INTEGRATING DISCOVERY & DEVELOPMENT NON STOP®

THE USE OF THE NEW PHYSIOTEL™ DIGITAL TELEMETRY IMPLANT (DSI) FOR CARDIOVASCULAR ASSESSMENT IN THE GÖTTINGEN MINIPIG. A PRELIMINARY STUDY

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INTRODUCTION

The Physiotel™ Digital telemetry implant is available as a replacement for existing large animal transmitters (D70-PCT /PCTP). This new fully digital system accommodates group housing of animals, contains bi-directional communication between implant and acquisition system for remote programming and has an increased transmission range. It also includes a solid tip negative biopotential lead for use in ECG placement.

OBJECTIVE

The study was conducted to challenge the product capability in Göttingen minipigs using Dofetilide and Nifedipine as oral cardiovascular reference compounds. The testing included several aspects:

- surgery implantation /surgery complication
- - quality of the signals (ECG, systemic blood pressure, left ventricular pressure)
- - recording of the telemetry signal in group-housed environment
- - Analysis of the data

MATERIAL AND METHODS

Test System : Species/strain: Göttingen minipig; Ellegaard Göttingen Minipigs Aps, Denmark.

Number of animals in the study: 3 males + 3 females. Weight : 7 to 13 kgs

Surgical procedure : Approximately 48 hours before surgical procedures, animals received antibiotic therapy with long acting amoxycillin (30 mg/kg; intramuscularly). Animals were pre-anesthetised with an intramuscular injection of Stresnil® (azaperone) at 0.1 mL/kg, 30 minutes before anesthesia, anesthetized by mask to be intubated (2 to 5 % isoflurane) and maintained under gaseous anesthesia (isoflurane). The implant was inserted into a muscular pocket in the flank. Left ventricular pressure was monitored with a pressure catheter inserted into the apex of the ventricle and secured with a purse-string suture. Systemic blood pressure was monitored via a pressure catheter inserted into the left femoral artery. The positive ECG electrode was placed subcutaneously over the left thorax near the ventral aspect of the thoracotomy incision and the negative solid tip lead was advanced into the cranial vena cava via the external jugular vein.

Post-surgical procedures and recovery period : Broad-spectrum antibiotic prophylaxis with amoxicillin (30 mg/kg/day intramuscularly) was given twice at consecutive intervals of 48 hours starting on the day of surgery. Analgesic prophylaxis with flunixin meglumine (2mg kg/day - 0.04 ml/kg/day; im), 5 times at 24 hour intervals (starting on the day of surgery) + Buprenorphine, 3 times (starting on the day of surgery). Local application of povidone iodine for 7 days following surgery.

Treatment : Animals were dosed according a cross over design as follows:

<table>
<thead>
<tr>
<th>Group</th>
<th>Dose level mg/kg</th>
<th>Dose volume mL/kg</th>
<th>Concentration mg/mL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vehicle</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dofetilide Low dose (LD)</td>
<td>0.1</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>Dofetilide High dose (HD)</td>
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<td>0</td>
<td>0.06</td>
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<tr>
<td>Nifedipine Low dose (LD)</td>
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<td>0</td>
<td>0.2</td>
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<tr>
<td>Nifedipine High dose (HD)</td>
<td>3</td>
<td>0</td>
<td>0.6</td>
</tr>
</tbody>
</table>

RESULTS

The transmission range of Physiotel™ Digital allowed collection of telemetry signals from 6 animals housed in a ~16 m² room (3 females group housed) with only four transceivers.

CONCLUSION

These preliminary results are very encouraging, and the Physiotel™ Digital implant appears to be a suitable alternative to existing large animal telemetry devices. This new implant offers social housing compatibility thereby improving animal well-being with encoded animal identification and a longer transmission range.