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Case report: Preoperative progressive pneumoperitoneum in giant inguinoscrotal hernia

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ABSTRACT

Giant inguinoscrotal hernias are rare surgical entities, generally seen in developing countries, and pose a challenge to surgeons trying to repair this hernial defect. Therefore, to facilitate the surgical procedure, a progressive pneumoperitoneum technique before surgery has been proposed. Here we describe the case of a 43-year-old male patient who presented to the outpatient surgery office with a giant inguinoscrotal hernia, which had been growing for 11 years and was not associated with any discomfort other than a difficulty in walking. During hospitalization, preoperative progressive pneumoperitoneum generation technique was performed, and intra-abdominal pressure levels were monitored for seven days. Surgical right inguinal hernia repair was performed using the Stoppa technique, exposing a large defect on the posterior wall of the right inguinal canal where the greater omentum bulged out. There was also evidence of small intestine loops and right colon lodged in the scrotum. The hernia sac was reduced and cut with relative ease; the defect was repaired using a mesh implant covering the full area of the Fruchaud's myopectineal orifice defect in the preperitoneal space, closing the cavity layer by layer until reaching the skin. The patient had a postoperative period with no complications and was discharged on the fifth day.

Key words: Giant inguinoscrotal hernia, preoperative progressive pneumoperitoneum, hernioplasty, case reports

Introduction

Giant inguinoscrotal hernias are rare surgical pathologies, most frequently seen in developing countries due to two reasons: on the one hand, patient's negligence by not seeking medical attention timely; and, on the other hand, the possible influence of the healthcare system [1]. The starting point is a simple inguinal hernia, but the hernial defect grows as a result of patient's physical effort and lifestyle, eventually allowing the

omentum, small intestine, colon, and other organs to enter. These are conditions which alter the quality of life as they generally hinder walking, sitting, or defecating [2]. Surgical repair is quite a challenge for surgeons due to the massive hernia contents, adhesions, and concomitant fibrosis. One of the recommended techniques for repair is preoperative progressive pneumoperitoneum, which facilitates surgery and prevents intra-abdominal post-operative complications, such

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as intra-abdominal hypertension or cardiorespiratory problems [3]. Here we describe the case of a 43-yearold male patient who had an asymptomatic giant inguinoscrotal hernia which had been growing for 11 years. The patient underwent surgery to repair the hernial defect following preoperative preparation using progressive pneumoperitoneum.

Case Presentation

A 43-year-old male patient was admitted for surgery for his progressively bulging right scrotum, worsened by physical effort, which did not pose him any discomfort other than difficulty in walking. The patient did not have any comorbidities, risk factors, or previous surgeries. Data recorded on Physical Examination: BP: 120/60 mmHg; HR: 80; RR: 19; temperature: 36.8 °C; abdomen: globular, hydro-aerial sounds; right inguinoscrotal mass with a size of 40 x 25 x 20 cm, painless to palpation and movement, non-reducible (Figure 1). Data recorded at Supporting Examinations: white blood cell (WBC) count: 7,430/mm³; hemoglobin: 14.6g/dl; hematocrit: 43.4%; platelets: 234,000/ mm³; glucose: 114mg/dl; creatinine: 0.92mg/dl; urea: 27mg/dl; complete urine test: no abnormalities; chest x-ray: no abnormalities.

During patient hospitalization, progressive pneumoperitoneum generation technique was performed. An initial puncture with Veress needle was performed, and a CERTOFIX[®] catheter was introduced in the up-



Figure 1. Giant right inguinoscrotal hernia with the lower end reaching knee level.



Figure 2. CERTOFIX® catheter insertion into the upper left quadrant of the abdomen by Seldinger technique for pneumoperitoneum generation.



Figure 3. Simple abdominal x-ray, showing pneumoperitoneum a day before surgery.

per left quadrant using the Seldinger technique (Figure 2). Initially, 500 cc of ambient air was blown in, and then 1,000 cc of ambient air was blown in daily for seven days. Abdominal perimeter, scrotal perimeter, and intra-abdominal pressure were monitored everyday, reaching a maximum value of 16 mmHg. The patient's vital functions were normal, and he experienced only mild intra-abdominal pain. A day before surgery, simple abdominal and scrotum x-rays were taken, showing the pneumoperitoneum generated as well as liver and spleen displacement owing to the gravitational downward movement of intestinal contents (Figure 3). The patient's surgery risk was Class II/IV as per Goldman Risk Index.

The patient underwent right inguinal hernioplasty surgery by Stoppa technique (Figure 4A); by way of a

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Figure 4. (A) Giant hernial defect being repaired using the Stoppa technique; (B) Patient in the immediate post-operative period showing the absence of the hernial defect.

subumbilical midline incision. A large defect was found on the posterior wall of the right inguinal canal where the greater omentum bulged out, as well as evidence of small intestine loops and right colon lodged in the scrotum. The hernia sac was reduced and cut, and a 20 x 30 cm polypropylene mesh implant was placed covering the full area of the Fruchaud's myopectineal orifice defect in the preperitoneal space, closing the cavity layer by layer until reaching the skin. The patient had a postoperative period with no complications (Figure 4B). He was discharged on the fifth day with the recommendation to wear a scrotal support.

Discussion

Giant inguinoscrotal hernias are defined as a hernia extending below patient's mid-thigh in the standing position [4]. Trakarnsagna et al. [5] proposed a three-type classification for this hernia: Type I (mild), when the lower end reaches the mid-line between mid-thigh and supra-patellar area; Type II (moderate), when the lower end reaches the upper end of the patella; and Type III (severe), when the lower end advances below the patella.

The surgical treatment for giant inguinoscrotal hernias is associated with local and systemic complications. Among the most common local complications are wound dehiscence, infection or hematomas, besides the aesthetical aspect. Also, overtime the peritoneal cavity has adapted to a lower intraabdominal pressure, and repair of the giant hernia results in subsequent diaphragm elevation, causing a reduction in tidal volume and vital capacity due to an increase in the intrathoracic pressure [6].

In order to treat these giant hernias surgically, several techniques have been proposed, ranging from small or large intestine resection performed by Serpell et al. [7], the hug technique proposed by Cavalli [8], the diet technique proposed by Moss [9], and abdominal wall lengthening using mesh or flap rotation [10]. In 1940 in Argentina, Goñi Moreno [11] introduced the progressive preoperative pneumoperitoneum technique to treat great ventral hernias, which aims to progressively distend the abdominal cavity by means of inserting an umbilical catheter to blow in 240 to 1500 cc of ambient air per day, depending on patient tolerance and the presence of symptoms such as pain or nausea [12]. This technique has been extrapolated to other surgical scenarios, such as giant inguinoscrotal hernias, and different gasses, like oxygen, CO₂, ambient air, and nitrous oxide have been used [13]. Ambient air was preferred over CO₂ due to its accessibility and cost, as well as the fact that its physical characteristics allow for its slow absorption by nitrogen. Conversely, CO, would be absorbed too fast. This technique is very practical and has been developed by Martinez in Mexico [14]. In our case, pneumoperitoneum was generated using the Seldinger-type technique, which resulted in an atraumatic pneumatic lysis of adhesions, allowing for the

reduction of hernia content and a better adaptation to the abdominal cavity. Radiation control was performed after these sessions to decrease complications associated with a sharp reduction, such as compartment syndrome [15].

This technique is suitable for eventrations larger than 10 cm, large inguinoscrotal and umbilical hernias with non-reducible sacs and loss of domain, or those larger than 10 L. Relative indications are large relapsing hernias with an infected or rejected mesh to be removed, in which cases the use of a prosthesis is not recommended. This technique must not be used on elderly patients or patients suffering from decompensated disease, such as heart and lung failure, abdominal infections, multiple eventrations, high risk of intestinal complications, development of dyspnoea or skin lesions with signs of ischemia [8,16].

Preoperative progressive pneumoperitoneum and its corresponding variations in administered gas volume and number of insufflation days allow us to increase the volume of the retracted abdominal cavity and to detach the adhesions between the intestine and the parietal peritoneum. Likewise, this technique achieves a pneumatic lysis of intestinal adhesions, allows reduction of hernia contents and improves respiratory function. In addition, this technique facilitates the process of cutting the hernial sac as the contained structures are separated and identified.

This clinical case aims at presenting preoperative progressive pneumoperitoneum technique as an alternative method in the previous preparation of patients with giant hernias and loss of domain, where it is difficult to push back the contents and perform a later hernioplasty.

Conclusions

Preoperative progressive pneumoperitoneum is a safe and replicable technique provided that the indications as mentioned above are followed. Surgical results obtained are good, and patients show satisfactory multisystem adaptation. It is important to consider that this procedure must be performed in hospitals which meet the necessary conditions to deal with any situation that may arise.

Conflict of interest statement

The authors have no conflicts of interest to declare.

- Anand M, Hajong R, Naku N, Hajong D, Singh KL. Giant Inguinal Herniae Managed by Primary Repair: A Case Series. J Clin Diagn Res JCDR 2017;11:PR01-PR02.
- 2. Tarchouli M, Ratbi M-B, Bouzroud M, Aitidir B, Ait-Ali A, Bounaim A, et al. Giant inguinoscrotal hernia containing intestinal segments and urinary bladder successfully repaired by simple hernioplasty technique: a case report. J Med Case Rep 2015;9:276.
- 3. Karthikeyan VS, Sistla SC, Ram D, Ali SM, Rajkumar N. Giant inguinoscrotal hernia--report of a rare case with literature review. Int Surg 2014;99:560-4.
- Hodgkinson DJ, McIlrath DC. Scrotal reconstruction for giant inguinal hernias. Surg Clin North Am 1984;64:307-13.
- 5. Trakarnsagna A, Chinswangwatanakul V, Methasate A, Swangsri J, Phalanusitthepha C, Parakonthun T, et al. Giant inguinal hernia: Report of a case and reviews of surgical techniques. Int J Surg Case Rep 2014;5:868-72.
- Cheatham ML, Safcsak K. Intra-abdominal hypertension and abdominal compartment syndrome: the journey forward. Am Surg 2011;77(Suppl 1):S1-5.
- 7. Serpell JW, Polglase AL, Anstee EJ. Giant inguinal hernia. Aust N Z J Surg 1988;58:831-4.
- Cavalli M, Biondi A, Bruni PG, Campanelli G. Giant inguinal hernia: the challenging hug technique. Hernia J Hernias Abdom Wall Surg 2015;19:775-83.
- Moss G. Letter to the editors: Techniques to aid in hernia repair complicated by «loss of domain». Surgery 1975;78:408.
- Valliattu AJ, Kingsnorth AN. Single-stage repair of giant inguinoscrotal hernias using the abdominal wall component separation technique. Hernia J Hernias Abdom Wall Surg 2008;12:329-30.
- Moreno IG. Chronic eventrations and large hernias; preoperative treatment by progressive pneumoperitoneum; original procedure. Surgery 1947;22:945-53.
- 12. Granel Villach L, Gamón Giner RL, Fortea Sanchís C, Gómez Beltrán F, Salvador Sanchís JL. [Neumo-

peritoneo preoperatorio para el tratamiento de la hernia inguinal gigante: revisión de nuestra experiencia][Article in Spanish]. Rev Hispanoam Hernia 2014;2:133-8.

- Piskin T, Aydin C, Barut B, Dirican A, Kayaalp C. Preoperative progressive pneumoperitoneum for giant inguinal hernias. Ann Saudi Med 2010;30:317-20.
- Martínez Munive Á, Orvañanos FQ, Longoria RP, Silva RH, Castillo ÓÁ, Ramírez OM. [Catéter de doble luz para neumoperitoneo en hernias

gigantes. Informe de cuatro pacientes] [Article in Spanish]. Cir Gen 2002;24:313-8.

- 15. Momiyama M, Mizutani F, Yamamoto T, Aoyama Y, Hasegawa H, Yamamoto H. Treatment of a giant inguinal hernia using transabdominal pre-peritoneal repair. J Surg Case Rep 2016;2016(9).
- Rodríguez Ortega M, Garaulet González P, Ríos Blanco R, Jiménez Carneros V, Limones Esteban M. [Neumoperitoneo en el tratamiento de hernias gigantes] [Article in Spanish]. Cir Esp 2006;80:220-3.

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