

Shifting the Management of Post Bariatric Hernia Repairs with Abdominal Procedures from In-Patient to Out-Patient

Introduction

Obesity has received considerable attention as a major health hazard. Because of the increased risk of death and the increased risk of costly chronic diseases associated with obesity, the obesity epidemic places a large financial burden on the economy. The U.S. Department of Health and Human Services has estimated the total economic cost of overweight and obesity in the United States to be close to \$117 billion annually [1]. The progression of the problem indicates preventive measures have been unsuccessful so far. Only bariatric surgical treatments have been able to achieve substantial and durable weight loss for many patients [2]. While many chronic diseases improve with bariatric surgery the anatomy and physiology of the abdomen is typically left in a diminished state [3].

The abdominal fascial system lacks integrity similar to the dermis of the skin after massive weight loss. It is not surprising many forms of hernias are found in these patients. In a series of 325 consecutive patients undergoing laparoscopic gastric bypass, and 26 (8%) had a ventral hernia found at laparoscopic gastric bypass [4]. Trocar site hernias are also more common in this patient population. Host factors such as obesity predispose these patients to poor outcomes, however, technical factors including need for large trocars, multiple fascial punctures, fascial stretching and incomplete fascial closure matriculate into multiple abdominal hernias [5].

Abdominal contouring with removal of excess skin can aid the general surgery team to visualize the hernia and reduce post-operative wound dehiscence [6]. Large ventral hernia repairs when combined with component separation procedures tend to produce a significant number of wound complications due to tension on the wound necessitating the inferior approach and removal of redundant tissue which acts parasitically on the wound above the hernia repair [7]. Numerous advantages exist to combining these operations into one stage. However, those with significant comorbidities such as steroid use and nicotine use should ideally be done in two operations [6]. These procedures are typically done in tertiary centers as an in-patient procedure. In a study at a large academic institution of 41 patients over 2 years the average length of hospital stay was 3 days [8]. In the same study there was a 17.5% incidence of blood transfusions and a 2.5% rate of fatal pulmonary embolus.

The number of outpatient surgical procedures has continued to increase in the United States since the early 1980s [9]. There are several advantages with respect to outpatient procedures over in-hospital procedures, including: fewer scheduling delays, more autonomy for physicians, and cost savings [10]. Specifically, outpatient procedures were associated with greater cost savings

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(up to 60% in mean total cost) than inpatient procedures. Contributors to cost reductions were identified as operating room charges, overnight admission charges, and floor charges; and more specifically as costs associated with radiographs, medication, laboratory tests, room, nursing and therapy [11]. The objective of this study was to retrospectively evaluate processes and protocols that our outpatient private surgical center has developed to perform these complicated cases safely in an outpatient setting.

Patients and Methods

A retrospective study was performed to assess the safety of outpatient combined hernia repair and abdominal contouring in a private practice ambulatory surgical setting. All patients were operated on between December 2015 and January 2017. To meet eligibility requirements, patients were younger than 75 years, non-smokers within 4 weeks of surgery, were not on steroids, BMI less than 40 (Except for 1), and were medically cleared for surgery by their internist. We operated on a total of 63 patients, 10 male and 53 female. Median age of the male cohort was 47.3 years of age +/- 24.3 years. The median age of the female cohort was 45.7 years of age +/- 19.3 years. Pre-operative evaluation of all patients undergoing abdominal body contouring procedures starts initially with pre-operative duplex ultrasound assessment of the deep veins of the pelvis as well as the veins and arteries of the lower extremities. Superficial venous insufficiency is treated with thermal ablation to minimize the risk of DVT, and deep venous reflux or pelvic reflux is evaluated with venogram and IVUS. Should IVUS reveal stenosis, we stent significant lesions that are likely to be made worse with the increased intra-abdominal pressure of a hernia repair. All stents are re-evaluated post stenting for patency. All veins that are ablated have follow up scans to confirm closure as well as DVT scans.

All patients with abdominal body contouring procedures get pre-operative and post-operative istat H&H pre-op and post op. Patients are not allowed to eat or drink post-op until we have evaluated their post-op H&H as well as examined their abdomen, incisions, and drains. Patients with elevated cardiac risk, have a 12 lead EKG performed. Anyone with cardiopulmonary disease or over the age of 50 gets a CXR. Post-operatively for large cases, our initial follow up is the next day with a DVT Scan.

Massive weight loss patients typically present to our center with large ventral hernias. Complicating this is the fact that many of the patients are woman and after multiple pregnancies have wide diastasis recti. A simple technique to cover these large defects would be alloplastic or autogenous meshes. The use of synthetic mesh decreases hernia recurrence rates by up to 20% [12], but this carries the risk of mesh infection, exposure, and extrusion. It is also contraindicated in the presence of gross contamination or infection and these patients typically have poorly responsive intertrigo and folliculitis throughout their body. Our approach involves repairing the hernias using primary closure without mesh and than the repair is reinforced with autologous tissue by performing midline diastasis plication from xiphoid to pubis. Early in our series we noticed airway pressures would rise at this point of the procedure. Given the large amount of intraabdominal contents in massive weight loss patients we decided to add a component separation in order to improve the compliance and physiology of the abdomen and its organ constituents. A longitudinal incision is made lateral to the border of the rectus sheath and separation continued in the more-or-less avascular plane between the external and internal oblique muscles, leaving the external oblique lateral to the subsequently closed midline incision [13].

Abdominal panniculectomy/abdominoplasty was performed with conservative undermining. Rarely was liposuction used as an adjunct to the procedure as this is primary a functional procedure. Patients are offered elective cosmetic contouring at a later date. Often a horizontal, elliptical fascial plication between the umbilicus and pubis was used. This maneuver, elliptical transverse plication, also helped minimize dead space by reducing its vertical dimension [14]. Closure of the skin was performed in a layered fashion over two to four Jackson-Pratt drains.

The Obese patient population, those with sleep apnea, requires special consideration when it comes to anesthesia. Patients with obstructive sleep apnea are at a higher risk for perioperative morbidity and mortality. In addition, obesity provides a challenge to all forms of anesthesia, including obtaining intravenous access, rapid oxygen desaturation secondary to a reduced functional residual capacity (FRC), difficult intubations, and identification of surface landmarks for regional techniques. In an analysis of more than 9000 nerve blocks, Nielson and colleagues found that patients with a body mass index (BMI) of greater than or equal to 30kg/m² were 1.62 times more likely to have a failed block. Because other variables such as increased risk with general anesthesia, difficulty alleviating postoperative pain, and unanticipated admissions, obese patients should not be automatically excluded from regional anesthesia procedures and in fact, if carefully chosen and expertly

performed, peripheral nerve blocks often prove to be the best and safest anesthetic option for this patient population [15].

At our center we combine Multimodal analgesia [16] (the combination of 2 or more analgesic agents or techniques [i.e. regional anesthesia] that act by different mechanisms of action) along with aggressive patient peri-operative warming [17] to provide better pain relief with less opioid consumption, making it the ideal anesthetic technique in this patient population. Regional anesthesia, while decreasing overall opiate requirements, also allows the ability to use shorter acting sedatives/opiates, further reducing the incidence of cardiopulmonary and airway complications compared with general anesthesia techniques alone. A recent systematic review showed the Transversus Abdominis Plane (TAP) block is safe, reduces postoperative opiate requirements, nausea/vomiting and the severity of pain after abdominal surgery [18]. It has been shown that a single-injection subcostal TAP block to be more effective than IV opioid analgesia in radical gastrectomies as Well [19]. At our center, bilateral TAP blocks are performed under ultrasound guidance prior to surgical incision. Using a 21G x 110mm or 22G x 80mm Pajunk SonoTap cannula (Pajunk, Geisingen, Germany), the tip is positioned between the internal oblique and transversus abdominis muscles in a posterior to anterior direction under direct ultrasound guidance. Correct tip placement is confirmed by visualization of an ellipsoid expansion layer of injectate separating the two muscle layers. Up to 20ml of 0.2% Ropivacaine (or 0.25% Bupivacaine) is injected on each side.

Overall satisfaction with regional techniques has been shown to be similar to that for patients with a normal BMI, however, the risk/benefit ratio must be evaluated. Careful examination of the patients overall health, the ability to handle surgery with sedation, and benefits of regional techniques over general techniques can help the anesthesiologist to determine the best form of anesthesia to provide [20] (Figure).

Results

In 63 complex cases our complications were minimal. To be exact, we experienced one hernia recurrence, no DVT's or PE's and no complication related deaths. We experienced three simple wound complications, two of which required a trip back to the operating room. On both revisions, we had to washout and reclose. One patient had to have a mesh excision done in the hospital. Since this case we exclusively use bio prosthetics. We experienced one bleeding patient who required a re-intervention with a transfusion but ultimately did extremely well post operatively.

It is important to note in our practice we keep a very close eye on our patients post-operatively. In our practice when a seroma is present post-operatively we use interventional techniques to treat the seroma. These techniques usually employ ultrasound guided percutaneous drainage of the seroma and this usually resolves the seroma permanently. In these sixty three patients we experienced four post-operative seromas that required us to drain. Again, it is important to note all 4 patients with the post-operative seroma did extremely well.

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