POSITIVE FLOW CROSSMATCHES DUE TO ANTI-ABO RED BLOOD CELL ANTIBODIES

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BACKGROUND

While positive flow crossmatches (FXM) caused by antibodies (Abs) against ABO red blood cell antigens have been reported (Hayashi et al., 2022), they are uncommon and can be overlooked in cases of suspected HLA Ab reactivity. We present the case of unexplained, positive flow XMs in the absence of donor specific HLA Abs, presumably due to ABO red blood cell incompatibility .

METHODS

Three color FXM using the Halifax protocol (R Liwski) were performed with pronase treated donor cells and untreated recipient sera. HLA Ab testing was performed with EDTA pretreated sera, using One Lambda and Werfen luminex SA assays. HLA typing was performed by RT-PCR (One Lambda or CareDx).

RESULTS and CONCLUSIONS

AS is a 52 yo multiparous female, blood type ABO-O, with PCKD, scheduled to receive her first living donor (LD) kidney transplant (Tx). Her HLA Ab profile was unremarkable except for common, known false positive reactions. To confirm that this reactivity was nonspecific, we performed surrogate FXMs on current sera (9/28/23). Surprisingly, the initial FXM was strongly T/B cell positive, so we continued to assess Ab reactivity by surrogate FXMs using current and historical sera vs multiple donor cells. In total, 4 FXMs were strongly T/B cell positive and 4 FXMs were T/B negative with no channel shifts (CS). All 8 FXMs were against cells with similar HLA typings, yet the results were quite different and did not show a clear HLA Ab pattern. Of note, the positive FXMs displayed distinct, narrow peak architecture (compared to control patient sera) which often indicates false positive reactivity (see Figures below). Furthermore, historical sera (7/7/23) generated negative FXMs, suggesting a sensitizing event had occurred affecting the current sera. We discovered that the patient had recent bilateral nephrectomies with hemorrhage, so transfusions (Txfs - RBC and FFP) were given (7/19/23). The luminex Ab results were unchanged when comparing pre and post Txf sera, but the surrogate FXM results reflected consistent, albeit nonspecific, positivity in the post Txf samples which was not present in the pre Txf samples. Auto FXMs and final FXMs with LD cells, using pre and post Txf sera, were all negative with no CS. When reviewing the surrogate XMs more carefully, we discovered that the negative FXMs with post Txf sera were against donor cells with ABO-O blood type (same as recipient), while positive FXMs using post Txf sera were against donor cells with ABO-A and AB typing. FXMs using pre Txf sera against ABO-A, AB cells were negative. It appears in patient AS that new Abs against cells from ABO-A, AB type donors were detected in post Txf sera. With the increased use of virtual XMs in our Tx program, our lab now relies more heavily on surrogate FXMs to aid in HLA Ab assessments. Careful attention must, then, be paid to indicators in surrogate XMs, e.g. ABO compatibility and raw data/peak architecture, to reliably interpret results and accurately determine donor/recipient compatibility.