

## Application of Botulinum Toxin A as a Preoperative Adjuvant Technique in Large Abdominal Wall Defects

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The treatment of large hernias of the abdominal wall and the inguinal region is a real challenge, involving different actors [1].

The diagnosis is fundamentally clinical, based on a detailed and exhaustive physical examination, accompanied by a dynamic computed axial tomography [2] which allows us to assess the continent, content, size of the defect, the Tanaka index [3] and other associated pathologies.

In this manuscript we are going to focus on W3 defects (> 10 cm) [4] or greater with or without loss of home rights and large inguinal hernias.

Three very important aspects must be considered after the replacement of large herniated volumes, the risk of developing abdominal hypertension, respiratory failure, and early recurrence [5].

In midline defects there are 3 basic principles that should be tried to achieve in the treatment of abdominal wall hernias: closure of the posterior leaf of the rectus muscle sheath, medialization of the rectus muscles and closure of the anterior leaf rectus muscles, thus achieving an adequate anatomical and functional repair [6].

In order to achieve this purpose and avoid the aforementioned eventualities, there are different strategies that have been called adjuvant techniques [7].

Among the most frequently used adjuvant techniques we have preoperative techniques such as the use of botulinum toxin A or Goñi-Moreno pneumoperitoneum and intraoperative techniques

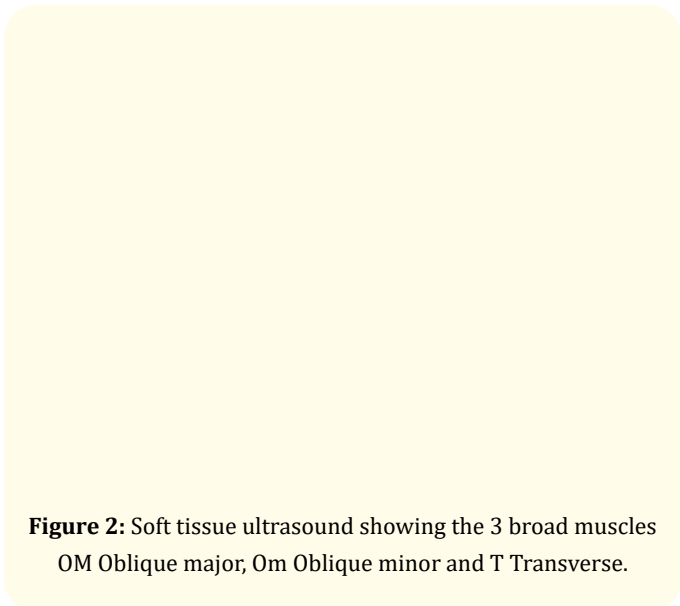
such as the different alternatives offered by component separation techniques.

Botulinum toxin A [8] produces a flaccid and reversible paralysis as it is infiltrated bilaterally in the muscular thickness of the lateral muscles.

Different infiltration strategies have been described, the classic form is 5 points on each side, taking the costal rim, iliac crest, anterior axillary line and mid-axillary line as reference (Figure 1).

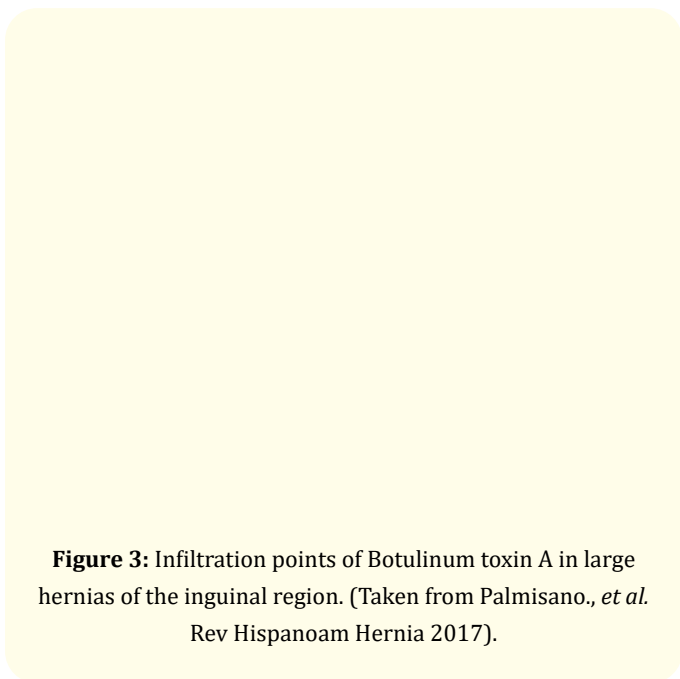
**Figure 1:** Infiltration points of Botulinum toxin A in large midline defects. (Taken from Palmisano., *et al.* Rev Hispanoam Hernia 2020).

Although the infiltration can be done freehand, we recommend ultrasound guidance, which allows a simple and economical application of the toxin (Figure 2).



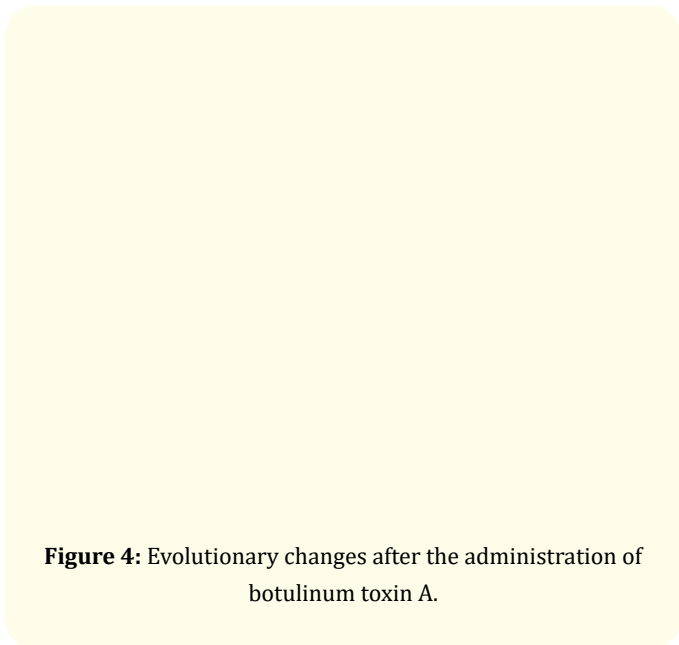
**Figure 2:** Soft tissue ultrasound showing the 3 broad muscles OM Oblique major, Om Oblique minor and T Transverse.

In the case of large hernias of the inguinal region to the points previously described, 4 supra and infraumbilical points are added at the level of the rectus abdominis muscle [5,7] (Figure 3).



**Figure 3:** Infiltration points of Botulinum toxin A in large hernias of the inguinal region. (Taken from Palmisano, *et al.* Rev Hispanoam Hernia 2017).

Its maximum effect is observed on day 30 - 45 where we evidence a decrease in muscle thickness (1 cm average on each side), increase in muscle length (2.5 cm average on each side), decrease in the size of the defect and increase in diameter of the abdominal cavity [9], these changes will remain until approximately the 6th month from the moment of their application (Figure 4).



**Figure 4:** Evolutionary changes after the administration of botulinum toxin A.

In midline defects, following the experience published by Hernandez [10] and later by Palmisano, *et al.* [11], its use is recommended in defects from 10 cm to 15 cm with successful closure without the support of intraoperative techniques (separation components) between 75 - 100% of cases.

From 15 cm or defects associated with loss of right to home/non-reducible chronic abdominal herniation, the combination of toxin with progressive preoperative pneumoperitoneum [12] or its abbreviated version5 is good practice. The purpose will be to enhance both effects. In these cases, the repair will be achieved in the midline by means of component separation surgical techniques and in the inguinal region with the one that the surgeon feels most comfortable with, preferably the Stoppa technique [13] or similar.

In conclusion, with these strategies we seek to expand the abdominal cavity, facilitate the reduction of the herniated visceral content, with adequate musculo-aponeurotic coverage through a closure with less tension and an acceptable morbidity and recurrence rate.

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