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Preoperative abdominal wall Botulinum A toxin in the outpatient pain clinic prior to complex abdominal wall repair: A letter to the editor

Dear Editor,

Hernias are a frequent complication following abdominal surgery, occurring in 10–38 % of cases [1–4]. Large ventral hernias, particularly when the abdominal compartment volume is insufficient to encompass the viscera, present significant challenges [5]. During ventral hernia repair, the hernia contents are reduced, the midline is restored, and the repair is reinforced with mesh. Traditionally, complex hernia repair techniques have included a bridging repair, where mesh spans the defect without fascial closure or surgical component separation, requiring lateral muscular release to increase abdominal volume. However, both techniques have significant challenges including high failure rates and surgical site infection [6–8]. Prior studies suggest that hernia defects over 8 cm in width commonly require surgical component separation [7]. A newer option is chemical component separation, where Botulinum A toxin (Botox) is injected into the abdominal wall musculature to increase abdominal compartment size [9].

The existing evidence supporting chemical component separation is primarily described in the surgical literature with little detail on the logistics of where procedures were performed or who performed them [10]. Given their intimate knowledge of abdominal wall ultrasound (US) anatomy and procedural expertise in fascial plane blocks, pain providers are uniquely suited to perform chemical component separation in the preoperative period.

In 2020, our team initiated a pilot program for preoperative abdominal wall chemical component separation with Botox for patients with large hernias or loss of domain in the chronic pain clinic. After reviewing protocols in the literature, we utilized a protocol of 300 units of Botox diluted into 150 ml of sterile saline (2 unit/1 ml) divided among 18 muscle sites [9–13].

Patient selection was initiated by the surgeon of record. Botox candidates were identified when abdominal wall defects were greater than 8 cm or there was significant loss of abdominal domain. After Botox patients were identified, the surgeon would communicate with the pain provider and a consult was placed. Patients were seen in the pain clinic to discuss the procedural risks, potential benefits, and post procedure expectations. All procedures were performed in the outpatient pain clinic 3–4 weeks prior to surgery.

Following institutional review board exemption, we reviewed the medical records of 14 consecutive patients who underwent preoperative abdominal wall Botox between October 1, 2020 and July 30, 2022.

Our primary outcome was to identify the abdominal wall closure rate in patients who received preoperative Botox as documented in the surgical operative note. The secondary pain and Botox outcomes included postoperative pain levels on POD2 and at discharge, opioid consumption in MEQ on POD2 and on discharge, percentage of patients on opioids at 30 and 60 days postoperatively, opioid use in MEQ at 30 and 60 days postoperatively, and Botox procedural complications defined as complication during or after the procedure [14]. Pain and opioid consumption assessments were made POD2 due to the typical length of epidural analgesia in our institution for this surgery, with most catheters removed on POD2.

Each chemical component separation was performed by a single physician in the outpatient pain clinic. After informed consent, patients were placed in the supine position and an US survey of the abdominal wall was performed (Fig. 1). Using a linear probe, we obtained imaging similar to a transversus abdominis plane (TAP) block with identification of the external oblique, internal oblique, and transverse abdominis. After skin localization with 1 % Lidocaine, a 21 G 100 mm US needle was inserted in-plane in a medial to lateral approach into the right upper quadrant, and advanced into the transverse abdominis (Fig. 2). Next, 1 ml of sterile saline was injected to ensure proper location, followed by injection of 8.3 ml of Botox (2 units/ml). The needle was withdrawn into the internal oblique, where this process was repeated. The needle was retracted into the external oblique with equal amounts of saline and Botox administered (Fig. 3). The needle was removed and the process was repeated in the right mid-axillary line and right lower quadrant. The patients then underwent the same procedure on the left. Fifty units of Botox were given at each of the six needle entry sites with a sum of 300 units and a total of 18 muscle locations.

The patients in our study were 35 % female and 65 % male with an average age of 56 years. Two patients were on preoperative opioids: one for abdominal pain and the other for post-laminectomy syndrome. The average hernia defect width was 11.8 cm. One patient underwent repair of an inguinal hernia, all other patients underwent repair of ventral or incisional hernias. A preoperative epidural catheter for post operative analgesia was placed in 64 % of patients with the average therapy continuing through POD2. Following preoperative Botox, 100 % of patients achieved fascial closure and 72 % without additional surgical component separation. Post-operative pain levels showed a median score of 4/10 at POD2 (0–6/10) and 2/10 at discharge (0–4/10). The 12 opioid-naive patients had a mean daily opioid consumption of 8 morphine equivalents (MEQ) at both post-op day two and at discharge (5–22 MEQ) with a median length of stay of 3 days (1–8 days). The two patients on chronic opioids had a mean POD2 consumption of 216 MEQ (50–230 MEQ) and 41 MEQ at discharge (15–67 MEQ), with a mean length of stay of 7 days (6–8 days). None of the opioid-naive patients had continued opioid use at 30 days postoperatively. Patients on chronic opioids were below their baseline MEQ, with a mean 27% decrease at 60 days postoperatively. There were no complications due to the Botox procedure.

Large ventral hernias greater than 8 cm often require a complex surgical repair with increased risk of post operative complications and

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Fig. 1. Botox injection locations.

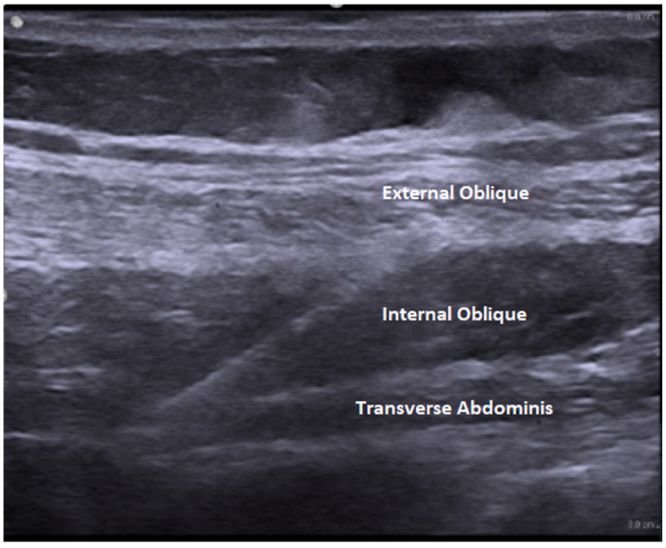

Fig. 2. Needle within the transverse abdominis prior to Botox injection.

recurrence.

In our study, 100 % fascial closure was achieved with 72 % of patients not requiring surgical component separation following pre-operative Botox in the outpatient pain clinic. This is consistent with the surgical literature showing a decreased need for surgical component separation when pre-operative Botox is performed [15,16]. The opioid-naive patients had no persistent opioid use and patients on chronic opioids surgery were below their baseline MEQ with an average

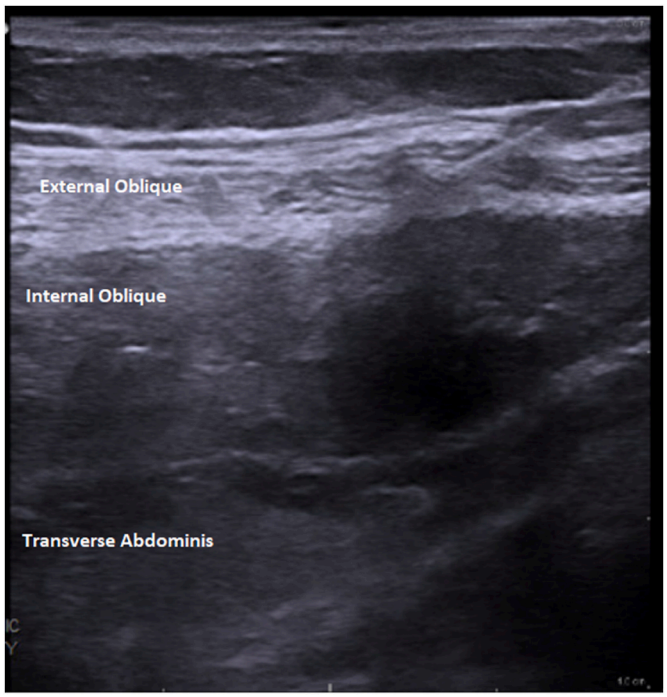

Fig. 3. Needle within the external oblique in the same patient after deposition of Botox within the transverse abdominis and internal oblique.

27 % decrease at 60 days. New persistent opioid use is approximately 5–10 % for opioid-naive patients [17–19] across all major elective surgeries, which is a stark contrast to the Botox patients in our study. The overall low reported pain scores and opioid consumption could be due to less surgical time and dissection, or pain-modulating properties of Botox through the blockage of CGRP and substance P release [9].

Our findings suggest that chemical component separation can be safely and efficaciously performed in the outpatient pain clinic yielding similar outcomes to the existing literature. Through their experience with fascial plane blocks, chronic pain providers have the experience and expertise to perform this procedure in a practice environment accustom to this type of procedure, allowing for seamless coordination of care. The encouraging results, including low postoperative pain scores and opioid utilization support the use of chemical component separation prior to complex hernia repairs. However, limitations such as small sample size and single performing provider limit generalizability. The absence of a control group makes the data concerning pain scores and opioid use difficult to interpret, highlighting the need for randomized controlled trials to better define success rates and opioid use compared to other surgical techniques.

Author contribution statement

KY contributed to the concept and design of the article, acquisition and analysis of data, as well as drafting and revision of the article. AA contributed to the acquisition of data and drafting of the article. MP contributed to the design and drafting of the article. SB contributed to the concept, design of the article and acquisition of data. MM contributed to the acquisition of data and editing of the article. BW contributed to concept and design of article.

Ethical approval statement

The Dartmouth-Hitchcock Institutional Review Board (IRB), determined the data reported in this paper to be IRB exempt on 11/29/2022. Reference number 02001665.

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Declaration of competing interest

The authors have no actual or perceived conflicts of interest.

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