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VIDEO CONTROLLED RADIOTELEMETRY OF NATURAL FILLING CYSTOMETRY TO EVALUATE THE QUOTIENT OF NON-MICTURITION-ASSOCIATED AND MICTURITION-ASSOCIATED DETRUSOR EVENTS AS AN INDEPENDENT PARAMETER IN A GÖTTINGER MINIPIG MODEL OF PARTIAL BLADDER OUTLET OBSTRUCTION

Hypothesis / aims of study

There are very limited data for large animal models to characterize and monitor detrusor hypercontractility monitored by natural filling cystometry. Telemetric transmitter devices (DSI: St. Paul, Minnesota) provides high quality of natural filling cystometry to determine maximal detrusor contraction, duration of detrusor contraction and frequency of detrusor events.

radiotelemetered cystometry as a monitoring system was used to compare urodynamical changes before and after sphincter cuff placement and banding around the bladder neck in Göttinger Minipigs. We differentiated between micturition- and non-micturition-associated detrusor events and calculated the quotient of non-micturition-associated detrusor events divided by micturition-associated detrusor events as a potential indicator for an animal model of detrusor hypercontractility and hyperactivity.

Study design, materials and methods

The telemetric transmitter devices were implanted subdermally into female Göttinger Minipigs. Pressure-sensory catheters were placed into the bladder and peritoneum and sutured in place. Transmitted 24 h recordings were obtained in a metabolic cage. For validation

micturition events were monitored by video camera and uroflowmetry. Baseline values were recorded within 6 weeks followed by sphincter cuff placement or by banding around the bladder neck to induce bladder outlet obstruction, which was then monitored for 4 months.

Results

High quality natural filling cystometry were obtained in both cases at baseline and on follow-up, less than 8.5 % of radiotelemetric events could not be assigned to micturition- and non-micturition-associated detrusor events. An increase of micturition-associated detrusor events with a frequency of 4.2 (range: 2.4-6) per day during baseline and 5.75 (range: 4.8 to 6.6) during bladder outlet obstruction could be investigated. Non-micturition-associated detrusor events raised from 1.3 (range: 0.7-1.9) per day during baseline to 5.3 (range: 4.7 to 6.0) at bladder outlet obstruction indicating hyperactivity. For maximal detrusor pressures of micturition-associated events we could observe a significant increase by 23.5 percent from 39.57 ± 2.631 mmHg (n=37) to 59.41 ± 4.491 mmHg (n=20) and for duration of micturition-associated-contractions an increase from 93.66 ± 8.873 sec. (n=38) during baseline

and 117.0 ± 13.69 (n=20) during bladder outlet obstruction. After infravesical obstruction micturition-associated detrusor event-levels remained constant and non-micturition-associated detrusor events-levels increased The quotient of non-micturition-associated / micturition-associated detrusor-events increased from 0.44 at baseline to 0.9 in bladder outlet obstruction, which means that the frequency of non-micturition-associated detrusor events approaches to that of micturition-associated detrusor events, as a possible indicator of bladder outlet obstruction-triggered detrusor instability.

Interpretation of results

The non-micturition-associated/micturition-associated detrusor event-quotient is independent from metabolic cage associated parameters like micturition frequency and micturition volume.

Concluding message

Radio-telemetry provides a high quality real-time natural filling cystometry monitoring for identification and evaluation of detrusor contractions. The quotient of non-micturition-associated and micturition-associated detrusor events can be used as a parameter for detrusor associated bladder activity in Göttinger Minipigs.

Disclosures

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