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Advanced Management of Giant Incisional Ventral Hernia with Application of Botulinum Toxin

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Abtract

Incisional hernias or eventrations originate from a surgical incision that, for different reasons, heals poorly, allowing the protrusion of viscera through these healing defects with the formation of a hernial sac composed of fibroscar tissue and peritoneum in most cases, with gradual growth of the diameters of the defect (as in all hernias) caused by the mechanical effect of dilatation of the viscera which protrude through the hernia defect. Botulinum toxin Type A, Known for its multiple medical applications in urological conditions, achalasia, hyperhidrosis, migraines, cerebral palsy, cosmetics, strabismus, depression, and among others. It acts at the nerve endings, inhibiting the release of acetylcholine in the neuromuscular plate, causing a chemical denervation that will weaken muscle contraction, generating reversible muscle atrophy. Its use has currently been implemented in the preparation of patients with incisional hernias of the abdominal wall, first reported in 2009 by Ibarra-Hurtado et al. Its application in the muscles of the lateral wall of the abdomen will condition a flaccid paralysis that will allow its lengthening temporarily, with a maximum effect reported between week 4 and 6 after its application, which is reversible and can last from 6 to 9 months. We present the case of a 71-year-old female patient with hernia with loss of domicile who had botulinum toxin type A infiltration, which allowed us to perform hernioplasty with the rives technique with adequate closure of the hernia defect and adequate evolution.

Keywords: Botulinum; Toxin; Hernia; Giant; Hernioplasty; Infiltration

Introduction

Incisional hernias or eventrations originate from a surgical incision that, for different reasons, heals poorly, allowing the protrusion of viscera through these healing defects with the formation of a hernial sac composed of fibroscar tissue and peritoneum in most cases, with gradual growth of the diameters of the defect (as in all hernias) caused by the mechanical effect of dilatation of the viscera which protrude through the hernia defect. There is a special group in these complex eventrations, made up of obese patients or patients with liver disease, organ transplants, advanced diabetes, bronchopathies and chronic heart diseases, etc; with several recurrences of the eventration, trophic skin disorders and in many cases loss of domicile of the abdominal wall which is defined as the hernia with 50% of contents of the abdominal cavity is outside it, which pose a real challenge for surgeons. In some cases, prior pneumoperitoneum is required, as described in 1946 by the Argentine surgeon Goñi Moreno, in order to create more space in the abdominal cavity to relocate the visceral contents without resection [1].

Case Reports

A 71-year-old female patient, with type II diabetes mellitus of 20 years' duration, hypertensive disease of 5 years' duration, and hyperthyroidism of 10 years' duration under medical treatment with adequate control. Surgical history of salpingectomy 50 years ago and conventional appendectomy 1 year ago with no reported events. Her condition began with mild to moderate pain in the hypogastrium with the appearance of an incisional hernia secondary to appendicectomy, that gradually increased in size until resulting in a hernia with loss of domicile lasting approximately 5 months. An abdominal tomography was requested showing a hernial sac containing omentum and intestinal loops with significant retraction of the lateral muscle

complex and hernial ring in its maximum transverse diameter of approximately 17 centimeters. It was decided to complement management by making an appointment for nutrition. He comes after a year of his condition with significant weight loss (30 kg/m2) (Figures 1 & 2). It was decided to continue the protocol by infiltrating botulinum toxin type A into the lateral muscle wall complex. Ventral hernioplasty is performed with rives technique and an appointment was made one month later with adequate progress (Figure 3).

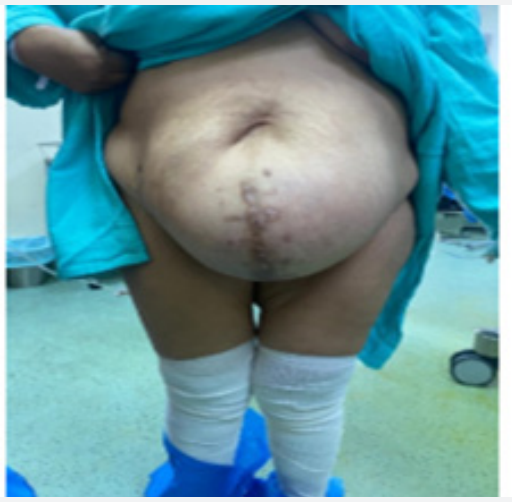

Figure 1: Hernia with los of domicile before surgery.

Figure 2: lateral view of Hernia with loss of domicile.

Surgical technique

It was decided to perform a planned surgical intervention 6 weeks after the application of botulinum toxin type A. An infraumbilical midline incision was made (Figure 4) and a careful dissection of the hernial sac was carried out until it was freed from the hernial ring, then continued with the dissection of the retromuscular space with rives technique (Figures 5 & 6), preparing thus the appropriate place for placing the polypropylene mesh.

After the dissection of the retromuscular space, the mesh is placed, fixing it with monofilament polypropylene suture with cardiac stitches and once it is adequately fixed, the aponeurotic closure is carried out, which was successful thanks to the previous preparation with the infiltration of botulinum toxin type A (Figure 7).

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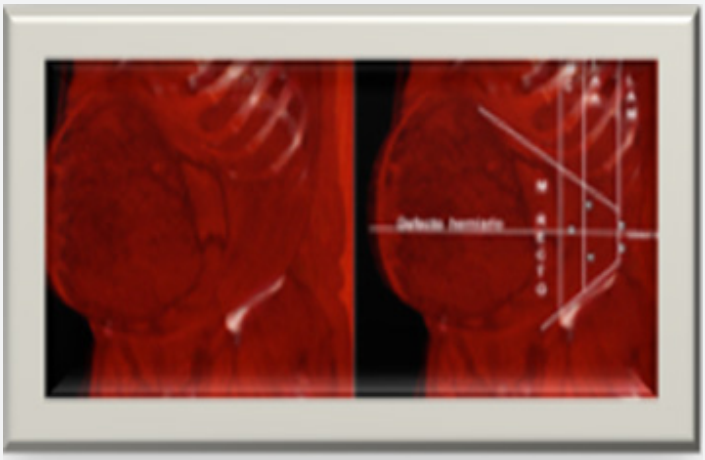

Figure 3: anatomical references of puncture site for botulinum toxin in 3D.

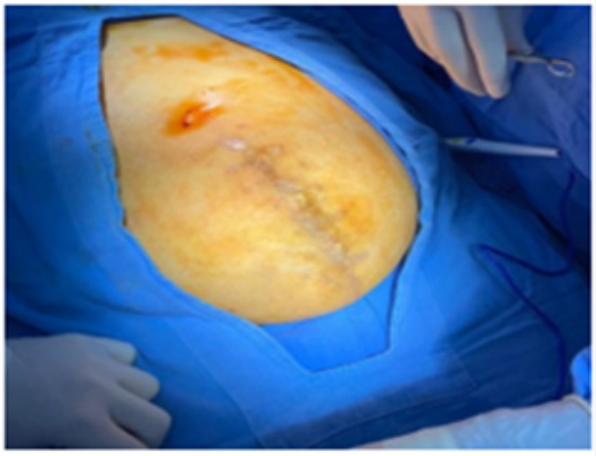

Figure 4: Localization of incisional hernia before prodecure.

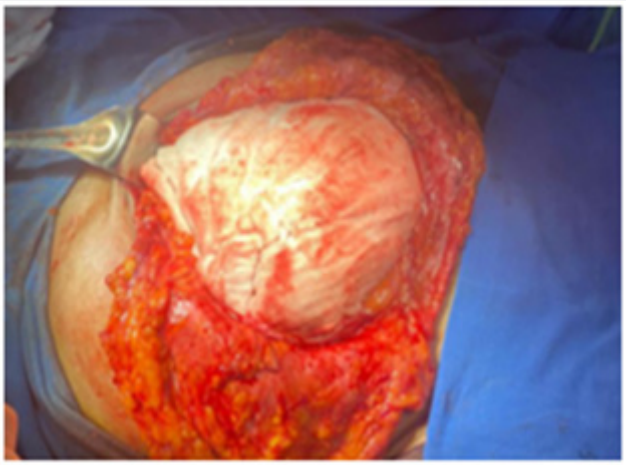

Figure 5: hernial sac before dissection of the retromuscular space.

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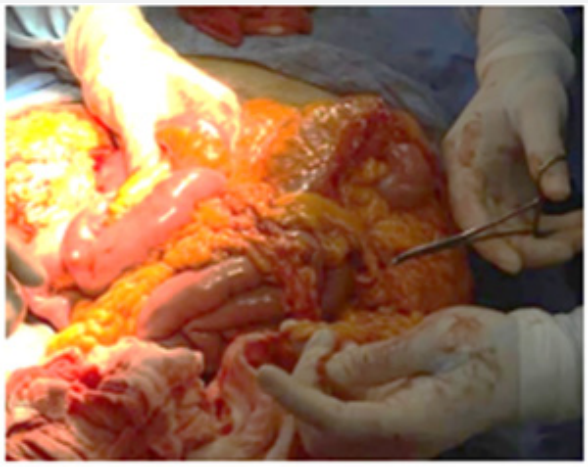

Figure 6: open hernial sac dissection carefully.

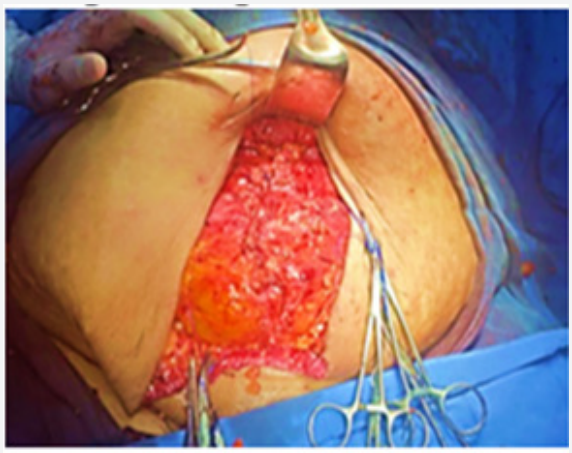

Figure 7: successful fascial closure is observed.

Results

The patient is evaluated 2 months later after surgery with adequate evolution.

Discussion

Botulinum toxin Type A is one of the eight toxin serotypes (A-H) produced by bacteria of the genus clostridium (botulinum, argentinensis, barati, and butyrricum) [2]. Known for its multiple medical applications in urological conditions, achalasia, hyperhidrosis, migraines, cerebral palsy, cosmetics, strabismus, depression, and among others [3,4]. It acts at the nerve endings, inhibiting the release of acetylcholine in the neuromuscular plate, causing a chemical denervation that will weaken muscle contraction, generating reversible muscle atrophy. Its use has currently been implemented in the preparation of patients with incisional hernias of the abdominal wall, first reported in 2009 by Ibarra-Hurtado et al. [5]. Its application in the muscles of the lateral wall of the abdomen will condition a flaccid paralysis that will allow its lengthening temporarily, with a maximum effect reported between week 4 and 6 after its application, which is reversible and can last from 6 to 9 months [4]. Contraindications for its use are hypersensitivity to the toxin or its components, infection of the site, and myasthenia gravis [6]. The dose varies in different reviews, documenting from low doses of 100 U - 500 U in total. The toxic dose was studied by intraperitoneal injection in mice (MLD50) and in Rhesus monkeys, calculating that the toxicity in intramuscular application is 2730 U of Botox® and the lethal dose is 5,000 U of Botox® [7]. Its use is considered safe, since the dose used is well below the toxic dose; in the same way, due to its localized effect at the application site, reporting up to 25% of mild, temporary, and non-systemic adverse effects related to the mechanism of action, no mortality has been reported due to its application to the abdominal wall. Incobotulinumtoxin A itself does not have complex proteins; therefore, it has low

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immunogenic potential. Some studies describe that it does not produce antibodies, reducing the probability of tachyphylaxis [8].

Progressive pneummoperitoneum as a preparation for ventral hernias was first described in 1946 by Goni-Moreno. Its objective is to increase intra-abdominal pressure to improve ventilatory function, correcting the position of the diaphragm, returning the organs to the cavity, improving portal circulation, and reducing intestinal and mesentery edema. The presence of air in the cavity generates pneumatic lysis of adhesions, it also has an impact on the immune system, improving healing [8]. The amount of ambient air to be insufflated will depend on the size of the hernia and the patient's tolerance to progressive pneumoperitoneum; which regularly does not exceed 12-15 mmHg. Initially, 1000-4000 cc of ambient air are introduced, and later maintenance with daily insufflation of 1000-2000 cc. An objective measurement can be carried out with the insufflator of the laparoscopy tower or a sphingomanometer. The progressive pneumoperitoneum maintenance time varies according to the authors, from 7 to 15 days until the day of surgery. Up to 12% complications are reported due to its application, mainly pain radiating to the scapular region, subcutaneous emphysema, and infection of the puncture site, without associated direct mortality.8

In this case we decided to use botulinum toxin type A due to the low rate of adverse effects in addition to not having systemic effects, compared to the good results that have been obtained in different studies after its use in hernias with loss of domicile, although certain studies refer Without sufficient results, other studies suggest that the management of hernias with loss of domicile with botulinum toxin reduces the risk of intra-abdominal compartment syndrome and elongates the abdominal wall to allow its adequate closure, while progressive pneumoperitoneum has a higher than botulinum toxine type A[1].

As conclusion, Botulinum toxin type A has been used in some studies to reduce the complication rate in incisional hernia repair. Although there are promising results, more controlled studies are needed to determine its long-term effectiveness and safety. In general, the decision to use botulinum toxin type A in incisional hernia repair should be individualized and discussed in detail with an experienced surgeon. Therefore, we conclude that it is the surgeon who must have therapeutic diagnostic certainty for the correct use of botulinum toxin type A because a considerable reduction in complications and recurrences has been demonstrated in these patients by reducing the patient's abdominal muscle tension. In this way, the objective is to promote the constant use of this management at the institutional level to generate an impact on the postoperative results of patients with incisional hernia in our institution.

Acknowledgement

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Conflict of Interest

There was no conflict of interest during the study, and it was not funded by any organization.

References

1. Asociación Mexicana De Cirugía General, Proquest. Tratado de cirugía general (3a. ed.). Distrito Federal: Editorial El Manual Moderno: 2017.
2. Smith TJ, Hill KK, Raphael BH (2015) Historical and current perspectives on Clostridium botulinum diversity. Res Microbiol 166(4): 290-302.
3. Naumann M, Jankovic J (2004) Safety of botulinum toxin Type A: a systematic review and meta-analysis. Curr Med Res Opin 20(7): 981-990.
4. Pirazzini M, Rossetto O, Eleopra R, Montecucco C (2017) Botulinum neurotoxins: biology, pharmacology, and toxicology. Pharmacol Rev 69(2): 200-35.
5. Ibarra-Hurtado TR, Nuño-Guzmán CM, Echeagaray-Herrera JE, Robles-Vélez E, González-Jaime JD (2009) Use of botulinum toxin type a before abdominal wall hernia reconstruction. World J Surg 33(12): 2553-2556.
6. Rodriguez Acevedo O, Elstner KE, Jacombs AS, Read JW, Martins RT, et al. (2018) Preoperative botulinum toxin A enabling defect closure and laparoscopic repair of complex ventral hernia. Surg Endosc 32(2): 831-839.
7. Asociación Mexicana de Hernia (2021) Consensos y Guías de Práctica Clínica Para-Hernias de la Pared Abdominal.
8. López-Juárez SE, Medina-Benítez A, Durán-Reyes R, Bagundo-Pérez BI, Fortuna-Sandoval OI, et al. (2023) Toxina botulínica A (IncobotulinumtoxinA) y neumoperitoneo guiados por imagen para la reparación de hernia con pérdida de dominio. Cirugía y Cirujanos 91(1).

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