

Evaluation of the Optic Nerve Regeneration In A New Orbital Composite Tissue Allotransplantation Model

Ramazan M.Polat, MD; Fatih Zor, MD; Selcuk Isik, MD; Bulent Kurt, MD; Fatih Ors, MD; Bilal Battal, MD

Abstract

Introduction:The aim of this study is to describe a new CTA model including orbital globe, periorbital soft tissues and optic nerve, to evaluate the optic nerve regeneration and to determine the effect of allotransplantation on orbital globe and orbital soft tissues.

Methods:Sprague-Dawley rats were used in this study. At the preliminary study a flap including all soft tissues of orbita is prepared with a part of facial skin based on common carotid artery and external jugular vein as vascular pedicle. An angiography of flap is taken following radio opaque material injection from its pedicle. The angiography showed well vascularisation of all tissues in the flap and the study was began based on this finding(Figure 1).

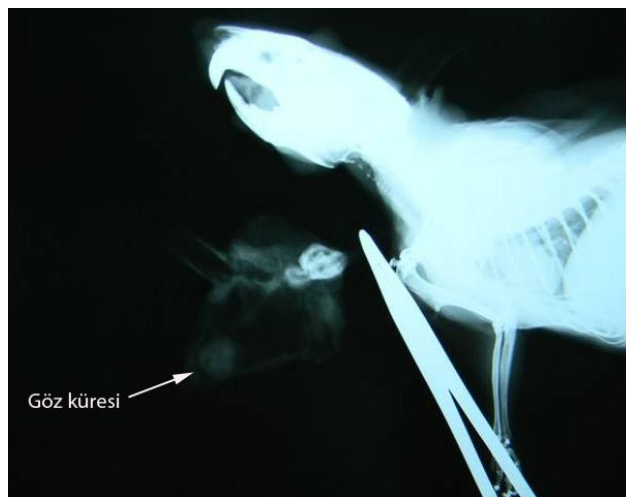


Figure 1.

A flap including all soft tissues of orbita is prepared with a part of facial skin. Optic nerve is cut at its most possible proximal portion end to eyeball and included in flap. For survival of the recipient rat, a heterotopic transplantation is planned and anterior neck is chosen as the recipient area.

Evaluation is done by macroscopy, MR and histopathologic examination.

Findings:Macroscopic evaluation revealed than that all flap tissues were vital, no evidence of rejection till the end of study(Figure 2). However the eyes lost its brightness in early period with a minimal decrease in its volume. The MR evaluation for volume is indicated that eyeball loses its volume by 35%. The histological evaluation of nerve coaptation sections showed severe degeneration with no evidence of regeneration.

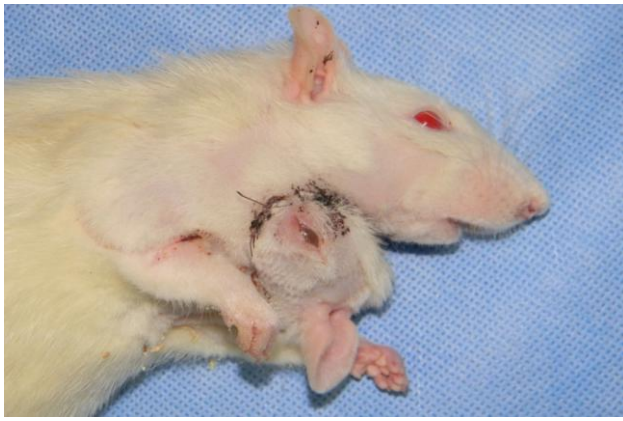


Figure 2.

Conclusion:In this study, a composite tissue flap including periorbital tissues, eyeball and the optic nerve is described for the first time in literature and an allotransplantation is applied successfully. This experimental model provided for both evaluation of optic nerve regeneration and effect of allotransplantation on composite tissues including orbital content.