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URINARY TRACT OBSTRUCTION

Stem cells hinder stricture formation

Injection of human adipose-tissue-derived stem cells (hADSCs) into sites of urethral injury can prevent fibrosis in a rat model of urethral stricture formation.

Stem cells have been shown to counteract fibrosis formation in different animal models, including in Peyronie's disease, possibly through paracrine signalling. In a new study, performed at the University of Leuven, Belgium, Fabio Castiglione and colleagues investigated whether hADSCs could decrease fibrosis in a model of urethral stricture formation. Their experiment included three groups: sham-treated rats and animals in which fibrosis and stricture were modelled by TGFβ1 injection and urethral wall incision, of which one group was injected with hADSCs at the stricture site on the following day. Outcomes were measured after 4 weeks.

Ultrasonographic imaging showed a hyperechogenic pattern of urethral walls in animals in the stricture groups. Cystometric data revealed significant reductions in micturition interval and volume, as well as bladder capacity, and significant increases in threshold and flow pressure in rats not receiving hADSCs compared with the other groups ($P<0.05$), but no differences between the sham-treated and the hADSC-treated group. Similarly, contractile responses of isolated bladder tissue were only lower in non-hADSC-treated rats compared with the sham-treated group.

Histological and protein analysis showed disorganization of collagen fibres and increased levels of collagen I and III and elastin in the penile shafts of non-hADSC-treated rats, whereas overall structure and collagen and elastin content of the urethra were preserved in hADSC-treated rats. According to gene expression analysis, five genes were differentially expressed between the animals who received hADSCs and those who did not.

The study provides insights into mechanisms underlying the ability of stem cells to prevent fibrosis, and highlights possible future translation of this approach to reduce stricture formation in a clinical setting.

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ORIGINAL ARTICLE Castiglione, F. *et al.* Adipose-derived stem cells counteract urethral stricture formation in rats. *Eur. Urol.* http://dx.doi.org/10.1016/j.eururo.2016.04.022 (2016)