

678

Huppertz N<sup>1</sup>, Strick K<sup>1</sup>, Hirshman S<sup>1</sup>, Leonhäuser D<sup>1</sup>, Kirschner-Hermanns R<sup>1</sup>, Zraik I<sup>1</sup>, Stopinski T<sup>1</sup>, Tolba R<sup>1</sup>, Schwantes U<sup>2</sup>, Grosse J<sup>1</sup>

1. University RWTH Aachen, 2. Dr. R. Pfleger GmbH, Med. Sciences and Clinical Research, Bamberg,

## REAL-TIME URODYNAMIC RECORDINGS FROM FEMALE GÖTTINGER MINIPIGS WITH AN IMPLANTED RADIO-TELEMETRIC SYSTEM

### Hypothesis / aims of study

Conventional cystometry from animals requires nonphysiological conditions i.e. using bladder catheter, artificial filling and anesthesia or sedation that limits its continuous use. Furthermore, as in humans such bladders react different than in awake less stressed animals during natural filling. Therefore, we implanted telemetric transmitter devices to perform repeated longterm cystometry in awake minipigs

### Study design, materials and methods

The devices (TLIIM3-070-PCP, DSI, St. Paul, Minnesota) were implanted into four female

Göttinger minipigs under general anesthesia subdermal in the flank. Both pressure-sensory catheters were tunneled and placed into the bladder and intraperitoneally, fixed by non-absorbable sutures and EMG electrodes were fixed outside the bladder surface to monitor potentials of detrusor contraction related activities. Receiver transmitted recordings from minipigs were obtained in 24h sessions (N= 5-7) in a metabolic cage. For validation micturitions were monitored online by video camera, volumes measured by flowmetry (Laborie) and detrusor contraction by EMG.

### Results

Good quality cystometries were obtained from all minipigs during a 2 months follow-up.

Micturition events verified by video and uroflowmetry correspond with maximum detrusor amplitudes [mmHg; mean  $\pm$  SEM] of  $99.4 \pm 32.1$  for pig 1, with  $121.1 \pm 46.6$  for pig 2, with  $40.2 \pm 20.1$  for pig 3 and with  $38.53 \pm 10.8$  for pig 4. EMG provided in all events a clear increase of potentials during detrusor contractions. Duration of detrusor contractions related amplitudes [sec; mean  $\pm$  SEM ] were  $36.3 \pm 12.8$ ,  $138.9 \pm 68.4$ ,  $86.3 \pm 44.6$  and  $105.1 \pm 64.9$  for pigs 1, 2, 3, and pig 4. Corresponding micturition volumes [ml; mean  $\pm$  SEM] were  $176.5 \pm 28.1$  ml for pig 1,  $306 \pm 40$  ml for pig 2,  $1533 \pm 725$  ml and  $1575 \pm 468$  ml for pig 4. Micturition frequency per day was 19 for pig 1, 24 for pig 2, 3 for pig 3 and 6 for pig 4.

### Interpretation of results

Radio-telemetry provides a reliable real-time natural filling urodynamic monitoring. Simultaneous real time recordings from intraabdominal and intravesical pressure profiles allows to identify precisely detrusor contractions and activities which are not associated with micturitions. The validation by video camera and flowmetry as well as EMG of the detrusor muscle is necessary for the differentiation of micturition associated detrusor contractions.. Interindividual comparisons of the telemetric recordings demonstrate that every minipig has their individual behaviour of bladder function and detrusor activity.

There is no direct correlation between DDmax, the duration of detrusor contraction and the voided volume recorded by flowmetry.

### Concluding message

It has the potential to significantly decrease animal use when evaluating i.e. pharmacological responses or validating bladder models with defined pathologies, especially in a longterm setting.

### Disclosures

**Funding:** Grant No. 01EZ0913; Federal Ministry for Education and Research BMBF; Germany **Clinical Trial:** No **Subjects:** ANIMAL **Species:** minipig **Ethics Committee:** RegistrierNr.: 8.87-50.10.37.09.122 Landesamt für Natur, Umwelt und Verbraucherschutz Nordrhein-Westfalen Postfach 101052 45610 Recklinghausen