumoperitoneum with the intraoperative use of the Rives-Stoppa technique or posterior separation of components, Abdominal Wall Strength Score improves significantly in a short time, with quick socio-economic reintegration and low-rate of complications. Conclusions. By preoperative preparation, with augmentation techniques of the abdominal wall, thus, even the barriers given by comorbidities (absolute contraindications) are overcame, with low postoperative risks, offering the patient a normal quality of life.

Keywords: Complex incisional hernia; Optimization; Botulinum toxin A; Pneumoperitoneum; Augmentation; Posterior component separation

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Introduction.

Incisional hernia represents a defect in the abdominal wall or loss of continuity of fascial closure, appeared after abdominal surgery, through which, the content of the peritoneal cavity protrudes under the skin in a serous sac [1-2]. It is the most frequent postoperative complication, with an incidence rate between 5-20%, which influences the patient's quality of life, sometimes being associated with life-threatening complications such as incarceration (6-15%) and intestinal strangulation (2%). It is also known that the recurrence rate is extremely high, ranging between 14-63%, despite all lately improvements in surgery [1-2].

In 2019, an International Delphi Consensus of Expert Surgeons established the definition for the loss of domain (LOD). According to the authors, LOD is a ventral hernia large enough such that simple reduction in its contents and primary fascial closure cannot be achieved either without additional reconstructive techniques or without a significant risk of complications due to the raised intra-abdominal pressure [3].

We present here a clinical case with loss of domain with a relative indication for surgery who was resolved with proper systemic and local optimization.

Figure 1. Clinical aspect of incisional hernia (lateral view)

Clinical Case.

A 63-year-old male patient, was admitted in the Clinical Department of Surgery in June 2021 for abdominal pain, and an abdominal large irreducible mass (figure 1). The onset of symptoms dates from about 1 year ago shortly (2 weeks) after an umbilical hernia repair without mesh in another surgical department. Clinical exam highlights a patient with oral cyanosis, with dyspnea and limited physical performance (Karnofky Performance Index = 40 – disabled, requires special care and help), and severely influenced emotional status. The abdominal mass was not reducible in supine position. Medical history shows an active smoker with multiple comorbidities: stage I obesity (BMI: 31.1kg/m^2), stage IV Gold COPD with the need for oxygen at home, type 2 compensated diabetes with oral therapy, hepatic steatosis, stage 2 hypertension stable under medication, and chronic NYHA II heart failure. Biologic routine samples evidenced a slightly increased leukocytosis (11.200/mm^3), moderate hyperglycemia (167 mg % with HbA_1 - 7.2%), normal renal and liver function, no dyslipidemia. Arterial blood gases at admission pH = 7.403 (normal); pCO_2 = 33.5 mmHg (decreased); pO_2 = 44.1 mmHg; Lactate = 1.8mmol/L (normal). An abdomino-pelvic native CT scan is performed (General Electric Optima CT520): large midline

parietal defect involving almost the entire linea alba with a length of 160 mm and a width of 160 mm, through which intestinal loops and omentum are engaged. According to Tanaka the Incisional Hernia Sac Volume (IHV) was 2738 cm^3, Abdominal Cavity Volume (ACV) was 6100 cm^3, and Peritoneal Volume (PV = ACV+ IHV) was 8838 cm^3. In order to evaluate the degree of LOD, the Sabbagh Index (IHV/IHV+ACVx100) is calculate with the value of 31% (figure 2). At spirometry, a severe ventilatory dysfunction (restrictive and obstructive) with 67% VEMS reduction is record (figure 3).

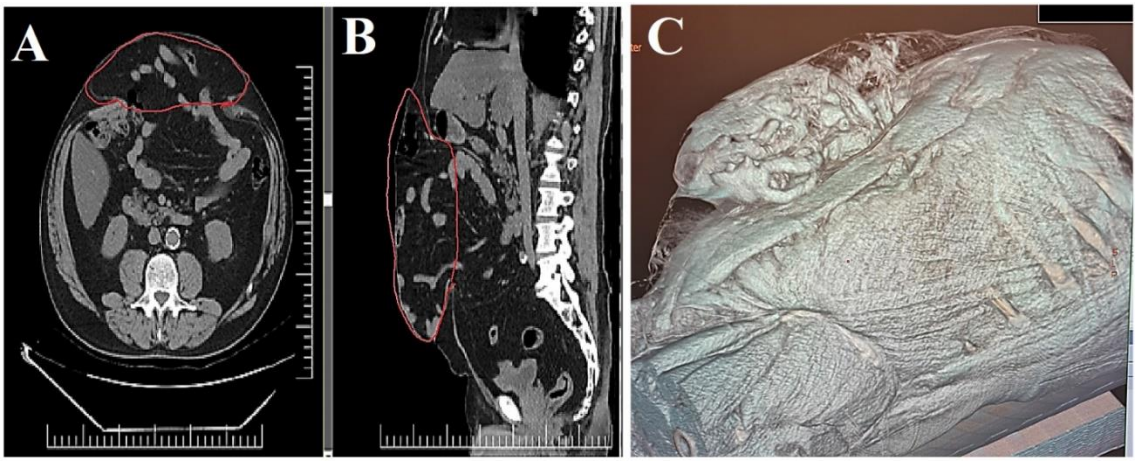

Figure 2. Preoperative CT scan. Note the CC and LL large diametrs and volumes of incional hernia sac and abdominal cavity. **A.** Transversal view; **B.** Sagital view; **C.** 3D reconstruction

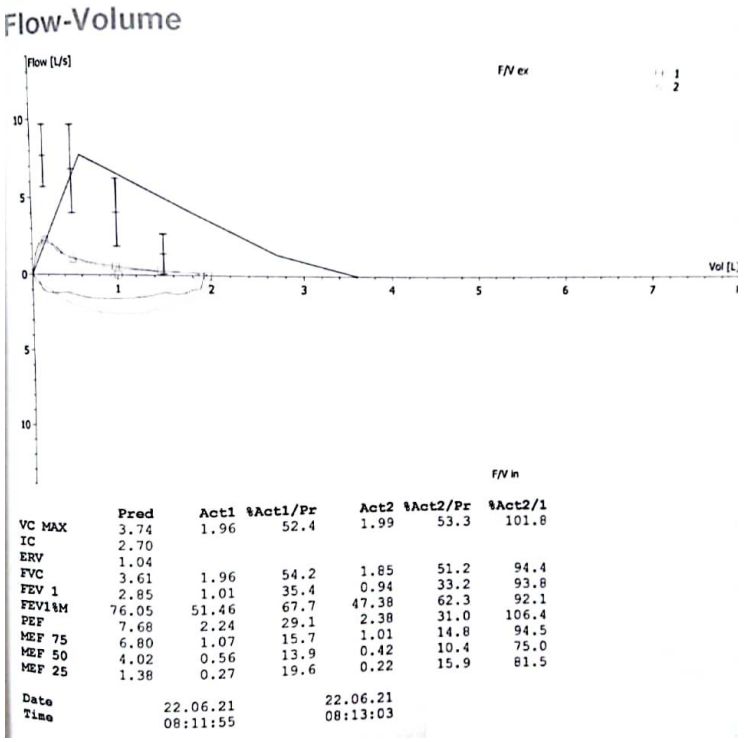

Figure 3. Preoperative respiratory evaluation: **A.** Restrictive dysfunction (Forced vital capacity: Actual 1.96 l, Actual/Predicted 54.2%); **B.** Severe obstructive dysfunction (Forced expiratory volume at 1 sec: Actual 1.01 l; Actual value/Predicted 35.4%; Tiffeneau Index: Actual51.46, Actual/Predicted 67.7%; Peak of expiratory flow: 2.24 l); **C.** Obstruction on small airways (Forced expiratory flow at 25% lung volume: 19.6%; Forced expiratory flow at 50% lung volume: 13.9%; Forced expiratory flow at 75% lung volume: 15.7%)

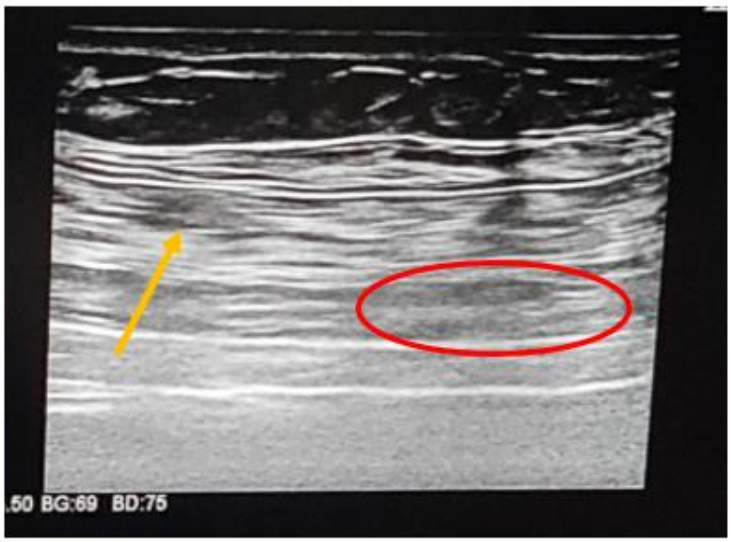

Figure 4. Botulinum Toxin type A injected into the lateral muscles under ultrasound guidance. Note the bubbles of diluted toxin into the internal oblique muscle (arrow) and transversus muscle

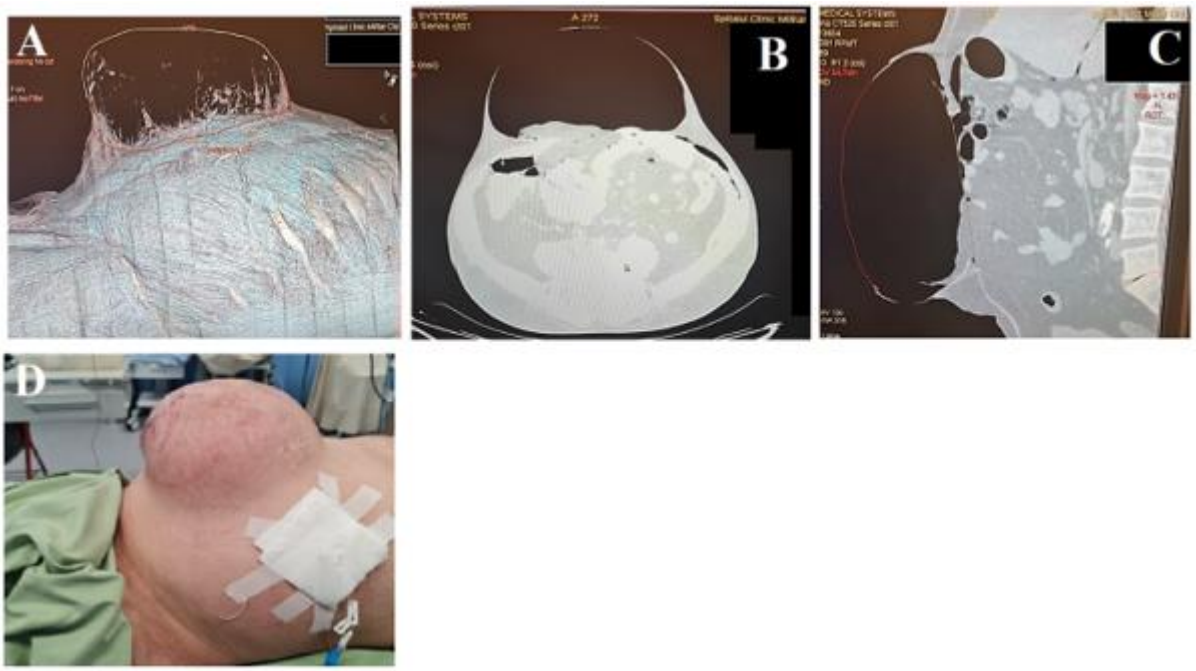

Figure 5. Aspects at the end of the wall augmentation. **A.** 3D reconstruction; **B.** Transversal view; **C.** 3D reconstruction; **D.** Preoperative aspect. Note the complete reduction of the herniated mass is kept in place by the air.

Under these circumstances, we referred the patient to the pneumologist for a complete pulmonary assessment and optimization if possible. After 1 week of pulmonary rehabilitation, the significant improvement of the clinical status and the new spirometry, suggest than the patient could be a candidate for an abdominal wall reconstruction with minimal risks. We decide to measure the intra-abdominal pressure (IAP) indirectly through a urinary catether; the recorded value was six mmHg. Abdominal wall function was evaluated by two clinical tests: Double Leg Lowering (DLL) and

Trunk Raising (TR); values of the total score (T = DLL + TR) showed a trace level (2 points).

At this stage, we decided to enlarge the abdominal wall and to increase its compliance *via* a chemical component separation. Under ultrasound guidance 500 I.U. of Botulinum Toxin type A (Dysport™) diluted in 100ml of 0.9% saline was injected into the lateral muscles according with Ibbara-Hurtado technique [4] (figure 4). We discharge the patient with medical and physical respiratory recommendation. After 6 weeks, he was re-admitted; pneumologist examination revealed a marked improvement of the respiratory function (data not show). Smoking completely ceased for 8 weeks. After CT scan, reexamination a decrease of the width and length of the defect (150/130 mm CC/LL) is notice and the second stage of optimization is initiate with the aid of progressive pneumoperitoneum (PPP). Under local anesthesia with 200 mg of 1% Xylocaine, we insert a central venous catheter, in the Palmer's point and environmental air is insufflated daily into the peritoneal cavity for 10 days with a total volume of 11.000 ml.

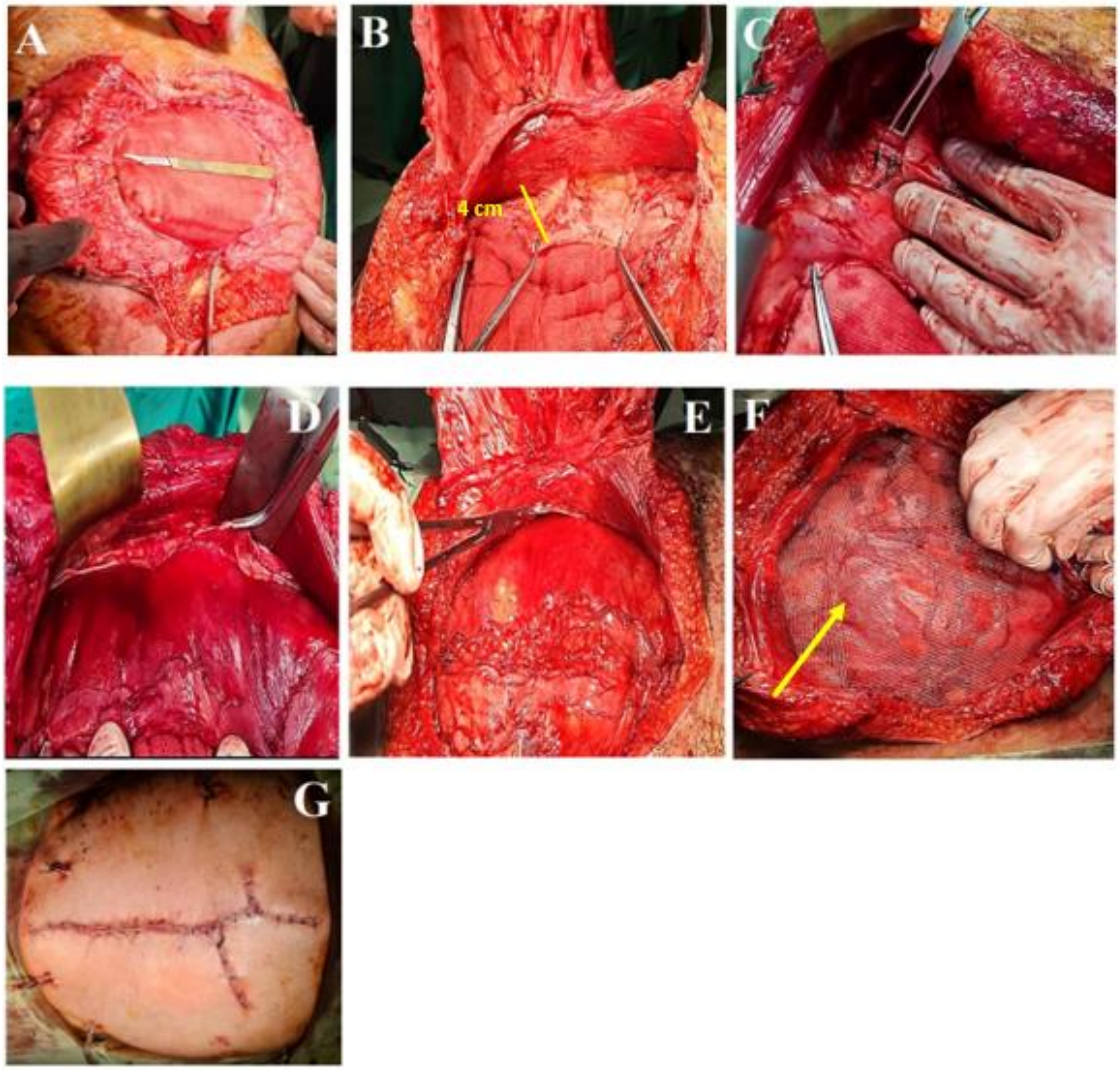

Figure 6. Intraoperative aspects. **A.** Intraoperative defect measurement; **B.** Opening of the retro-rectus space. Note the reduced width of the posterior rectus sheath, which is only 4 cm; **C.** Posterior separation of components (progression of TAR); **D.** Medial advancement of the posterior sheath and the large preperitoneal space developed after TAR; **E.** Closing the posterior sheet; **F.** Mesh inserted in the retro-muscular space; Arrow indicates the line of sutures between meshes; **G.** The final aspect of the operation

At the end of the augmentation of the wall, a control abdominal-pelvic CT-scan is performed where is observed the reduction of the content in the peritoneal cavity by pneumo-adhesiolysis, and an elevation of the diaphragm with 6 cm (figure 5). Preoperatively a new record of the IAP was done and showed an increase from 6 mmHg to 14 mmHg without respiratory compromise.

Surgical procedure: Before anesthesia, IAP via urinary catheter is 12 mmHg. After intubation, Plateau Pressure (PPr) was recorded; the abdomen is open through the old scar. Minimal adhesyolisis was necessary. The medial border of the rectus muscle are identified and the rectus sheath was opened on its posterior aspect in the right side and on its anterior on the left side in order to preserve peritoneal flaps. We develop the retro-rectus space from the xiphoid process to the pubic symphysis (extreme retraction with a width of about 4 cm on each side); the anterior rectus sheath even with the preservation of the peritoneal flap cannot reached the midline. We decide to perform a posterior component separation with transversus abdominis release (PCS-TAR) on both sides (figure 6). The preperitoneal space is dissect until we reach bilaterally the psoas muscle. After that, the posterior rectus sheath with a small amount of peritoneum was closed with a running suture of 2-0 polydioxanone (PDS) in a 5-to-1manner. A quilted macroporous medium-weight monofilament polypropylene mesh summing 45x45 cm was inserted in that large space and fixed with cyanoacrylate (Hystoacril™). Plateau pressure at this stage was 14 mmHg. Two drains were inserted on the surface of the mesh and after completing hemosthasis, the anterior fascia was closed with minimal tension with a running suture of 1 polydioxanone in the same manner as posterior sheath. Again, PPr was 14 mmHg. The excess skin was removed and closed with interrupted sutures. At the end of the procedure, PPr recorded values of 13 mmHg and IAP 13 mmHg. Total operative time was 110 minutes of which 20 minutes for TAR. The patient was extubated and monitored for 12 hours in the ICU.

Uneventful recovery: the drains were removed in the 4th postoperative day when only 10 ml of serous fluid was recorded. The patient was discharged in the 7th postoperative day.

At one month, the patient presents to the outpatient clinic in good condition with a flat abdomen and good respiratory function (no O_2home dependence). At the evaluation of the abdominal wall functionality a marked improved is noted (TR 2 point; DLL 3 points; AWS 5 points).

Discussion.

Comorbidities can seriously affect the patient's outcomes in repairing of the abdominal wall. It is mandatory to analyze several risk factors and preoperative optimization of the patient, such: obesity (BMI <35), diabetic control (HbA1C <7 mmol/L), abstinence of smoking prior with 4-6 weeks before surgery, normal value of albumin [1-2].

One method by which we can say that we are facing the loss of domain, is to determine the Tanaka Index (LOD=HSV/ACV) or the Sabbagh Index (LOD=HSV/TPV) by CT-scan analysis and by which the volume of the sac must be over 20% [3].

Chemical Component separation with Botulinum Toxin type A has several paramount advantages: increasing lateral muscle length (~3.5 cm on each side), decreasing defect size (~6 cm), significantly reducing postoperative pain and opioid use, decreasing the risk of complication [4-6]. The conclusion is that the technique has a high safety profile that ensures an optimal closure of the abdominal wall.

In addition to Botox advantages, the preoperative progressive pneumoperitoneum contribute to the enlargement of the peritoneal cavity, and to improvement of the respiratory function; either progressively increase IAP to allow a progressive accommodation with the reintroduction of the visceral mass. Progressive air insufflation stretch the abdominal wall muscles with increasing their length sometimes with 6 to 9 cm [7]. It is a technique with a high

safety profile and allows the decrease of the operating and hospitalization time. Most of the complications are minor such as shoulder pain, subcutaneous emphysema, or abdominal pain [8].

Rives – Stoppa is the gold standard and the recommendation of the European Hernia Society for most of ventral hernias, but in complex situations, this technique is insufficient because of the narrowed retro-muscular space. Since Novitsky published the posterior component separation technique, it has grown among use preferences for complex incisional hernias [9]. The advantages of this technique, practically a continuation of the Rives-Stoppa technique, are as follows: provide an important medial advancement for both rectus sheaths (~8-10 cm on each side), is effective in restoration of the linea alba, and develops a large retro-muscular plane for a giant prosthetic reinforcement. It is safe, effective, and ensures an optimal abdominal closure when the indication is correct and the expertise is present [9].

Even if the patient's comorbidities contraindicated the reconstruction of the wall, the operation was successfully crowned, with the patient being discharged on the 7th postoperative day, without complications.

The functionality of the abdominal wall improved significantly at one month postoperatively. Applying Trunk Raising Test (1 to 2 points), Double Leg Lowering Test (1 to 3 points), overall improvement of Abdominal Wall Strength Score at a level of fair (5 points in one month postoperatively) from trace (2 points at admission).

Conclusions

By preoperative preparation, with augmentation techniques of the abdominal wall, of the patient in case of ventral hernia with loss of domain and by applying a concrete reconstruction protocol, the desired results can be obtained with a rapid recovery, low rate of postoperative complications and rapid socio-economic reintegration.

Thus, even the barriers given by comorbidities (absolute contraindications) can be overcome, with low postoperative risks, offering the patient a normal quality of life.

Compliance with ethical standard

Conflict of interest: The authors declare that they have no conflict of interests.

Disclosure: Nothing to disclose for all authors.

Ethical approval: The study was approved by the hospital ethics. Informed consent Informed consent for procedure and consent for review of patient data were taken from the participating patient.

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References

[1]. Itatsu, K., et al. "Incidence of and risk factors for incisional hernia after abdominal surgery." *Journal of British Surgery* 101.11 (2014): 1439-1447.

[2]. Stabilini, Cesare, et al. "Preventing Incisional Hernias: Closure of Abdominal Wall, Follow-Up in Abdominal Surgery." *Abdominal Wall Surgery*. Springer, Cham, 2019. 71-83.

[3]. Parker, Samuel G., et al. "Definitions for loss of domain: an international delphi consensus of expert surgeons." *World journal of surgery* 44.4 (2020): 1070-1078.

[4]. Ibarra-Hurtado, T. R., et al. "Effect of botulinum toxin type A in lateral abdominal wall muscles thickness and length of patients with midline incisional hernia secondary to open abdomen management." *Hernia* 18.5 (2014): 647-652.

[5]. Weissler, Jason M., et al. "Chemical component separation: a systematic review and meta-analysis of botulinum toxin for management of ventral hernia." *Journal of plastic surgery and hand surgery* 51.5 (2017): 366-374.

[6]. Alam, Nasra N., et al. "Methods of abdominal wall expansion for repair of incisional herniae: a systematic review." *Hernia* 20.2 (2016): 191-199.

[7]. Mayagoitia, J. C., et al. "Preoperative progressive pneumoperitoneum in patients with abdominal-wall hernias." *Hernia* 10.3 (2006): 213-217.

[8]. Martínez-Hoed, J., S. Bonafe-Diana, and J. Bueno-Lledó. "A systematic review of the use of progressive preoperative pneumoperitoneum since its inception." *Hernia* (2020): 1-16.

[9]. Novitsky, Yuri W. "Posterior component separation via transversus abdominis muscle release: the TAR procedure." *Hernia surgery*. Springer, Cham, 2016. 117-135.