Symptomatic Venous Thromboembolism and Major Bleeding After Renal Transplantation: Should We Use Pharmacologic Thromboprophylaxis?

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ABSTRACT

Background. Venous thromboembolism (VTE) is a major health issue that may result in complications such as post-thrombotic syndrome, pulmonary hypertension, and death. Appropriate thromboprophylaxis in individuals undergoing kidney transplantation remains unclear. The aim of this study was to determine the prevalence of symptomatic VTE and major bleeding within 90 days after renal transplantation (RT).

Methods. This was a retrospective study on consecutive patients undergoing RT at Hospital Privado Córdoba, Argentina, from January 1, 2006, to December 31, 2013. Exclusion criteria were age <18 years and combined organ transplantation. Pharmacologic or mechanical thromboprophylaxis was not used routinely. Symptomatic VTE and major bleeding were documented.

Results. A total of 511 RTs were performed; 62 patients received combined organ transplantation, and 8 patients (1.5%) were lost to follow-up. Overall, follow-up was completed on 441 patients, 4 (0.9%) of whom developed deep venous thrombosis and 14 (3%) of whom died. The most frequent causes of death were septic shock and severe hemorrhage. Duration of surgery >4 hours ($P = .006$) and a history of VTE ($P < .001$) were associated with VTE. Twenty-three patients (5.2%) had major bleeding, 2 (0.4%) died from bleeding complications, and 17 (3.85%) required a reoperation to control bleeding.

Conclusions. This study shows a low prevalence of symptomatic VTE in patients undergoing RT despite not having used thromboprophylaxis routinely. Major bleeding was significant, and despite the high risk of VTE assigned by the Caprini score, which suggests pharmacologic prophylaxis, our data raise questions about the appropriate prophylaxis for these patients.

VENOUS THROMBOEMBOLISM (VTE) is a major health issue that may result in complications such as post-thrombotic syndrome, pulmonary hypertension, and death [1]. Risk factors for thromboembolic events after general surgery and its preventive measures have been widely documented in the literature [2,3]. However, appropriate knowledge on thromboprophylaxis in individuals undergoing kidney transplantation remains unclear [4].

End-stage renal disease (ESRD) causes a complex alteration of hemostasis. Low hematocrit levels, together with erythropoiesis defects and platelet dysfunction, would potentially increase the risk of postoperative hemorrhage. These hemostatic factors could theoretically offer some protection against VTE during the early postoperative period [5–9]. For these reasons, and owing to the low frequency of symptomatic VTE perceived, some transplant

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centers do not routinely use pharmacologic prophylaxis, which is usually prescribed in other surgical procedures of a similar magnitude.

Age, diabetes, cancer, and history of thromboembolic event have been associated with VTE in renal transplant recipients. However, knowledge about the effects of transplant-specific factors remains scarce [4,5,10–17].

The primary aim of the present study was to determine the prevalence of symptomatic VTE events within the 1st 90 days after renal transplantation (RT) surgery. The secondary aim was to document the prevalence of major bleeding evaluated during the same period.

METHODS

We conducted a retrospective longitudinal study on 511 RT surgeries (in 505 recipients) performed at Hospital Privado Universitario Centro Médico de Córdoba from January 1, 2006, to December 31, 2013. Patients undergoing combined organ transplantation and <18 years of age were excluded. Patients did not routinely receive pharmacologic or mechanical thromboprophylaxis, and they were hemodialyzed before surgery. Medical records were reviewed from the day of transplantation through the following 90 days after transplantation. Symptomatic lower extremity deep venous thrombosis and pulmonary thromboembolism confirmed by means of objective methods were analyzed. Deep venous thrombosis of upper extremities and those associated with the catheter, as well as superficial thrombophlebitis, were excluded from the analysis. Bleeding complications were also investigated; major bleeding was evaluated according to the bleeding definition proposed by Schulman et al [18].

The following variables were designated: age, sex, cause of end-stage renal disease, renal replacement therapy, type of donor, hospitalization period, pharmacologic prophylaxis for VTE, previous thromboembolic events, cancer, diabetes, drugs used during immunosuppression, delay in graft function, body mass index (BMI), and score of risk for VTE according to Caprini [2,19,20]. The duration of the surgery was defined as the time from the induction of general anesthesia to emergence from the anesthesia [21].

To analyze the data, we used SPSS software (Chicago, Illinois) for Windows, version 21. We calculated mean and SD for quantitative variables and percentages for categoric variables. To compare means between groups, we applied a *t* test or a Mann-Whitney test; to compare categoric variables, we applied a chi test [2] or a Fisher exact test as appropriate. We used receiving operating characteristic (ROC) curves to define a cutoff point in the duration of surgery variable. A *P* value of <.05 was considered to be significant.

RESULTS

During the study period, a total of 511 RT procedures were performed. Sixty-two patients (12%) were excluded on account of being recipients of combined organ transplantation, and 8 (1.5%) patients were lost to follow-up. Follow-up was completed on 441, from which 293 (65.4%) were from cadaveric donors and 148 (33.6%) were from living related donors.

During the study period, 14 (3.1%) renal transplant recipients died (Fig 1). Causes of death were septic shock ($n = 8$), hypovolemic shock ($n = 2$), acute myocardial infarction ($n = 2$), intestinal perforation ($n = 1$), and intestinal ischemia ($n = 1$). Pulmonary thromboembolism

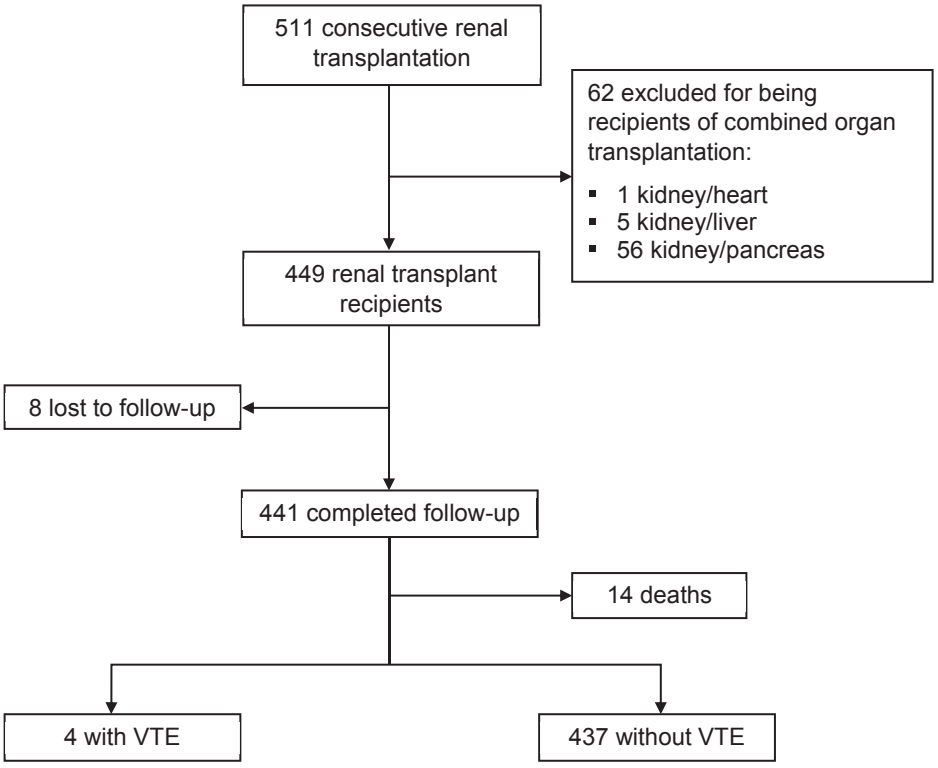

Fig 1. Flow diagram of the study. Abbreviation: VTE, venous thromboembolism.