

The application of tissue-engineered preputial matrix and fibrin sealant for urethral reconstruction in rabbit model.

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Abstract:

Background: To introduce the role of fibrin sealant and preputial acellular matrix (PAM) as a new source of inert collagen matrix for urethral reconstruction. **Methods:** A ventral urethral segmental defect was created in 24 male rabbits divided into four groups. In group 1 (G1), urethrotomy was closed in layers. In group 2 (G2), closure was followed by applying fibrin sealant. In groups 3 (G3) and 4 (G4), urethroplasty was performed with a patch graft of PAM, and in G4, fibrin sealant was also applied. Serial urethrography was performed before and after the operation. Then, the animals were euthanized, and their urethra was excised 1, 3, and 9 months postoperatively for further electron microscopic examination, terminal deoxynucleotidyl transferase dUTP nick-end labeling (TUNEL) technique, and immunohistochemical (IHC) staining with CD34, CD31, desmin, SMA, and alpha-actin. **Results:** In G1 and G2, the fistula repair failed in all the time points. In G3 and G4, serial urethrography confirmed the maintenance of a wide urethral caliber without signs of strictures or extravasations. Satisfactory vascularity was observed in G3 and G4 during the whole study, which was more significant in G4 after 9 months of follow-up. The presence of a complete transitional cell layer was confirmed over the graft in G3 and G4 in all time points. IHC staining confirmed the effectiveness of fistula repair in G3 and G4, 3 months postoperatively. **Conclusion:** This rabbit model showed that PAM combined with fibrin sealant may herald a reliable option for repairing segmental urethral defects. © 2014 Springer Science+Business Media.