COMMENTARY

Temporary Deceased Donor Splenic Transplant Prior to Simultaneous Kidney-Pancreas and Pancreas Transplant: A way to Desensitize and make the Transplant Possible

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DESCRIPTION

Transplant recipients with circulating anti-HLA antibodies (sensitized patients) often wait for longer duration on the UNOS deceased donor waitlist compared to non-sensitized individuals. Patients form these anti-HLA antibodies during pregnancies, transfusions, and previous transplants. Transplanting in the presence of Donor Specific Anti-HLA Antibodies (DSA), especially HLA-Class I DSA can prove to be detrimental to graft in the immediate post-transplant period. Depending on the number, strength and titer of the DSA, the damage to the graft could be significant. When a deceased donor organ is offered, there is no time for performing desensitization by conventional plasmapheresis/plasma exchange and IVIG therapy. This just accrues additional cold ischemia time and has a negative effect on post-transplant graft function.

Deceased donor spleens are usually discarded. Spleen is the largest lymphoid organ in the human body. It's massive endothelial and arterial meshwork, unique free flowing of blood through the sinusoids, cords, and red and white pulp, large numbers of nucleated cells and dendritic cells that present both Class I and Class II HLA antigens on their surfaces makes it an ideal candidate to remove DSA. In this study 1, we hypothesized that a temporary splenic transplant from the same donor prior to the graft transplant (kidney/pancreas or pancreas only) would function as a desensitization mechanism and provide a safe immunologic window for transplant [1]. We first tested this hypothesis in a highly sensitized intestinal transplant recipient. We had to decline several deceased donor intestines offers since this patient had multiple strong class I and class II anti-HLA antibodies that gave positive Flow Cytometry Cross-matching (FXM): a physical compatibility test in which the recipients serum and donor lymphocytes are mixed. If DSA's are present in the serum, there is an antigen-antibody reaction on the surface of the donor lymphocytes, giving a positive result. This patient also had positive Complement Dependent Cytotoxic Crossmatches (CDC XM): again, a physical crossmatch that demonstrated that the DSA were complement binding and therefore significantly pathogenic. Due to the patient's dire clinical circumstances and urgency, we accepted an intestine across a positive FXM and CDC XM in the presence of multiple strong HLA-Class I and HLA-Class II DSA. Post-two-hour temporary deceased donor splenic transplant, the flow crossmatch became negative [2].

With this success, we embarked on a retrospective study, in which we evaluated the immunologic data and clinical outcomes of 8 sensitized patients with DSA and 27 controls that had undergone a temporary-splenic transplant prior to simultaneous kidney-pancreas or pancreas transplant. The surgeries were performed as follows: simultaneous transplantation of spleen and pancreas, spleen being left for 2 hours while performing duodeno-ileostomy for exocrine drainage of the pancreatic graft and vascular anastomoses of the kidney graft, and then spleen was explanted. All sensitized patients who were FXM positive prior to splenic transplant, became FXM negative after transplant. Seven of eight patients had HLA-Class I DSA pre-transplant; none of this HLA-Class I DSA were detected in the post-transplant sera. Five of the 8 patients had Class II DSA pre-transplant. Post-splenic transplant, Class II DSA was not detected in one patient; the strength of DSA decreased in all four patients who showed persistence of the HLA-Class II DSA [3]. These persistent DSA did not give a positive FXM indicating very low strength and titer of these DSA (usually not detrimental to the graft). The donor spleens were sent for histopathologic review and demonstrated varying features of acute humoral insult/rejection as we have previously described (expanded red pulp secondary to congestion, increased neutrophilic and macrophage infiltration in the sinusoids, and few to several neutrophilic micro abscesses) [3].

Received 16-Aug-2023 Manuscript No; IPP-23-17322 **Editor assigned** 18-Aug-2023 PreQC No. IPP-23-17322 (PQ) **Reviewed** 01-Sep-2023 QC No IPP-23-17322 **Revised** 08-Sep-2023 Manuscript No. IPP-23-17322 (R) **Published** 15-Sep-2023 DOI: 10.51268/1590-8577-23.S9.001

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Citation: Cocco P, Gaitonde S, Benedetti E, Tzvetanov I. Temporary Deceased Donor Splenic Transplant Prior to Simultaneous Kidney Pancreas and Pancreas Transplant: A way to Desensitize and Make the Transplant Possible. JOP. J Pancreas. (2023) 23:3-4

Seven out of 8 recipients are alive with normal function of both grafts with median (range) follow-up of 231 days (97-395) at the time we published this study. One patient died from multiorgan failure secondary to severe acute respiratory syndrome from coronavirus 2 infection. We did not identify any Cytomegalovirus (CMV), BK, or any serious septic complications in our patient population during the follow-up period [4].

This is the first study that utilizes deceased donor spleen (that would normally be discarded) to desensitize DSA prior to transplant of kidney-pancreas or pancreas alone from the same donor with promising results. This study demonstrates that the immediate immunologic risk of antibody-mediated rejection/ humoral insult can be mitigated by desensitization with deceased donor spleen. There is no risk of coagulopathy; or increased cold ischemia time; risks associated with use of plasmapheresis for desensitization. Temporary donor splenic transplant provides a means to remove DSA to a deceased donor before simultaneous kidney-pancreas and pancreas transplant. The spleen may also remove "other" antibodies such as anti-endothelial antibodies, anti-phospholipid antibodies, that may prove beneficial to the transplanted organ/s [5,6].

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