Recipient Immunological Responses Following Face Transplantation

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BACKGROUND:

Vascularized composite allotransplantation (VCA) represents a groundbreaking surgical paradigm shift for a previously unsolvable clinical problem. Despite numerous technical successes, the dynamic interplay between donor and recipient immune responses in VCA remains poorly understood, largely due to imprecise methods of monitoring of multiple tissue types with varying antigenicities. Here, we review our novel toolbox for understanding VCA rejection.

METHODS:

Between 2012 and 2019, 3 patients underwent facial transplantation. Routine surveillance assays to monitor acute and chronic rejection included hematoxylin and eosin staining, complement deposition staining, human leukocyte antigen mismatch staining, skin cytokine profiling, detection of peripheral blood cell-free DNA, and short tandem repeat (STR) chimerism analysis.

RESULTS:

Over 7 years of follow up, we report two episodes of acute clinical rejection successfully treated with pulse steroids. At baseline, all patients' biopsies revealed low levels of non-specific inflammation (Banff Grade 1-3). Further clarification of this inflammatory infiltrate during clinical episodes of rejection confirmed complement deposition and host-derived inflammation. STR chimerism assays, comparing donor and recipient DNA within hair follicles, revealed significant contamination (between 6-35%), during rejection episodes. The presence of donor derived cell-free DNA (>1%) also confirmed our diagnosis.

CONCLUSIONS:

Until now, the diagnosis of rejection after VCA has been a clinical and histopathologic diagnosis, based on skin biopsies. Unfortunately, common and non-specific dermatitis and cutaneous infections can mimic rejection, often confounding a

definitive clinical diagnosis. Given these limitations of the Banff Classification on skin samples, we have explored adjunct methods of understanding the human immune system after VCA to aid in our clinical diagnosis of rejection.