Sperm Quality in the Retrograde Fraction of Semen Collected by Electroejaculation in the Olive Baboon

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INTRODUCTION

• Rectal probe electroejaculation (RPE) is used to collect semen in humans and in animal models
• Retrograde ejaculation occurs during RPE, with approximately half of sperm lost to the retrograde fraction in the bladder1,2
• The retrograde fraction of the ejaculate is of lower motility after RPE in humans, but higher motility after RPE in non-human primates: the lion-tailed macaque4 and lowland gorilla5

OBJECTIVE

To compare sperm number, motility, and rate of forward progression in antegrade and retrograde fractions from RPE in olive baboons

METHODS

• IACUC approved
• Ketamine sedation at 10-12 mg/kg
• Pre-RPE catheterization: empty bladder, rinse with 30 ml HEPES-HTF (mHTF), leave 30 ml mHTF in bladder
• Using 2.6 cm diameter probe (3 electrodes), perform standard RPE protocol (step-up voltage) with stripping of urethra, collection of antegrade ejaculate
• Post-RPE catheterization: collection of retrograde ejaculate in mHTF
• Transport at 37°C to BSL-2 research lab
• Analysis using WHO criteria, by 2 andrologists
• Retrograde only: analysis after concentration of original volume to 0.5-1.5 ml

RESULTS

• 24 RPE procedures on 9 adult male baboons
  • Age: 6-16 years
  • Weight: 22-39.1 kilograms
  • Volume of antegrade collected: 0.02-4.0 ml
  • Volume of retrograde collected: 11-50 ml
  • Motility and RFP were significantly different in the antegrade and retrograde fractions collected
  • Higher motility and higher RFP were observed in the retrograde fraction
  • The number of total sperm present in the antegrade and retrograde fractions was not significantly different

SEmen Parameters by Fraction

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Antegrade</th>
<th>Retrograde</th>
<th>Median (range)</th>
<th>Mean difference (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motility</td>
<td>46% (0-98%)</td>
<td>79% (44-94%)</td>
<td>35.2% (+16.8, +53.6%)</td>
<td>0.0012*</td>
<td></td>
</tr>
<tr>
<td>RFP</td>
<td>2 (0-3)</td>
<td>3 (2-4)</td>
<td>1.4 (+0.9, +2.0)</td>
<td>0.0001*</td>
<td></td>
</tr>
<tr>
<td>Total Sperm</td>
<td>4.1 x 10⁶ (0.239.2 x 10⁶)</td>
<td>19.5 x 10⁶ (0.3-242 x 10⁶)</td>
<td>5.5 x 10⁶ (-31.0, +42.1 x 10⁶)</td>
<td>0.2121</td>
<td></td>
</tr>
</tbody>
</table>

*P<0.05 by matched pair Wilcoxon signed rank test

CONCLUSIONS

• A significant portion of the sperm retrievable by RPE is found in the bladder
• This retrograde fraction of ejaculate is of higher motility and RFP in the olive baboon
• Future studies examining semen parameters in baboons should account for portion lost to retrograde
• Future baboon and other non-human primate IVF may benefit from utilizing sperm from retrograde ejaculate

REFERENCES


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