The authors propose an aid to disentangling the effects of the numerous factors that influence the results of kidney transplantation. Many confoundings are in effect already known. Many covariables were thus considered, including factors linked to the donor, to technical contingencies such as the duration of cold ischemia, factors linked to the recipient such as the underlying disease that lead to end-stage renal disease, dialysis prior to FTR (or not, in case of preemptive transplantation), characteristics of the FTR when a STR occurred, and variables known to be associated with the STR prognosis, duration of the FTR, transplantectomy, or duration of dialysis before STR.

This work is based on a cohort of transplanted patients, named DIVAT. As expected, patients' characteristics were distinct in the two groups. STR patients were younger with transplants from younger donors. Recurrent nephropathy, past history of cardiac disease, hepatitis and malignancy were more frequent among STR patients; on the other hand, they were less frequently diabetic and obese. Compared to FTR, STR patients received better HLA-matched transplants, but their cold ischemia time was longer and they were more immunized against HLA class I and class II antigens (Panel Reactive Antibodies) than FTR patients. They received more frequently an induction therapy with a lymphocyte-depleting agent.

 Appropriately, the authors took into consideration and adjusted for all of the possible pre- or per-transplant immunological and non-immunological confounding factors and for all the baseline parameters differentially distributed between FTR and STR.

They proposed two models to support their approach:
- On one hand, they made an adaption of a multiplicative-regression model for relative survival which allows a direct comparison of risk factors between two groups of patients without assigning a presupposed role to each variable. The retained semi-parametric models were the Cox model for the expected hazard and a multiplicative-regression model for the relative hazard. The authors properly outlined the limit of these models. They require estimating the standard
deviations using Monte-Carlo simulations associated with bootstrap re-sampling.
- On the other hand, the authors showed that a stratified Cox model specifying
the graft rank as strata may be fitted to take into account STR-specific variables
as a subvector of variables that enter in the model for STR only. The authors
correctly evoked that, contrary to the relative model, a limitation of this approach
is that its corresponding structure presupposes knowledge of the role of each
explicative variable.

Using MRS and SCM models seemed an original approach to compare risk
factors between two populations.

- Discretionary Revisions: Thirty seven FTR patients were also part of the STR
group since they received two transplants during the study period. Though few,
and even if conditional independence of the two transplantations in a given
patient were possible, the authors did not provide convincing evidence, since the
power of their frailty Cox model was certainly low.

**Level of interest:** An article whose findings are important to those with closely
related research interests

**Quality of written English:** Acceptable

**Statistical review:** Yes, and I have assessed the statistics in my report.

**Declaration of competing interests:**

'I declare that I have no competing interests'