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INST OF EXPERIMENTAL CLINICAL RESEARCH , NEUROSCIENCE

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DEVELOPMENT OF DETRUSOR HYPERREFLEXIA IN MINI-PIGS WITH PARKINSON-LIKE SYMPTOMS AFTER N-METHYL-4-PHENYL-1,2,3,6-TETRAHYDROPYRIDINE (MPTP)-TREATMENT

Background

The most used incontinence pig model is based on detrusor instability secondary to infravesical obstruction(1) MPTP-treatment of pigs induces a Parkinson-like symptoms with rigidity, hypokinesia and destruction of dopaminergic pathways(2). MPTP-treatment of monkeys leads to reduced cystometric capacity but no detrusor hyperreflexia(3).

Aim

We aimed at assessing the effect on the bladder storage function accompanying the development of Parkinson-like symptoms in pigs after MPTP-treatment.

Methods

Two female Goettingen-minipigs weighing 42 and 40 kg were treated with nine and seven dosages of MPTP 0.5 -0.75 mg/kg bodyweight, injected subcutaneously at 1-8 days intervals during one month. Timing and number of dosages were decided after examinations of general health and clinical signs of Parkinsonism. After MPTP-treatment termination a chronic double-lumen catheter was placed in the bladder dome and connected to a double port-a-cath chambre localised subcutaneously.

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Results

After treatment termination the pigs showed mild and stable signs clinically resembling Parkinsonism: rigidity, poverty of movements, impaired coordination of hindlimb movements. PET-scanning revealed lowered levels of dopaminergic neurons compared to non-treated male minipigs. In the non-anaesthetised state the MPTP-pigs had cystometries performed through the chronic catheter. In one pig, 1 of 4 cystometries showed a detrusor hyperreflexic contraction at 110 ml infused: 8 cm H₂O = 60 % of subsequent voiding pressure; total cystometric capacity 550 ml. In the other pig, 1 of 3 cystometries showed a detrusor hyperreflexic contraction at 245ml infused: 10 cm H₂O = 50% of the subsequent voiding pressure; total cystometric capacity 600 ml.

Conclusion

This study shows that detrusor hyperreflexia can be demonstrated in pigs treated with MPTP.

Acknowledgements:

This study was supported by the Danish Board of Health Research, the Medicotechnical Programme and by Aarhus University Research Foundation

References.

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- (2) MPTP-induced Parkinsonism in minipigs: A behavioral, biochemical, and histological study. Neurotoxicol Teratol 1999 Mar-Apr;21(2):169-75
- (3) The dopamine D1 receptor agonist SKF 38393 suppresses detrusor hyperreflexia in the monkey with parkinsonism induced by 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) Neuropharmacology. 1993 Apr;32(4).315-21