SCIENTIFIC REGISTRY OF TRANSPLANT RECIPIENTS

Program Practice Drives Variation in Choice of US Kidney Transplant Induction Therapy

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Background

- In 2009, the Kidney Disease: Improving Global Outcomes guidelines recommended induction therapy in all kidney transplant (KTx) recipients.
- The guidelines also suggested that interleukin-2 receptor blocking antibodies (IL2rAb) should be the first-line agent, the only FDA-approved agent for KTx induction.
- However, from 2004 to 2014, IL2rAb use fell from 35% to 20%, while use of thymoglobulin (TMG) and alemtuzumab (ALEM) increased from 18% to 65%.

Objective

- To better understand the variation in induction therapy use in KTx, adjusting for covariates.

Methods

- KTxs from 2005-2014 in SRTR data (n = 166,766).
- Bi-level hierarchical models were constructed, wherein use of each regimen was compared pairwise with use of IL2rAb, to adjust for clustering effects.
- Level 1 comprised patient/donor and transplant (case) factors and level 2 represented the program.
- Empirical Bayes estimates provided the adjusted proportion (with 95% confidence intervals) of use of a regimen of interest.
- Heterogeneity in induction immunosuppression prescribing across programs was quantified using intraclass correlation (ICC) and median odds ratios MOR).
- ICC quantifies the proportion of total variance in induction use that is accounted for by the program.
- MOR provides the median of the odds that patients with identical characteristics will receive the induction regimen of interest when two programs are drawn at random (performed for all possible pairs of programs).
- Data were analyzed using Stata 13, College Station, TX.
- Models included interactions of induction regimen and clinical factors.

Results

- Overall percentages of regimen use at the patient level across programs: TMG, 46.0%; IL2rAb, 22.0%; ALEM, 12.5%; other induction, 1.3%; no induction, 18.2%.
- Black or highly sensitized recipients, or recipients who experienced delayed graft function or had longer pretransplant dialysis duration, were more likely to be treated with cell depleting agents (ALEM, TMG).
- The proportion of patients treated with each induction agent varied widely across programs: IL2rAb (0%-98.8%), TMG (0%-100%), ALEM (0%-84%), none (0%-97%) (**Figure 3**). We found no regional patterns of induction use.
- Most variation in TMG (58%), ALEM (66%), other induction (51%), and no induction (58%) use reflected program practice.

Strengths

- Large national study in recent period.
- Detailed analyses of variation.

Limitations

- Binary definition of induction use.
- No information was available on either the schedule or dosing of induction regimen, presence of donor-specific antibody, prior malignancy, or infections.

Conclusions

- Clinical patient or donor characteristics explained < 5% of variation in induction therapy choice across US transplant programs; rather, choice reflects program preferences and practice.

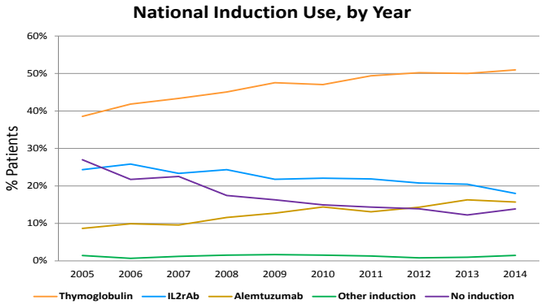


Figure 1. National trends in kidney transplant induction over time.

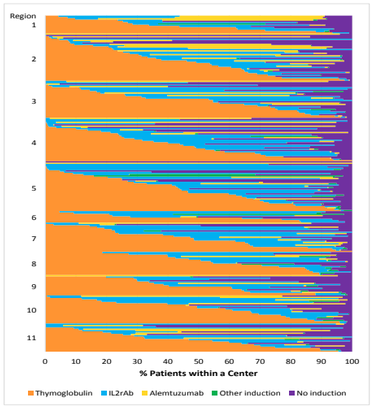


Figure 3. Proportion of patients receiving each induction immunosuppression option (including no induction) across US transplant programs (2005-2014). Each horizontal bar represents an individual program within US regions ordered by the proportion of patients receiving each regimen.

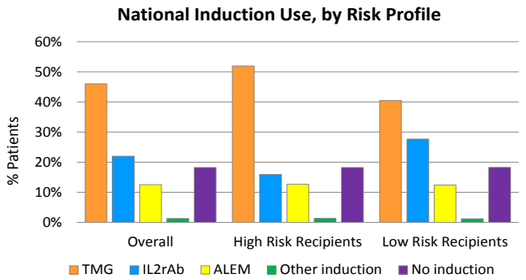


Figure 2. National trends in kidney transplant induction by recipient immunologic risk profile.

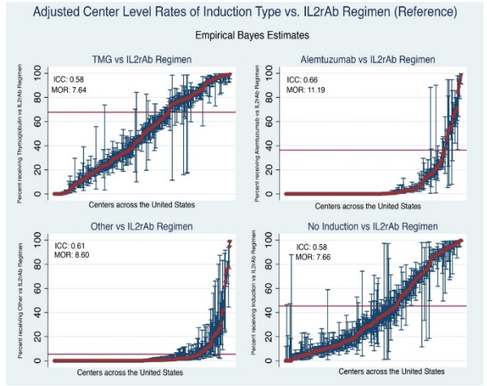
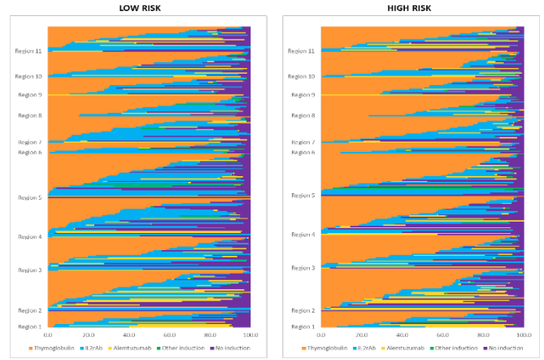


Figure 4 . Empirical Bayes estimates for likelihood of induction regimen use compared with IL2rAb. Red bar demonstrates national average rate of use of each regimen (within pairwise regimen comparisons). Each red dot represents adjusted use at one program and the blue bars reflect 95% confidence intervals for use at the program determined by empirical Bayes estimates, adjusting for case factors of transplants at the program; exclusion of the national average by a 95% confidence interval reflects adjusted program use significantly above or below the national average.



Further Studies

- Observed variation can be used to analyze transplant outcomes to better target induction to patients who are expected to derive the best outcomes.
- Closer analyses of cumulative infection risk, and posttransplant malignancies, and an economic analysis of overall costs attributed to induction immunosuppression.

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This work was supported wholly or in part by HRSA contract 250201000018C. The content is the responsibility of the authors alone and does not necessarily reflect the views or policies of the Department of HHS, nor does mention of trade names, commercial products, or organizations imply endorsement by the U.S. Government.

Funding: Supported in part by R01DK102981 from the National Institutes of Health