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Vascularized Composite Tissue Mandibular Transplantation in Dogs

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In the clinical scenario, optimal reconstruction of major facial defects of various origins is often very difficult. Composite tissue allografts (CTA) represent a therapeutic alternative without causing a donor site morbidity. The purpose of this study was the development of an experimental model for craniofacial allografts in dogs to test the feasibility of CTA.

MATERIAL AND METHODS

In 10 adult non-related Beagle dogs, vascularized segmental left mandibular hemijoint grafts including the surrounding soft tissue were performed. Four dogs underwent autotransplantation (control). Allografts were exchanged between two animals in three pairs. The vascular pedible was reanostomosed to the jugular vein and artery. Osteotomies were fixed with compression plates. All allografted dogs received tacrolimus orally (1.0 mg/kg/d; Fujisawa Pharmaceuticals). Therapeutic drug levels were monitored.

RESULTS

Nine of 10 animals became long-term survivors. One dog had to be sacrificed after 2 weeks for weight loss over 25%. The control autograft dogs were sacrificed after 1 year. One allograft dog developed intussusception and had to be sacrificed after 18 months. The remaining four dogs were sacrificed after 2.5 years. All long-term survivors had a good functional outcome, keeping their preoperative weight. Mouth opening was only reduced in one dog. Clinically, there were no signs of infection or instability of the bony junction. X-rays and histology demonstrated complete osseous integration of the grafts. Histologic examinations of the allograft muscles demonstrated viability.

DISCUSSION AND CONCLUSIONS

Currently solid organ transplantations have become standard procedures, but CTA is still at the experimental level. In nonvascularized bone allografts the main complications, instability and infections, occur in of about 25% of the grafts.[1] Meanwhile, immediate revascularization of free bone autografts improves osseous integration. Allograft revascularization is combined with the disadvantage of an increase in immunogenecity, thus requiring immunosuppression.[2] Randzio et al[3] showed that long-term survival of vascularized hemimandible grafts with cyclosporine immunosuppression in rabbits is limited by a toxic wasting syndrome. Gold et al[4] reported only short-term survival of hemimandible transplants in two of four monkeys. The results of our study prove that vascularized partial

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mandible transplantation can be performed in dogs without significant problems using tacrolimus immunosuppression. Long-term graft survival with good functional results and histologic outcome were demonstrated. This model has important clinical relevance and implications.

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