Relation Between Wound Complication and Lymphocele After Kidney Transplantation: A Monocentric Study

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ABSTRACT

Introduction. Wound complication frequently arises after kidney transplantation and its risk factors are well known. In a previous paper we analyzed these factors, and in this new retrospective study we evaluate the influence of lymphocele in the development of wound complications.

Patients and methods. From January 2000 to December 2018, 731 consecutive kidney transplants have been performed in our center. We have analyzed the incidence of wound complication and lymphocele and their risk factors.

Results. Out of 731 kidney transplants, we have observed wound complications in 115 patients (15.7%) and lymphocele in 158 patients (21.7%). Of these, 70 patients developed both complications (9.5%), but 6 patients have been excluded because they were in therapy with mammalian target of rapamycin inhibitors. Twenty-nine patients (45.3%) presented a first level and 35 patients (54.7%) showed second level wound complications. Lymphocele was the only present factor in just 3 cases (4.6%). The other patients showed diabetes in 28 cases (43.7%), overweight/obesity in 38 (59.3%), delayed graft function in 17 (26.5%), and 60 years or more in 38 (57.8%). The association has been found in 30 out 64 patients treated with tacrolimus (46.8%) and in 34 with cyclosporine (53.1%); 40 patients did not receive muscular layer's reconstruction (62.5%).

Conclusion. Our experience shows that lymphocele alone is not a predisposing factor for wound dehiscence after kidney transplantation, and they often coexist because they share the same risk factors, the most important being obesity, diabetes and delayed graft function, older age, and surgical techniques. No relation has been observed with calcineurin inhibitor therapy.

KIDNEY transplant is a standardized procedure, but despite the advantages in surgical techniques, it can entail surgical complications. Their development can be favored by patient's characteristic and comorbidities, as well as by several risk factors, which have been greatly analyzed in recent years in the latest literature [1,2].

Wound complications and lymphocele are 2 of the most common types of surgical problems, of which risk factors are well known and can worsen the patients' outcomes, increasing morbidity and hospitalization [2–4]. Wound complications may be classified as infectious, which usually appear earlier, and noninfectious complications (dehiscence of muscular fascia and incisional hernia), with a late onset [5,6].

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Lymphocele is a lymph collection surrounding the graft; it usually develops in the first 6 months after the transplant, with a maximum incidence after 6 weeks. It may develop either from the dissection of the lymphatic vessels and lymph nodes during iliac vessels isolation or from the dissection of renal hilum's lymphatics during graft procurement or back table surgery. In most cases it is symptomless, but, when it enlarges, the symptoms are linked to the mass effect and it can lead to vessel and ureter compression and, in severe cases, to iliac vein thrombosis and loss of graft function. In the literature, it is reported as an incidence for symptomatic lymphocele that varies between 0.03% and 26% [7,8].

In a previous paper we led a retrospective study with the aim to estimate the factors linked to impaired wound healing in a nondiabetic population; we found that overweight and delayed graft function (DGF) were those influencing its development the most [9]. We have, then, conducted a new retrospective study taking in consideration the role of postoperative lymphocele, analyzing its risk factors and its relation with wound complications.

PATIENTS AND METHODS

From January 2000 to December 2018, 731 consecutive kidney transplants have been performed in our transplant center. Out of these 731 patients, 307 (42%) were women and 424 (58%) were men, with an age range between 19 and 72 years. All the grafts were from deceased donors and the patients received the same immunosuppressive treatment consisting of basiliximab at induction and on the fourth postoperative day, corticosteroids with scaling dosages, calcineurin inhibitor (cyclosporine or tacrolimus) or mammalian target of rapamycin inhibitors, at dosages established daily according to blood levels.

We have evaluated the development of wound complications and lymphocele within 6 months after the transplant and the influence of the following factors: age, sex, antirejection drugs, overweight/obesity, diabetes, DGF, and surgical techniques.

As for immunosuppressive drugs, we have analyzed the patients treated with tacrolimus and cyclosporine, excluding those who received treatment with everolimus, due to its known effect on inhibition of fibroblast activation and proliferation [10,11].

Regarding the patients' characteristics, we have evaluated overweight/obesity assessing body mass index (BMI) and considered an increased risk in case of a BMI value greater than 28 kg/m^2. We have classified the patients based on their age in 2 groups using 60 years as a cut off; moreover, we have assessed DGF by the number of dialysis (minimum 4) in the post-transplant period and, finally, considered as diabetic only patients on treatment before transplantation.

All the transplants have been executed following an extraperitoneal approach with a pararectal incision prolonged to the pubes with dissection of the cutaneous, subcutaneous, and muscular/fascial layers. Grafts' vessels have been anastomosed with the iliac vessels and then an uretero-ureteral or a vesicoureteral anastomosis with Lich-Gregoir technique has been realized, all with the routine placement of ureteral stent. In the first 426 procedures, the muscular layer has not been reconstructed, and the muscular fascia has been sewn with 2 slowly absorbable half continuous sutures. In the last 305 transplants, the surgical technique has been modified and the muscular layer also has been reconstructed with 2 slowly absorbable semicontinuous sutures. We have, therefore, classified the patients with impaired healing of surgical incision in 2 groups, on the basis of the complication's severity, particularly following the Clavien-Dindo description [12]: the first group showed a superficial infection with partial closure of the wound and a dehiscence not involving the muscular fascia (first level of wound complication); the second group included patients with profound infection that extends to fascial and muscular layers and any wound that required an additional procedure for its closure (second level of wound complication) (Fig 1).

RESULTS

Out of 731 kidney transplants, we have observed impaired healing of the surgical incision in 115 patients (15.7%, 115/731) and lymphocele in 158 (21.7%, 158/731). Only 70 patients developed both complications (9.5%, 70/731). Six of these 70 patients received a treatment with mammalian target of rapamycin inhibitors and were therefore excluded from our analysis that was carried out on 64 patients (8.7%, 64/731). Of these 64 patients, 29 (45.3%, 29/64) presented first level complications and 35 (54.7%, 35/64) second level wound complications; 11 patients required an additional surgical procedure for the complete wound closure and healing.

In only 3 cases (3/64, 4.6%) lymphocele and wound dehiscence coexisted without the presence of additional factors and in just 1 patient the wound infection reached the muscular fascia. Thus, in the other 61 patients, other comorbidity factors were present including diabetes in 28

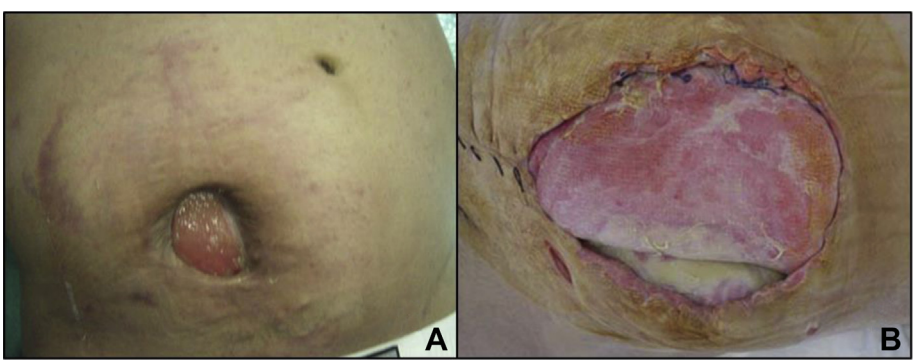

Figure 1. Dehiscence of surgical incision in transplanted patients. **(A)** first level wound complication. **(B)** second level wound complication

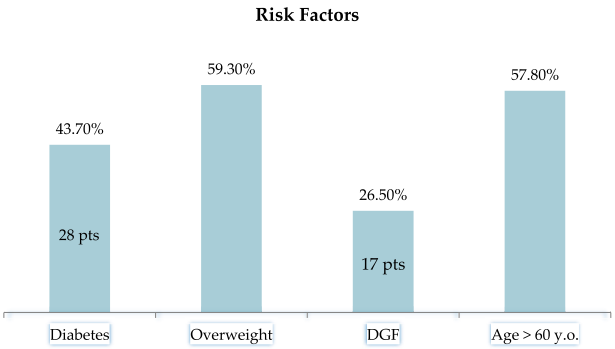

Figure 2. Risk factors in our 64 patients

patients (43.7%, 28/64), overweight in 38 (59.3%, 38/64), and 17 patients (26.5%, 17/64) developed DGF in the weeks post transplant with an average dialysis number of 11 (Fig 2). Moreover, among the 64 patients, 27 (42,1%, 27/64) were younger than 60 years old and, considering the surgical technique, 40 patients did not receive the reconstruction of the muscular layer (62.5%, 40/64). In the group of patients without the muscular layer reconstruction, we observed a higher incidence of second level wound complications compared with patients treated with the modified suture technique (29 vs 5). Lastly, regarding the immunosuppressive therapy, 30 patients were in treatment with tacrolimus (48.8%, 30/64) and 34 with cyclosporine (53.1%, 34/64).

DISCUSSION

Impaired healing of the surgical incision influences the outcome of patients undergoing kidney transplantation. In our previous paper we have linked its development to various factors, without giving the right relevance to lymphocele. Through our experience and an analysis of the literature, it is now evident how wound complications and lymphocele may have the same risk factors.

Obesity is a well-known risk factor for the arising of surgical complications after kidney transplantation. A higher weight is one of the best-documented independent determinant conditions for the development of wound complications, as well as for lymphocele formation, also probably for the longest surgical time and the need for a more extensive dissection. According to some authors, the higher the BMI, the greater is the risk [4,5,7,11,13–16].

Diabetes mellitus, which was present in 43.7% of patients in our analysis, is associated with a higher incidence of complications in general populations undergoing to surgical procedures and even in the transplanted population and is described as a predisposing factor [11]. It is linked to a greater risk of disrupted wound healing and lymphocele development, and an important role could be played by the diabetic microangiopathy [6,7].

Another important factor that presented in most of our cases is older age (37 patients equal or older than 60 years old). Probably, the altered nutritional status of old age, characterized by a reduction of proteinemia and albuminemia, determines an impairment of tissue healing and a prolonged lymphorrhea [2,3].

DGF, as well as episodes of acute rejection, is another condition commonly associated with impaired healing of the surgical incision, and in recent articles its predisposing role for lymphocele formation was also highlighted, as confirmed also by our experience [7,11,14,17,18].

Considering immunosuppression drugs, we did not observe a significant difference in the incidence of wound complication and lymphocele between patients receiving cyclosporine and tacrolimus, and even in the latest experiences found in the literature, immunosuppressive regimens using both drugs seem to have the same effects on wound healing and lymphocele formation [11,15,19,20].

One last aspect to analyze is the surgical techniques used. In the first 426 transplants the muscular layer had not been reconstructed, and we have observed in these group a higher incidence of complications, compared with the ones who received a muscular suture. The muscle is a tissue characterized by low resistance, so it does not avoid these kinds of complications but permits to reduce their severity, being also a further protection for the transplanted kidney. In fact, the majority of patients with second level wound complication did not receive the reconstruction of the muscular tissue. According to some authors, closing the muscular and subcutaneous space preventing fluid accumulation can prevent the development of wound dehiscence and lymphocele in immunosuppressed patients [21–23].

Others authors underline the role played even by peritoneal dialysis, peritoneal dialysis catheter, and polycystic kidney, but we have not found any correlation [3,24,25].

In our study population, the incidence of impaired healing of surgical incision (15.7%) and of lymphocele (21.7%) are similar to the rates found in the literature [5–7,17]. Lymphocele and dehiscence of surgical incision appear without additional factors in only 3 cases. Therefore, our experience and the analysis of the recent literature show that lymphocele alone is not a predisposing factor for impaired wound healing after kidney transplantation. These 2 entities often coexist because they share the same risk factors.

CONCLUSIONS

Impaired healing of surgical incision and lymphocele are 2 intimately linked entities, even if they do not seem responsible for their respective development. Our experience and the literature review confirm that their frequent coexistence in transplanted patients does not seem to be related to immunosuppression through calcineurin inhibitor, whereas it depends, instead, on their sharing of some predisposing factors such as obesity, DGF, older age, diabetes, and an incorrect surgical technique. Therefore, the therapeutic acts aimed at the avoidance of 1 of these 2 entities (ie, meticulous surgical procedure, accurate hemo/lymphostasis, careful wound

dressing, etc) in most cases are useful even for preventing the development of the second.

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