452

Forman A[1], Xing L[2], Wen J G[2], Kirkeby H J[3], Olesen H[3], Possover M[4], Djurhuus J C[3]
1. *Department of OB/GYN, Aarhus University Hospital, 8200 Aarhus,* ***2.*** *Zhengzhou University, Zhengzhou City, China,* ***3.*** *Institute of Experimental Clinical Research, Aarhus University, Denmark,* ***4.*** *Hirslanden Clinic, Zürich, Switzerland*

LAPAROSCOPIC DISSECTION AND FUNCTIONAL IDENTIFICATION OF THE PELVIC AND PUDENDAL NERVES: A NEW EXPERIMENTAL MODEL IN PIGS.

Hypothesis / aims of study

Current approaches for pelvic neuromodulation include stimulation of peripheral nerves, or sacral roots(1), while direct anterior access to the pelvic nerves is impaired by the deep position. A simple posterior approach has been developed in the pig(2), but the procedure does not allow for long term studies. Recent studies suggest that neuromodulation can be performed by laparoscopic application of electrostimulation, with possibilities for modulation at multiple sites(3).
The aim of the present study was to establish laparoscopic dissection and identification of pelvic nerves in the pig to further explore the potential of this method for acute and chronic modulation of bladder function.

Study design, materials and methods

Acute experiments were peformed in Danish land-race pigs (4 months old, mean body weight 40 Kg (range 35-45 kg). General anaesthesia with endotracheal intubation was used. Laparoscopy was performed with transumbilical insufflations, 10 mm 30^0 optics, and 5 mm troikarts for instruments. Laparoscopic neuronavigation[5] was performed with use of a bipolar forceps (Storz) connected to a Grass S48 stimulator through a SIU5 unit. Bladder, urethral and rectal pressure changes were recorded by a computer (CardioMed, CM-4008, Norway).

Results

After inspection of the abdomen, two 5 mm ports were applied distally in the midline and one 10 mm port distally and laterally corresponding to the operative field. The pig was turned to the contralateral side. The ipsilateral leg was abducted, and the 30^0 optic was placed in the lateral 10mm port. This position allowed for dissection of the pelvic wall with deflection of the bladder and rectum.
The vesical peritoneum was divided at the pelvic wall. By blunt dissection, the bladder and rectum could be deflected from the pelvic wall, and the pelvic nerve was readily identified. The nerve arch formed by S_1-S_3 running parallel to the sacral bone was identified by following the pelvic nerve(2) and the components S_{1-2} , and S_{2-3} as well as the pudendal nerve running caudally from these segments could be identified. Functional testing with bipolar forceps(3) induced responses corresponding to previous findings using the open, posterior approach(2). Multipolar electrodes (Medtronics^R) could be precisely applied to the structures under visual guidance. With training, dissection could be performed within 30 minutes with scissor and forceps only, and without trauma to the nerve structures.

Interpretation of results

With use of laparoscopy, anterior dissection and functional identification of the pelvic and pudendal nerves can be performed, with possibilities for precise application of electrodes for neurostimulation under visual guidance. This allows for acute and chronic studies on the potential of this technique for neuromodulation of bladder function. The size and anatomy of the pig implies that operative techniques can be refined for subsequent application in the clinical setting.

Concluding message

Laparoscopic dissection and functional identification of the pelvic and pudendal nerves through the anterior approach represents a promising model for future studies on neuromodulation of bladder function

References

1. Peters KM. Alternative approaches to sacral nerve stimulation. Int Urogynecol J Pelvic Floor Dysfunct 2010; 21(12):1559-1563.
2. Wen JG, Jezernik S, Chen Y, Rijkhoff NJM, Sinkjaer T, Djurhuus JC. Access to pelvic and pudendal neves from a simple posterior surgical approach: An experimental bladder control study in pigs. Asian Journal of Surgery 1999:22(3), 285-290.
3. Possover M, Schurch B, Henle KP. New strategies of pelvic nerves stiulation for recovery of pelvic visceral functions and locomotion in paraplegics. Neurourol Urodyn 2010;29(8):1433-8.

Specify source of funding or grant	**Aarhus University Research Foundation**
Is this a clinical trial?	**No**
What were the subjects in the study?	**ANIMAL**
Were guidelines for care and use of laboratory animals followed or ethical committee approval obtained?	**Yes**
Name of ethics committee	**none**