Abstract

Introduction. Retromuscular mesh hernia repair using Rives-Stoppa technique has demonstrated the best results when it comes to repairing large midline hernias. We present the first pediatric case successfully treated with this technique.

Clinical case. This is the case of a 9-year-old male patient with hernia following urgent midline laparotomy. Basic repair principles included opening of the hernia sac and adhesiolysis, longitudinal incision on the posterior sheath of the rectus muscle and division of the retromuscular space, closure of the posterior sheath, placement of a mesh on this plane in the brand-new retromuscular space, and tension-free closure of the anterior musculo-aponeurotic flap, thus reconstructing the midline. No recurrences have been noted after a 2-year follow-up.

Discussion. Rives-Stoppa technique allows for a more anatomical layered reconstruction, which helps restore the anatomical and physiological properties of the abdominal wall. In our view, this could be a useful alternative for pediatric hernia treatment.

Key Words: Hernia; Rives-Stoppa; Retromuscular; Mesh; Pediatric Surgery.

INTRODUCTION

Hernias are rare in children, with an incidence of 2.1-3.2%, which is very low as compared to adults (5-50%) (1-3). As a result of this, incisional hernia repair has been little explored in pediatric surgery, where primary closure has been typically favored. If a prosthetic mesh is used, it is often placed above a primary closure (onlay technique) or sutured to the borders of the aponeurotic defect (inlay technique) (4). Only one case of anatomical reconstruction surgery of the abdomen has been described – a reconstruction surgery using Albanese technique in a 7-year-old female patient with giant hernia (5).

In the sublay technique, which requires the use of the mesh made popular by Jean Rives and Rene Stoppa in the late 1980s, dissecting a retromuscular plane between the muscle bellies and the posterior aponeurosis of the abdominal rectus muscles provides a vascularized space where the mesh can be placed, and frees the muscles for a tension-free closure of the musculo-aponeurotic flap in the midline (Figure 1), thus reconstructing the anatomy of the abdominal wall (6-8). In adults, the Rives-Stoppa retromuscular technique (RSRT) is considered as the technique of choice when it comes to repairing > 5 cm midline hernias (9).
This is the first case of a pediatric patient with midline hernia successfully treated using RSRT.

CLINICAL CASE

This is the case of a 9-year-old male patient diagnosed with type II mucopolysaccharidosis, with history of umbilical herniorrhaphy when he was 4. He underwent urgent supra- and infra-umbilical midline laparotomy as a result of a small bowel volvulus secondary to an umbilical adhesion. At postoperative week 3, he developed a midline progressive hernia with an 8 cm aponeurotic defect (Fig. 2). Given the size of the hernia defect and the presence of symptoms such as abdominal pain and local discomfort, surgical repair was decided upon. The hernia defect was accessed through a midline incision on the previous scar, and the hernia sac was dissected to the ring, while detaching it from the subcutaneous cellular tissue. The sac was opened by means of an adhesiolysis, and the abdominal cavity and the fascial defect were explored. The abdominal rectus muscles were then found to be laterally displaced on both sides of the hernia ring. A longitudinal incision was carried out on the posterior sheath while exposing the muscle throughout the whole defect. A retromuscular plane was dissected underneath the rectus muscle, while detaching the posterior sheath from the muscle belly. Dissection was extended laterally until the perforating branches of the inferior epigastric vessels were identified, and pursued 3 cm above and underneath the aponeurotic defect. A first plane was reconstructed by closing the peritoneum and the posterior sheath of the rectus muscles in the midline. A polytetrafluorethylene mesh was positioned on this plane, while extending it along the brand-new retromuscular space (Fig. 3). An aspiration drainage was placed at this level. Finally, the muscle flap and the anterior sheath of the rectus muscles were sutured in the midline, with a

Figure 1. Basic principles of Rives-Stoppa retromuscular technique: A) Longitudinal incision on the posterior sheath of the rectus muscle. B) Dissection of a retromuscular plane between the muscle belly and the posterior sheath. C) Closure of the posterior sheath in the midline (red arrow) with mesh placement on this plane and closure of the anterior musculo-aponeurotic flap (black arrow).

Figure 2. External appearance of the ventral defect before surgery.
tension-free closure allowing the anatomy of the abdominal wall to be reconstructed.

In the immediate postoperative period, the patient had a subcutaneous hematoma requiring exploration and drainage at the operating room. The remaining postoperative period was uneventful, and after 2 years of follow-up, no hernia recurrences have been noted.

DISCUSSION

Midline hernias cause the abdominal rectus muscles to be lateralized. Although they remain irrigated and innervated, these muscles do not function properly owing to the loss of tendinous insertion in the linea alba, which brings about progressive atrophy\(^5,10\). RSRT restores the anatomy of the native abdominal wall by reconstructing the midline. In their analysis of the rectus muscle’s function using a dynamometer, Criss et al. revealed the importance of bringing the muscles close to the midline. Through isokinetic and isometric measurements, they demonstrated a statistical improvement in muscle dynamics following anatomical reconstruction of the abdominal wall, which was associated with increased patient quality of life\(^10\).

RSRT allows the defect to be repaired on 2 planes, with the reinforcing mesh being placed in the retromuscular space, which favors integration with the abdominal wall. When the mesh is sutured to the borders of the aponeurotic defect only, not only is it exposed to the intraperitoneal content – with the resulting risk of adhesions and intestinal fistula –, but it is also less in contact with the greatly vascularized anterior musculo-aponeurotic complex, thus limiting integration and increasing the risk of recurrence. In addition, retromuscular placement allows the mesh to be less in contact with the skin, which prevents contamination and surgical wound related complications\(^3,11-13\). RSRT also allows the abdominal rectus muscle to be freed, providing 2 cm of muscle medialization, which favors tension-free closure and prevents compartment syndrome\(^14,15\).

In general, this technique is considered to be more difficult to execute and requires greater experience and technical skills, especially in patients with previous abdominal surgery. In these patients, the rectus muscle or the posterior sheath may be compromised, which means this space is small, difficult to dissect, or simply does not exist. Furthermore, the fact the layers are more detached – with the resulting risk of perforating vessel lesions – and larger prosthetic material is required makes hematomas and infection more likely\(^12,16,17\).

In our case, RSRT was preferred to other options given the size of the parietal defect and the underlying metabolic disease, which implied a higher risk of recurrence. RSRT allowed for a more anatomical layered reconstruction, while restoring the anatomical and physiological properties of the abdominal wall. And even though it is more technically demanding, our experience shows it is feasible in children and can be a useful alternative for pediatric hernia treatment.

REFERENCES