Preoperative BOTOX® Injection for Large Ventral Hernia Repair (PRETOX)

Study Overview

Brief Summary

This study is for adults who need open surgery to repair a very large abdominal (ventral) hernia. This study tests whether a one-time, image-guided injection of a medicine commonly known as "BOTOX®" (onabotulinumtoxinA) into the side abdominal muscles 3-7 weeks before surgery helps surgeons close the abdominal wall fully at the end of the operation. Closing the muscle and tissue layers ("primary fascial closure") is linked to fewer problems after surgery and better quality of life.

Participants will be randomly assigned (like a coin flip) to receive either the BOTOX® medicine or a saltwater (placebo) injection. Neither patients nor the care team will know which one was given. All participants will still have their planned hernia repair in the standard way that we repair patients who are not part of the study. The study will track whether the abdomen can be closed without leaving a gap, and investigators will also look at recovery, complications, time in the ICU or on a ventilator, length of stay, pain, and quality-of-life scores. Most information will be collected during participants' hospital stay, but the investigators will continue to see how participants are doing up to 2 years after surgery. Short phone check-ins will occur before surgery, and after surgery follow-up happens around 30 days, 90 days, 1 year, and 2 years.

Possible risks from the injection include temporary muscle weakness, trouble swallowing or breathing, pain or infection at the injection site, and (if CT is used for guidance) a small amount of radiation exposure. Surgery itself carries the usual risks (pain, bleeding, wound problems). Benefits are not guaranteed, but the injection may make closure easier and recovery smoother. About 188 people will take part at Cleveland Clinic.

Detailed Description

Background and Rationale:

Massive ventral hernias (pre-op axial width ≥15 cm and/or Tanaka volume ratio >25%) seldom achieve primary fascial closure (PFC) and are associated with higher respiratory morbidity, intensive care unit (ICU) utilization, post-operative pain, hospital length of stay (LOS), cost, and recurrence. Spasticity/fibrosis of the external oblique-internal oblique-transversus abdominis (EO/IO/TA) complex likely limits lateral abdominal wall compliance and impedes midline medialization. Pre-operative, image-guided onabotulinumtoxinA (BOTOX®) has been proposed to elongate the lateral wall, enlarge the functional abdominal domain, reduce closure pressures,

and thereby increase the primary fascial closure (PFC) rate. Prior institutional data show ~77% PFC in this population without pre-op toxin, whereas retrospective series suggest ~95% with toxin utilization, motivating a definitive randomized trial.

Design:

Single-center, randomized, double-blind, placebo-controlled superiority trial. Randomization uses pre-generated block allocation (statistician-generated). Analyses will be intention-to-treat (ITT), with a parallel per-protocol (PP) analyses limited to participants who receive the assigned injection and undergo AWR within 21-48 days post-injection. A single interim analysis is planned at 50% completion of primary endpoint. Intention-to-treat (ITT) is primary method of analysis; however, a per-protocol (PP) analysis will also be conducted as this supports causal inference among adherent participants. An independent DMC will review interim results and advise on continuation/early stopping.

Interventions:

Fully described in 'Arms and Interventions' section. Participants will either receive image-guided injections of BOTOX® at six sites on the lateral abdominal wall (three sites per side) with a total of 300 units give (2 u / cc concentration; 25 cc at each site); or, participants will receive the same volume of a 0.9% saline solution (25 cc at each site).

End Points and Outcomes:

Fully described in the 'Outcomes Measures' section. Primary endpoint is primary fascial closure (PFC), the successful closure of hernia defect at the conclusion of the case. Additional secondary outcomes regarding clinical course and patient-reported outcomes will be captured at 30 days, 90 days, 1 year, and 2 years.

Exploratory outcomes include cost and healthcare utilization information, as well as comparison of physiological parameters between treatment groups.

Data Stewardship:

Primary data capture occurs in the ACHQC registry, supplemented by an institutional REDCap database for variables not routinely captured (e.g., physiologic measures) in the registry.

Official Title

PREoperative Targeted OnabotulinumtoXina Injection for Abdominal Wall Reconstruction: A Randomized, Double-Blind, Placebo-Controlled Trial
Conditions
Hernia Abdominal WallBotox InjectionHernia Incisional VentralHernia Repair With Compartment SyndromeHernia SurgeryHerniaHernia Incisional
Intervention / Treatment

- Procedure: OnabotulinumtoxinA Injection
- Procedure: Saline (placebo) Injection
- Drug: OnabotulinumtoxinA
- Drug: 0.9 % Normal Saline
- Procedure: Open Ventral Hernia Repair

Other Study ID Numbers

- 25-824

Participation Criteria

Eligibility Criteria

Description

Inclusion Criteria:

- Adult (greater than or equal to 18 years of age)
- Candidate for elective open repair of ventral hernia
- Preoperative imaging demonstrating either:
- ventral hernia defect width of at lest 15 cm; AND/OR,
- Tanaka volume ratio of at least 25%
- Planned elective hernia repair in an open fashion via a midline laparotomy with posterior component separation and transversus abdominis release

Exclusion Criteria:

- Emergent cases
- Pregnancy and/or breastfeeding at time of intramuscular injection
- Inability to provide informed consent
- Inability to receive either study intervention (i.e. allergy to local anesthetics utilized for intervention administration, allergy and/or contraindication to any botulinum toxin, inability to attend outpatient administration of study intervention, inability to conform to safety check schedule)
- Known congenital or acquired neuromuscular disorder
- Presence of stoma
- Current infection at time of intramuscular injection
- Flank hernias s defined by EHS L1-L4
- BMI > 45 kg/m^2
- Diaphragmatic hemiparesis or chronic obstructive pulmonary disease (COPD) with chronic oxygen dependence