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Panniculectomy in End-Stage Renal Disease

Six-Year Experience of Performing Panniculectomy in Preparation for Renal Transplant

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Background: Patients with end-stage renal disease evaluated for renal transplantation are frequently declined secondary to obesity and decreased functional status. As a result, many of these patients lose weight intentionally in an effort to gain candidacy on the transplant waiting list. This frequently produces a panniculus encompassing the lower abdominal surgical site used for renal transplantation. These patients are declined for renal transplantation secondary to predictable wound-healing complications.

Materials and Methods: We previously identified significant weight loss (>10 kg) before renal transplantation as a risk factor for wound-healing complications after kidney transplant. Since that time, we have successfully performed 21 panniculectomies in renal transplant candidates (5 men and 16 women) with an average age of 55 years (range, 27–67 years) and an average body mass index of 30.2 kg/m² (range, 24.5–38.7 kg/m²) after significant weight loss, with an average maximum weight loss before panniculectomy of 37.7 kg (range, 5.5–83.2 kg), and median body mass index decrease before panniculectomy of 14 kg/m² (range, 2.0–23.6 kg/m²).

Results: We observed minor wound-healing complications (cellulitis or superficial wound separation) in 8 patients (38%), major wound-healing complications (hematoma, seroma, or unplanned return to the operating room) in 3 patients (14%), and no medical complications (defined as urinary tract infection, pulmonary embolism, pneumonia, deep venous thrombosis, central venous access loss, or myocardial infarction). Seventeen patients have been relisted on the transplant waiting list. Of the patients who have not been relisted on the transplant waiting list, no patient had his or her candidacy delayed secondary to complications of their panniculectomy. Of the patients who have been relisted, 6 have undergone transplantation. Of these 6 patients, no one has experienced wound-healing complications, 1 patient experienced delayed graft function and 1 patient experienced mild transaminitis resolved by discontinuing statin therapy.

Conclusions: Panniculectomies in preparation for renal transplant may be performed in patients with end-stage renal disease with an acceptable complication rate, converting previously ineligible patients into eligible candidates for kidney transplant. It also seems those who undergo panniculectomy before kidney transplant may expect to have lower rates of wound complications after their transplant had they not had a panniculectomy.

Key Words: renal, transplant, panniculectomy, wound healing, panniculus, pannus, wound-healing complication

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BACKGROUND

The panniculus is a burden for surgical access and wound healing to the renal transplant surgeon. Located directly over the usual lower quadrant incision used to access the iliac fossa for renal transplantation,

a panniculus increases moisture, bacterial colonization, and tension on the operative wound.¹ Furthermore, the panniculus is hypovascular, and, when combined with immunosuppression, creates an environment hostile to wound healing.^{2,3} At our institution, a “high risk” panniculus (subjectively determined on physical examination by the transplant surgeon) is a contraindication to renal transplantation, restricting access to otherwise acceptable transplant candidates. Since 2008, we have implemented a pilot program in which patients with a “high risk” panniculus, who are otherwise acceptable renal transplant candidates, undergo panniculectomy in an attempt to gain access to the transplant waiting list. This is a report of our ongoing experience performing panniculectomy in these high-risk patients, as well as their preliminary posttransplantation outcomes.

METHODS

We retrospectively reviewed all cases of panniculectomy performed in preparation for renal transplantation at UC Davis for 72 months from 2008 to 2014. Patient characteristics and surgical outcomes data were analyzed. Primary outcome was approval for transplant waiting list. Secondary outcomes were minor wound complications (skin separation, superficial surgical site infection), major wound complications (abscess, hematoma, return to the operating room), and medical complications (central venous access loss, pneumonia, pulmonary embolism, urinary tract infection, myocardial infarction, stroke, symptomatic deep venous thrombosis, sepsis and septic shock). Inclusion criteria required patients to have at least 3 months of follow-up from the time of panniculectomy.

Surgical Technique and Protocol

Preoperatively, skin markings are made in an effort to allow for removal of a maximal amount of redundant tissue while ensuring tension free closure. Dissection is subscarpal, in the loose areolar plane with effort focused toward limiting frank muscle or fascia exposure. The minimum amount of skin needed to eliminate the panniculus and provide a tension-free closure is elevated. Abdominal plication is never performed as this may increase intraperitoneal pressure, causing greater difficulty in creating space for the subsequent transplant. Infraumbilical or supraumbilical panniculectomy is performed at the surgeon's discretion, with the latter selected if the umbilicus is considered “high risk” secondary to redundant upper abdominal excess occluding the umbilicus, making it susceptible to moisture trapping. All patients undergo dialysis 1 day before the operation and are dialyzed on postoperative day 1 to ensure optimal electrolyte and fluid balance. Two 15-French Blake drains are used for all cases. All patients have sequential compression devices on lower extremities before induction of general anesthesia, are required to ambulate on arrival to the surgical ward, and receive chemoprophylaxis against deep venous thrombosis if they have a Caprini score greater than or equal to 7. Patients are discharged home on postoperative day 1 or once pain is controlled on oral analgesics. Our practice of discharging patients on prophylactic antibiotics until all drains are removed changed during this review period. Subsequently, we no longer routinely discharge patients on antibiotics. Patients are not discharged with abdominal binders. Drains are removed in clinic once output is less than 30 mL/d. If drain outputs

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are too high for removal after 2 weeks, patients are encouraged to wear abdominal girdles or other garments that provide gentle compression. Patients are not allowed to use heparin during dialysis until there is no evidence of seroma 1 week after final drain removal. All patients are followed up weekly until 1 week after final drain removal, postoperative month 1, and postoperative month 3 with more frequent follow-up as needed if management of postoperative wound or infectious complications necessitate. The goal for postsurgical clearance and listing for renal transplant required complete healing by 3 months from the date of the panniculectomy. Patients were referred back to transplant surgery for final clearance.

RESULTS

Twenty-one panniculectomies have been performed at our institution in preparation for renal transplant with at least 3 months of follow-up. All these patients were referred back to transplant for final approval to be placed on the kidney wait list. Median age at time of panniculectomy was 55 years (range, 27–67 years). Median maximum weight loss was 37.7 kg (range, 5.5–83.2 kg) and median body mass index (BMI) loss was 14.0 kg/m² (range, 2.0–23.6 kg/m²). Median BMI at the time of panniculectomy was 30.2 kg/m² (range, 24.5–38.7 kg/m²). Median specimen weight removed was 3.2 kg (range, 1.4–4.9 kg). Average time to subcutaneous drain removal was postoperative day 23 (SD 10.5 days, range 9–46 days).

Complications

Eight (38%) patients had minor wound-healing complications, 3 (14%) patients had major wound-healing complications (1 abscess, 2 hematomas), and no patient had a medical complication. Those with minor wound complications healed with local wound care or PO antibiotics within 10 weeks (average time, 24 days; range, 8–69 days). Five patients required oral antibiotics, with 1 patient requiring IV antibiotics. The abscess was treated with incision and drainage and negative pressure wound therapy performed at an outside hospital. Those who had hematomas were treated with operative evacuation and primary closure; 1 patient required 3 U of packed red blood cells, and the other required 1 jumbo unit of fresh frozen plasma (Fig. 1).

Outcomes

All patients were cleared by plastic surgery for renal transplantation within 3 months of their panniculectomy. Seventeen patients have been relisted for renal transplantation. Of the 4 patients who have not been relisted for renal transplantation, no patient had their candidacy delayed secondary to the panniculectomy. Six patients have undergone renal transplantation after panniculectomy. Of the 6 patients who have undergone renal transplantation, 3 patients had their panniculectomy incision incorporated into the surgeon's hockey stick incision. Incorporation of the panniculectomy incision was at the discretion of the transplant surgeon. In the 3 patients whose panniculectomy incision was not

incorporated into their hockey stick incision, all transplant surgeons reasoned that the panniculectomy incision was too low for renal transplant exposure. No patient had wound-healing complications after transplantation. Currently, all transplant recipients have dialysis-free graft survival.

DISCUSSION

The overall wound-healing complication rate after panniculectomy is very high, approaching 50% for all patients. When compared to recently published NSQIP data, this is almost 8-fold higher than the expected rates for truncal body-contouring procedures (6.7%).⁴ However, when compared with literature examining similar high-risk patient populations, it is consistent with previously reported data.^{5–7} We believe our high complication rate can be directly contributed to the high number of preoperative comorbidities (defined by NSQIP), as well as the rate of obesity in our patient population (median BMI, 30.2 kg/m²).

Of the 21 panniculectomies performed, 81% of patients have been approved for renal transplantation, and, of the 4 patients that have not been, none had their candidacy delayed secondary to complications from their panniculectomy. Specifically, their panniculus is no longer a contraindication to renal transplantation for these patients. Additionally, among those patients who had panniculectomy and went on to subsequent renal transplant, none had wound-healing problems. Thus, our early experience with panniculectomy in preparation for renal transplant suggests posttransplant wound complications can be minimized or even potentially avoided in patients with a panniculus if removed before transplantation.

The weaknesses of this study include its retrospective nature and limited number of patients who have gone onto transplant. We continue to accrue additional patients and seek to combine our experience with others beginning to perform panniculectomies in an effort to increase the number of patients deemed suitable candidates for kidney transplant. In addition, we altered our antibiotic protocol during the study period. Although it can be argued that the use of prophylactic antibiotics should be extended in these patients who are at high risk for perioperative wound infections, there is no literature to support this currently.

Lastly, the determination of what constitutes a “high-risk” panniculus is still subjective and left to the discretion of the transplant surgeon. Despite this, all our patients were clearly high risk for wound complications; all have end-stage renal disease (ESRD) and at least 1 additional risk factor for wound-healing complications identified by Fischer et al. We are currently working on an objective criterion to define the high-risk panniculus within the transplant surgery group.

CONCLUSIONS

There are patients with ESRD who present to transplant surgeons who raise concerns for postrenal transplant wound-healing complications, particularly those with a sizeable panniculus. Our early experience with panniculectomy before renal transplant suggests that, despite a



FIGURE 1. Hematoma in 1 patient after panniculectomy requiring operative evacuation.

predictably higher complication rate than the average panniculectomy patient, patients can be expected to have completely healed within 3 months of their panniculectomy, thus meeting our clearance criteria for transplant evaluation. Although the plastic surgeon bears the burden of this higher wound complication rate, all complications may be managed without much difficulty, with patients uniformly healed by post-operative month 3. Most importantly, panniculectomy in patients on renal dialysis allows patient access to kidney transplantation, a life-extending procedure for those with ESRD.

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