

Novel sutureless transplantation of bioadhesive-coated, freeze-dried amniotic membrane for ocular surface reconstruction.

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Abstract:

PURPOSE: To evaluate the efficacy and safety of a novel sutureless transplantation of bioadhesive-coated, sterilized, freeze-dried amniotic membrane (FD-AM) for ocular surface reconstruction.

METHODS: A bioadhesive-coated, freeze-dried amniotic membrane was made by freeze drying the denuded AM in a vacuum, applying the minimum amount of fibrin glue (mixture of fibrinogen and thrombin) necessary to retain adhesion on the chorionic side, and sterilizing it by gamma-radiation. The resultant AM was characterized for its biological and morphologic properties by immunohistochemical and electron microscopic examination. In addition, fibrin glue-coated, freeze-dried (FCFD) AM was transplanted onto a rabbit scleral surface without sutures, to examine its biocompatibility.

RESULTS: Immunohistochemistry of the FCFD-AM revealed that fibrinogen existed on its chorionic side, and the process of applying fibrin glue did not affect its biological and morphologic properties. Moreover, electron microscopic examination of the chorionic side of the FCFD-AM revealed tiny microfibrils (which are probably fibrinogen protofibrils), and showed that the epithelial surface of FCFD-AM consisted of intact basal lamina similar to that of FD-AM. FCFD-AM transplantation was very easily performed, and the graft adhered to the bare sclera immediately. Though the fibrinogen

naturally biodegraded within 2 weeks, the FCFD-AM remained for at least 12 weeks after transplantation. Epithelialization on the FCFD-AM was achieved within 2 weeks, as was the case with FD-AM transplantation. The conjunctival epithelium on the FCFD-AM was well stratified and not keratinized, suggesting that FCFD-AM supports normal cell differentiation.

CONCLUSIONS: The FCFD-AM retained most of the biological characteristics of FD-AM. Consequently, this sutureless method of transplantation of FCFD-AM is safe, simple, and useful for ocular surface reconstruction.