Is there any difference in cystometric parameters in rat lumbar canal stenosis models with decreased, normal, or increased cystometric capacity?

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Introduction

LCS rats cause neurogenic UAB 1).

- Voiding efficiency  
- Detrusor contractility  
- Detrusor response to agonist  
- Detrusor morphology

LCS causes neurogenic OAB, too 2).

- 29% of pts have DO.  
  - Irritation of sacral roots  
  - Ischemic disturbances of conus medullaris

OAB might compensate UAB 3).

- 68% of early UAB have DO, while 18% of severe UAB have DO

Objectives

- To Investigate cystometric parameters in LCS rats in terms of the presence or absence of increased MCC
  - LCS rats with no increase in MCC
    - Voiding functions ?
    - Frequency of NVCs ?

Methods

- Female Wistar rats (180 to 190 g).  
  - Sham (n=10): One small hole drilled at L5 arch  
  - LCS (n=32): Silicone rubber into epidural space

- Awake cystometry: 14 days after surgery.  
- Cystometric parameters were investigated.

- LCS rats were divided into three groups.  
  - Group A (MCC < 0.87 mL)
  - Group B (MCC 0.87-1.81 mL)
  - Group C (MCC > 1.81 mL)

  - These ranges correspond to < -2SD, -2SD to +2SD, > +2SD of MCC in Sham rats, respectively

Figure 1. CMG parameters in Sham and LCS rats

Figure 2. Representative CMGs in Groups A to C

Figure 3. CMG parameters in Sham and Groups A to C

Interpretation of Results

Neurogenic UAB in LCS rats

- Voiding functions  
  - Not favorable in rats with MCC  
- NVCs ↑ in rats with MCC  
- Decreased PVR  
  - Probably due to no increase in MCC

Conclusions

- LCS rats showed detrusor underactivity to the same degree regardless of MCC.  
- NVCs did not significantly increase in LCS rats with decreased MCC.  
- There was a significant increase trend toward higher NVCs with smaller MCC.

Abbreviations

- DO: detrusor overactivity, LCS: lumbar canal stenosis, MCC: maximum cystometric capacity (mL), NVCs: non-voiding contractions (>3.04 mmHg), OAB: overactive bladder, Pmax: maximum intravesical pressure during voiding (mmHg), PVR: postvoid residual volume (mL), RUR: residual urine rate (%), PVR = (VV + PVR) x 100, UAB: underactive bladder, VV: voided volume (mL)

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