Adipose-derived regenerative cell injection for the treatment of post-prostatectomy incontinence: phase I clinical study

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Objectives

- Stress urinary incontinence (SUI) is a common problem for men, particularly following radical prostatectomy.
- Various treatment options are available. They include pharmacological treatment, surgical treatment (e.g., injection therapy with bulking agents), application of sling systems, and cell therapy.
- The Celution system (Cytori Therapeutics, San Diego, USA) which is a commercially available device that allows rapid isolation of therapeutic doses of autologous adipose-derived regenerative cells (ADRCs) from human adipose tissue following liposuction.
- We report initial experience of transurethral injection of ADRCs for the treatment of persistent urinary incontinence after radical prostatectomy.

Materials and Methods

- Patients
  - 6 patients with SUI after radical prostatectomy were enrolled
- Assessment of outcome
  - 24hr pad test: baseline and at 2, 4, 8, and 12 weeks after treatment
  - International Consultation on Incontinence Questionnaire-Short Form (ICIQ-SF)
  - Maximum urethral closing pressure (MUCP)
  - The urethral sphincter thickness
  - Measuring the length between the lower rim of the pubic bone and bladder neck by MRI imaging
- Adipose tissue harvesting and isolation
  - Under general anesthesia, 200 mL of adipose tissue was harvested from the anterior abdominal wall with a single periumbilical incision.
  - The suctioned adipose tissue in saline solution was allowed to stand to allow the blood and cellular debris to settle.
  - ADRC were isolated from the harvested adipose tissue using the Celution system, which is a commercially available kit designed to isolate ADRC from human adipose tissue in a short time.

Results

<table>
<thead>
<tr>
<th>Pt</th>
<th>Age</th>
<th>24-h Pad test</th>
<th>MUCP (cm H2O)</th>
<th>MRI (mm)</th>
<th>ICIQ-SF</th>
</tr>
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<tbody>
<tr>
<td></td>
<td></td>
<td>Base</td>
<td>2wk</td>
<td>4wk</td>
<td>8wk</td>
</tr>
<tr>
<td>A</td>
<td>69</td>
<td>25</td>
<td>33</td>
<td>33</td>
<td>21</td>
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<tr>
<td>B</td>
<td>70</td>
<td>261</td>
<td>624</td>
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<td>165</td>
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<tr>
<td>C</td>
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<td>8</td>
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<td>66</td>
<td>21</td>
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- Magnetic resonance imaging around the urethra before (A) and after (B) the adipose-derived regenerative cell injection

Conclusions

- This study showed that transurethral injection of autologous ADRCs can be a safe and feasible treatment for SUI after radical prostatectomy.
- This new treatment modality represents a minimally invasive and highly effective therapeutic approach, although larger studies and those that assess long-term outcomes are needed to confirm the efficacy of this new treatment modality.