

DECELLULARIZED PORCINE-DERIVED BLOOD VESSEL MATRIX GRAFT FOR URETHRAL REPLACEMENT IN A RABBIT MODEL

Hypothesis / aims of study

To evaluate a xenographic urethral replacement model utilizing porcine derived, decellularized blood vessel matrices in rabbits.

Study design, materials and methods

In 17 male rabbits, a 1 cm tubular segment of porcine, acellular blood vessel matrix replaced a 1 cm urethral defect without a postoperative catheter (see fig. 1). The animals were sacrificed at varying intervals (1, 3, and 6 months) and assessed for graft patency and integration properties.

Results

All but one animal survived. One animal died of unknown etiology one month after surgery. In all 17 rabbits, the urethra was patent without evidence of stricture formation as confirmed by gross inspection and passage of a 10Fr catheter at the time of euthanasia/tissue harvest. At one month, histological examination revealed epithelialization, host cell infiltration, angiogenesis and migration of smooth muscle. Neovasculature and smooth muscle bundles were more organized by 6 months (see fig. 3). No significant fibrosis or stricture was observed in the anastomotic area. Photographs of the urethra are shown below (fig. 2).

Interpretation of results

We show successful reconstruction and integration of an unseeded, xenograft urethral substitution that would ultimately be an off-the-shelf product. Prior research using seeded and unseeded allograft has shown mixed results. This highly translational and easily reproducible model would obviate the need for a harvest procedure decreasing both morbidity and operative time.

Concluding message

This successful experiment would support efforts for further investigation of a potentially off-the-shelf product using porcine derived acellular blood vessel matrix for single-stage urethral reconstruction without requiring stem cell technology. To our knowledge this is the first report of a xenograft blood vessel matrix for urethral substitution.

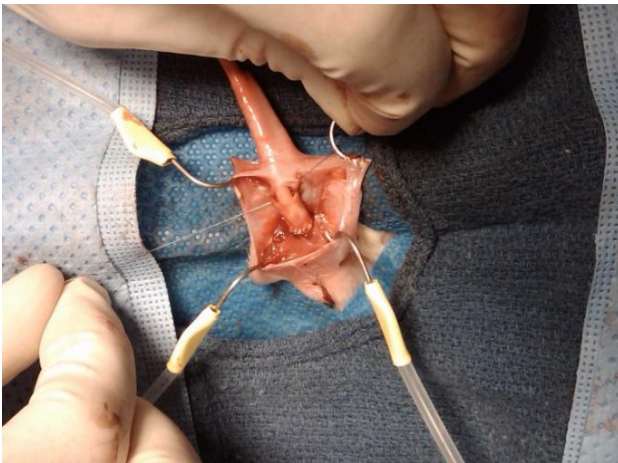


Fig. 1

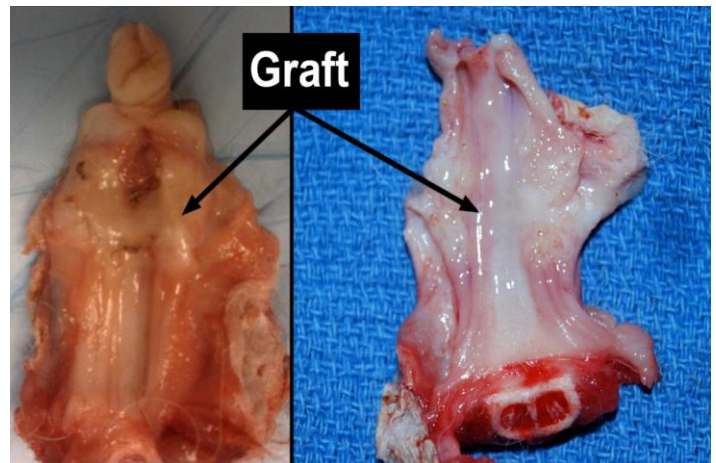


Fig. 2

Rabbit 11, 200X, Matrix/Native urethra Interface

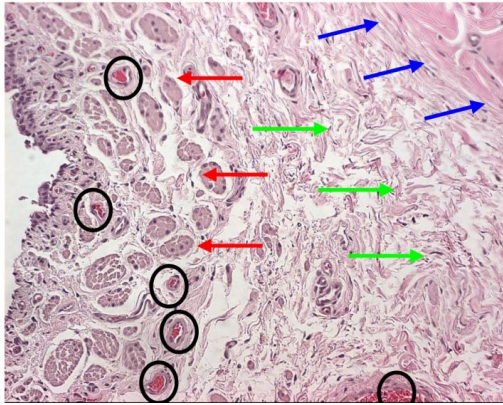


Fig. 3
 A. Dark Arrows: Native matrix B. Gray Arrows: Acellular matrix C. Circles: Neovasculature

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	Guidelines according to the IACUC (Institutional Animal Care and Use Committee) were followed
<i>Is this a clinical trial?</i>	No
<i>What were the subjects in the study?</i>	ANIMAL
<i>Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?</i>	Yes
<i>Name of ethics committee</i>	IACUC (Institutional Animal Care and Use Committee)