

THE EFFICACY AND SAFETY OF POLYLACTIC ACID (PLA) MICROSPHERES AND ADIPOSE-DERIVED STROMAL VASCULAR FRACTION (SVF) CELLS AS AN INJECTABLE BULKING AGENT IN THE URINARY BLADDER

Hypothesis / aims of study

Injection of bulking agents has been used in the endoscopic treatment of urinary incontinence and vesicoureteral reflux. The ideal bulking agent for the injection therapies must be easily injectable, biocompatible, volume-stable, non-antigenic and non-migratory. The aim of this study is to evaluate whether polylactic acid (PLA) microspheres and adipose-derived stromal vascular fraction (SVF) cells have appropriate properties as an injectable bulking agent in the urinary bladder.

Study design, materials and methods

40 male Sprague-Dawley rats (2-week-old) were randomized into two groups. In group I and II, 0.05ml of PLA microsphere suspension and 0.05ml of PLA microsphere suspension mixed with PKH26-labelled SVF cells were injected into bladder wall, respectively. At 2,8,16,24 weeks of PLA microspheres injection, 5 rats in each group were sacrificed. The volumes of implants were measured and bladder tissues including implants were analysed and compared grossly and histologically between groups. The distant organs including the liver, kidney, spleen and lung were also harvested and examined histologically to determine migration of PLA microspheres.

Results

There was no evidence of complications including swelling or erythema at the injection sites. At 24 weeks of implantation, 65-70% of injected volume was maintained and there was no significant difference between groups (Fig). In histological analyses, injected PLA microspheres were localized in muscular layer of bladder without infiltration into adjacent layer. From 8-16 weeks of injection, hybrid tissues contained collagen and actin were observed between PLA microspheres and these findings were more clear in group II. PKH26-labelled SVF cells were identified by fluorescence microscopy at all time points. There was no migration of PLA microspheres to other organs and no abnormality in weight gain and hematologic values.

Interpretation of results

At 24 weeks of PLA implantation, reasonable maintenance of volume and hybrid tissue growth in injection site were observed and hybrid tissue formation may be improved with SVF cells.

Concluding message

These results suggest the possibility of PLA microspheres as a potentially useful bulking agent in urologic field and further investigation is needed to know synergic effect of SVF cells.

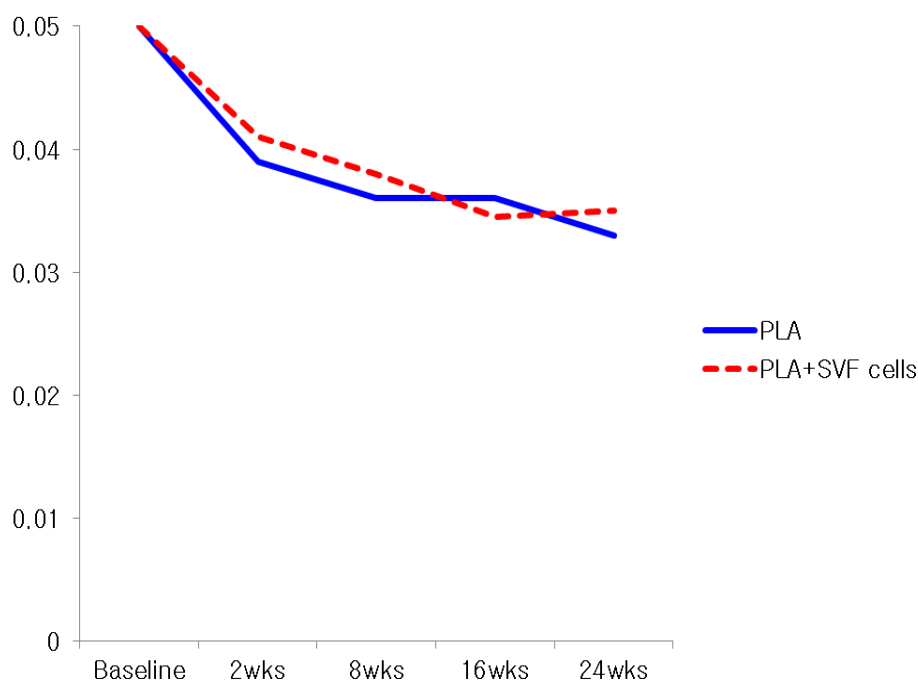


Fig. The profile of volumes of the hybrid tissues formed by polylactic acid (PLA) microspheres and stromal vascular fraction (SVF) cells injection over time.

Disclosures

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