Partial Closure of Skin Wounds after Kidney Transplantation Decreases the Incidence of Postoperative Wound Infections

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Abstract

Wound infections are a major cause of morbidity after kidney transplantation. The purpose of our study was to evaluate an improved technique of wound closure. Data corresponding to 104 consecutive live donor kidney recipients were prospectively collected and analyzed. Our routine standard technique involved closure of the abdominal wall muscle and fascia in one layer with interrupted nonabsorbable full thickness sutures. No drains were used. The skin was closed with interrupted 2–0 nylon sutures 4 to 5 cm apart, leaving the skin and subcutaneous tissue in between partially open. Patients were allowed to shower starting on the first postoperative day. Examination of the wounds was continued for at least 1 month postoperatively, and then routinely as needed. All patients were thoroughly informed preoperatively of our technique. There were no immediate postoperative wound infections. There were no instances of dehiscence, evisceration, or need for revision. All patients were able to continue with their routine daily activities. Cosmetic results were satisfactory in all cases. We did not experience any patient complaints with respect to our technique. Patient satisfaction scores conducted by Press Ganey and Associates ranked in the 99 percentile with respect to peers undergoing kidney transplantation. Three patients returned six months postoperatively with suture granulomas which were treated nonoperatively. Partial closure of the skin wound with no associated drains is an effective and cosmetically desirable way to decrease the incidence of postoperative infections in kidney transplantation.

Keywords

- kidney transplantation
- wound infection
- wound closure
- immunosuppression
- transplant surgery

Wound infections are a major cause of postoperative morbidity in patients undergoing kidney transplantation. These patients can then be at risk for graft loss and mortality as well.¹ Beyond the routine risk of surgical site infections for standard procedures, kidney transplantation bears the added risk caused by its obligate medication regimented immunosuppression. Immunosuppressive agents inhibit the inflammatory cytokines that

are responsible for transplant rejection. These cytokines are also responsible for the initial inflammatory phase of wound healing.² Furthermore, many patients with end-stage renal disease have concomitant diabetes or obesity which are additional independent risk factors for surgical site infection.

The risk of infection is greater in the first year after transplantation.³ Reports of wound infections range from

10⁴ to 27%,⁵ with up to 25% requiring radiological or surgical intervention.⁶ Risk factors for impaired wound healing after kidney transplantation include body mass index >30, dialysis pretransplantation, plasmapheresis after transplantation, treatment of acute rejection with thymoglobulin, immunosuppression induction with mycophenolate mofetil,⁶ maintenance immunosuppression with sirolimus, recipient age >60, diabetes, and delayed graft function.⁷

Despite the literature on patient factors and clinical course related to wound infections in kidney transplantation, there is scant literature regarding skin closure methods and their relation to postoperative wound infections. Large abdominal incisions, including kidney transplant recipients are most commonly closed with nonabsorbable skin staples. Other reported methods include subcutaneous closure with 4–0 Monocryl or interrupted mattress closure with 2–0 nylon. A small series describes the use of a subcutaneous absorbable stapling device.⁸

We have made it our practice to use partial wound closure in kidney transplant recipients. There is evidence to suggest decreased rates of wound infections in the orthopedic and trauma literature through the use of partial wound closure.⁹ There have been no reports of the use of this method and its relation to postoperative wound infection in kidney transplantation. The purpose of our study was to decrease the rate of wound infections in kidney transplantation through the use of partial skin wound closure.

Methods

Data corresponding to 104 consecutive live donor kidney recipients were prospectively collected and analyzed. Our routine standard technique involved performing the arterial and venous anastomoses followed by reperfusion of the renal allograft. A tension-free anastomosis was constructed with 5–0 synthetic absorbable sutures encompassing full thickness of both ureter and bladder. No drains were left in the perinephric space. The abdominal wall muscle and fascia were closed in one layer with interrupted nonabsorbable full thickness sutures. The skin was closed with interrupted 2–0 nylon sutures 4 to 5 cm apart, leaving the skin and subcutaneous tissue in between partially open.

Examination of the wounds was continued for at least 1 month postoperatively, and then routinely as needed. Wound infection was defined as an infection occurring within 30 days of surgery and involving the skin, subcutaneous, or deep soft tissues at the surgical wound site with any clinical features such as purulent discharge from the incision, pain, tenderness swelling, redness, heat, or fever.⁵ The examination was performed by the surgeons and nephrologists of the transplantation center. All patients were thoroughly informed preoperatively of our technique.

Results

There were no immediate postoperative wound infections as determined clinically. There were no instances of dehiscence, evisceration, lymphocele, or need for revision. All patients

Table 1 Wound Infection Rates of Recent Studies

Study	Wound Infection Rate
Molmenti (NSLIJ)	<1%
Sousa et al (UNIFESP) ³	10.3%
Menezes et al (UFSPB) ¹⁰	13%
Røine et al (OUHR) ⁴	27%

were able to continue with their routine daily activities; there was no need for visiting nurse services or home care. Patients were permitted to shower on postoperative day 1. Cosmetic results were satisfactory in all cases. We did not experience any patient complaints with respect to our technique. Patient satisfaction scores conducted by Press Ganey and Associates ranked in the 99 percentile with respect to peers undergoing kidney transplantation. Three patients presented 6 months posttransplantation to the outpatient transplantation center with suture granulomas and were treated nonoperatively with swift recovery (► **Table 1**).

Conclusions

Partial closure of the skin in kidney transplant wounds is an effective way to decrease the incidence of postoperative infections and provides satisfactory cosmetic results. Preoperative discussion with patients optimizes satisfaction. We believe that partial wound closure allows adequate drainage of any possibly infected material in the early postoperative period. Once drainage is achieved, the wound heals by secondary intention without tension. The low infection rate coupled with high patient satisfaction shows that this skin closure method is effective in achieving its stated goal and may be superior to standard practices.

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