INTRODUCTION:

Vascularized composite allotransplantation (VCA), a new reconstructive option for patients suffering from extensive facial defects leads to superior functional and aesthetic outcomes compared to the standard autologous reconstruction. Among VCA recipients, each case involves different facial structures and tissues depending on the patient's injury, thus drawing conclusions on the mechanism of immune interactions between the donor and recipient is challenging. This study introduces a new total hemiface VCA model, including scalp, external ear, mystacial pad, premaxilla, upper/lower lids, nose, and upper/lower lips to evaluate the effect of transplantation of multitissue VCA on the recipient's immune response.

MATERIAL AND METHODS:

Ten hemiface allotransplantations were performed in two groups between Lewis-Lewis (isograft) and LBN-Lewis (allograft) rats. Cyclosporine A (CsA) monotherapy was applied in the allograft group to prevent rejection.

RESULTS:

All flaps survived up to 100 days post-transplant. The mean warm ischemia time was 45 minutes. Histological analysis revealed normal bone, cartilage (ear and nose), conjunctiva, palpebra, and eyelashes. Flow cytometry confirmed donor-specific chimerism for T cells (CD4/RT1(n) and CD8/RT1(n) ) and B cells (CD45RA/RT1(n) ) in the peripheral blood of all rats in the allotransplantation group. At post-transplant day 7, chimerism levels were at 1.68% for CD4/RT1(n), 0.46% for CD8/RT1(n) and 0.64% for CD45RA/RT1(n). However, chimerism levels for CD4/RT1(n), CD8/RT1(n), and CD45RA/RT1(n) populations decreased at long-term follow-up (at post-transplant day 100) to 0.08%, 0.04%, and 0.23%, respectively.

CONCLUSION:

The feasibility and long-term survival of the new hemiface VCA transplantation model was confirmed, donor-specific chimerism