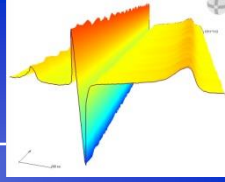
A new telemetry-based system for assessing cardiovascular function in large animals

Poster 176



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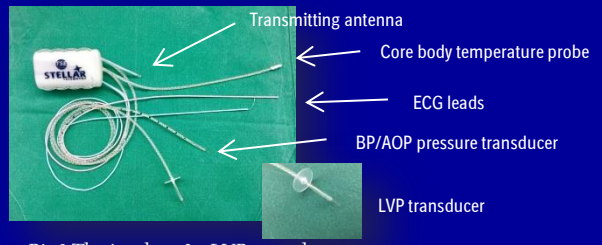
1. Introduction:

A first evaluation of a newly developed solid tip total implant telemetry system for cardiovascular (CV), electrophysiological and body temperature measurement. It is intended to be used for drug candidate safety pharmacological evaluations.



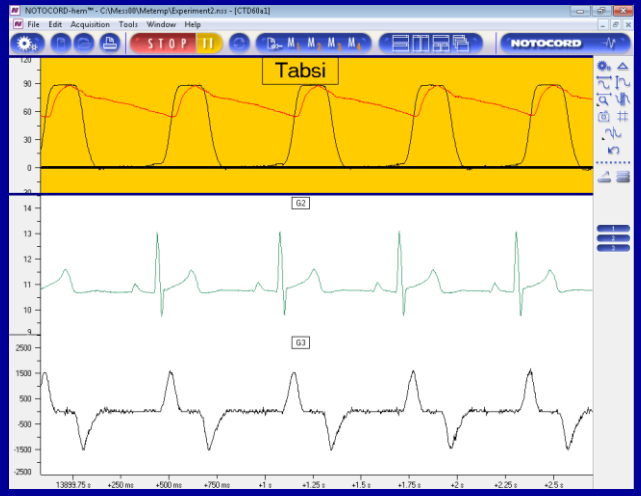
Pic 1 The implant & LVP transducer

2. Methods:

2 female Göttingen minipigs and 2 Labrador-mix female dogs were instrumented as described elsewhere (Ref. 1) with a prototype system. The implants (Stellar Telemetry, TSE Systems) feature a microprocessor, memory, solid state pressure-tipped catheters, amplifiers and radio transmitter. Sampling rates can be selected between 0.1-1 kHz. Biological signals are selected in a programmable fashion on a session-by-session basis according to a user-defined timing protocol. The pressure sensors are at the tip of an electrical lead of customized length. Temperature (core temperature) and activity monitoring (3D accelerometer) are included. Digital transmission range using a single antenna is 5 meters with no limit to the number of animals held together. The range can be expanded with more antennas in an array coupled to a single receiver. The antenna/receiver station consists of a single USB powered mobile unit connected to a PC or laptop. The battery life provides at least 110 days of continuous recording.
Notocord HEM 4.3 was used for data acquisition.
After recovery, aortic pressure (AP), left ventricular pressure (LVP), ECG and body temperature were recorded for 24 hrs. continuously.

3. Results:

Instrumentation of the animals, both minipigs and dogs were comparable to the procedures described before from our group. However, duration of the instrumentation could be reduced. First, the small glass tip of the transducer could be inserted into the LVP and Aorta more easily. Secondly, since the battery and electronics are in one housing, the time needed for instrumentation is reduced.
The implant was well tolerated and the animals recovered rapidly without any event. Excellent signal quality was obtained and stable hemodynamic and electrophysiological parameters could be measured.

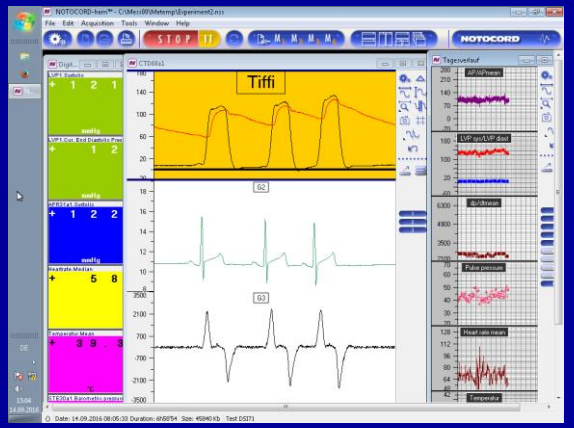


Pic 2 Overview on the signal quality during surgery

An additional benefit is the external temperature probe that is inserted into the abdomen. With that, true body core temperature can be obtained.

4. Conclusion:

This new large animal CV telemetry system provides a novel alternative to fluid-filled catheter telemetry systems. The remote "on-off" feature offers a remarkable added value in respect to not disturbing the animals during a long term study protocol.
Next steps will include testing of reference compounds in the instrumented animals and compare the results to the historic data collected with the ITS system.



5. References:

1. Klumpp, Anja; Trautmann, Thomas; Markert, Michael; Guth, Brian (2006). Optimizing the experimental environment for dog telemetry studies. *Journal of Pharmacological and Toxicological Methods; 54 (2), 141-149.*
2. Guth, B.D., Germeyer, S., Kolb, W., Markert, M. (2004). Developing a strategy for the nonclinical assessment of proarrhythmic risk of pharmaceuticals due to prolonged ventricular repolarization. *Journal of Pharmacological and Toxicological Methods, 49 (3), 159-169.*

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