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Case report

Abdominal suspension during massive panniculectomy: A novel technique and review of the literature

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ABSTRACT

Panniculectomy performed in patients with morbid obesity before or after massive weight loss improves body contour, incidence of soft tissue infection and overall functional status. However, obtaining adequate surgical exposure remains one of the most critical and challenging aspects of the procedure. We present the case of a 75-year-old veteran who underwent successful panniculectomy using a novel technique of abdominal suspension that is easier, more effective and less costly than previously used alternatives.

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Introduction

Morbid obesity is increasing in prevalence, creating a problematic public health concern. With at least one third of US adults having a BMI greater than 30, as well as almost one fifth of adolescents, referrals to surgeons for obesity-associated conditions will continue to rise.¹ One of these is for *panniculus morbidus*, a condition characterized by a massive abdominal apron of skin and soft tissue that is commonly found in morbidly obese and bariatric patients after massive weight loss. This tissue is prone to chronic infection at the skin folds, dermatitis, ulceration, sinus tract formation and lymphedema.² In addition, this abdominal apron can be a source of chronic back pain and functional limitation, hindering patients' weight loss efforts.

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The treatment for *panniculus morbidus* remains surgical. However, since Jackson and Steeper's first case report in 1951, suspension of the abdominal soft tissue pannus intra-operatively to provide adequate surgical visualization has been a constant challenge and area of active research interest.³

Initial methods of pannus suspension relied on a pulley system comprised of nails, pins and/or sutures inserted through the pannus and affixed to the ceiling or an overhead bar supported IV poles.^{3–5} These were complex endeavors that required repeated intra-operative adjustments and additional operating room personnel. We previously published our experience with the first use of a portable floor crane to allow surgeon-operated pannus suspension.⁶ This technology improved security of suspension, and decreased the need for additional personnel, but added considerable cost to the operation. Further advancements in the use hydraulic technology for pannus suspension have also since been published in the literature.^{7–10}

Recently, alternatives to machine-assisted devices have emerged as a more cost-effective method of pannus suspension and retraction. Bonnet and colleagues have reported their experience with using 16 French drains as external traction sutures for pannus suspension to the retractable frame of an orthopedic table.¹¹ In addition, Salhi and Cordoba have published their novel application of a limb positioner for orthopedic procedures for pannus suspension.¹² Both surgeons report adequate pannus exposure and maneuverability with their respective techniques, as well as improved operative efficiency and patient safety.^{11,12}

Case report

A 75-year-old veteran presented to our clinic for evaluation of his pannus. He had a history of hypertension, hyperlipidemia and morbid obesity (BMI of 50) as well long standing complaints of back pain, difficulty with ambulation and recurrent skin fold infections secondary to his massive abdominal pannus (Figure 1). Due to failure of conservative management, the patient elected to undergo a panniculectomy. The morning of surgery the patient underwent marking pre-operatively in our standard fashion (Figure 2). The superior margin was determined pre-operatively via pinch test and was at the level of the anterior superior iliac spines. The marking proceeded inferiorly along the course of the inguinal ligament in the panniculus-thigh skin crease. At the base of the penis, the marking was carried cephalad 8 cm to minimize tension and traction deformity after closure.

The Rultract Skyhook Surgical Retractor System (Rultract Inc., Cleveland, Ohio) was then used to assist in exposure and retraction. The base post is secured to each side of the operating table and secured to bars, which hold the ratchet system (Figure 3). We chose to use the supplied karabiner clip suspended on the ratchet cable. This allows us to attach multiple towel clips on each karabiner to grasp the tissue. Added length can also be achieved by using umbilical tape to attach towel clip to karabiner. The ratchet is controlled by a manual and reversible crank to allow for easy suspension of the pannus and visualization of all the markings. This allowed excision of the pannus with improved visualization and maneuverability in both the vertical and horizontal planes (Figure 4). The weight of the abdominal pannus specimen was 15.3 kg. We were able to perform the procedure quickly, minimize blood loss by preemptive vascular control and safely determine no hernias were present. Two Jackson-Pratt drains were placed at inferior abdominal wall quadrants to prevent seroma formation. Estimated total blood loss was 400 mL. Post-operatively, the patient did well. He was discharged to home post-operative day two. He had some cellulitis at his suture line at his first clinic appointment two weeks post-operatively which resolved with a one week course of oral antibiotics. His Jackson-Pratt drains were removed at two weeks and one month, respectively. Patient at three months post-operatively is satisfied with his improved abdominal contour and has since started a walking program to lose remaining excess weight (Figures 5 and 6).

Discussion

A critical step in performing a panniculectomy is obtaining adequate exposure to increase efficiency during dissection, prevent inadvertent vessel injury and identify if hernias are present. Many different techniques have been employed to assist in exposure, with varying degrees of success, materials and cost.



Figure 1. Pre-operative photo.

The ideal device should have the following qualities: easy to set-up, inexpensive, surgeon-operated, reliable, portable and readily sterilizable. The literature describes multiple different techniques including pulley systems from the ceiling, hydraulic cranes and the application of other retraction devices. Previously our group used a portable floor crane to aid exposure during a panniculectomy.⁶

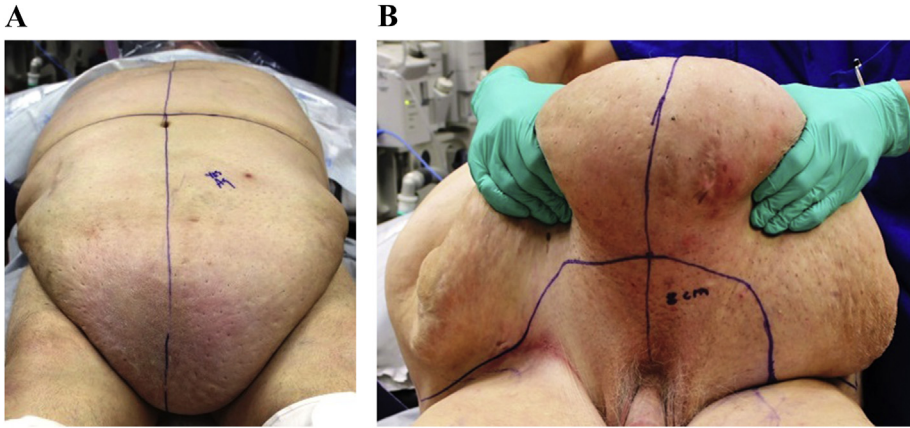


Figure 2. (a) Superior skin marking. (b) Inferior skin marking.

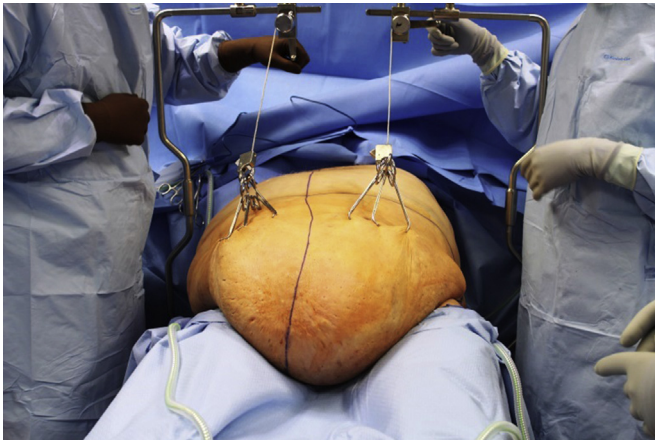


Figure 3. The Rultract Skyhook Surgical Retractor System.



Figure 4. Excision of pannus.

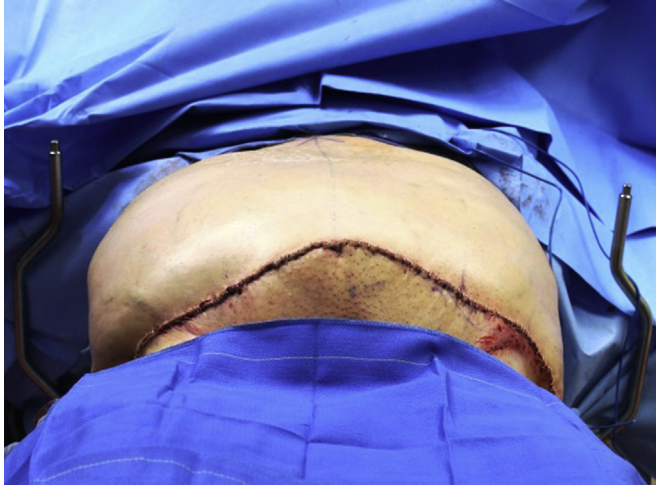


Figure 5. Post-operative photo taken day of surgery.



Figure 6. Post-operative photo taken at 3 month follow up.

Due to concerns over sterilization techniques, lack of portability, expense and the need for additional operating room personnel⁷ our group is now in favor of the Rultract Skyhook Surgical Retractor System. This device is currently used for sternal retraction in cardiothoracic surgery. The system has an easy, quick set-up and provides excellent exposure and maneuverability of the abdominal pannus in the

multiple planes. The device is also readily available, easy to store and sterilizable. At our institution the cost of the Rultract Skyhook Surgical Retractor System is less than half of that of the device described by Salhi and Cordoba (\$15,220 vs. \$37,762). Due to the ease of application and these other factors, this device is likely to expand its application in other surgical fields.

Conclusion

The Rultract Skyhook Surgical Retractor System is a safe, reliable and cost-effective option for abdominal suspension during massive panniculectomy.

Disclosures

The authors report no proprietary or commercial interest in any product mentioned or concept discussed in this article.

Conflicts of interest

None.

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