

IMPROVED SACRAL NEUROMODULATION IN THE TREATMENT OF THE HYPERACTIVE DETRUSOR: SIGNAL MODIFICATION IN AN ANIMAL MODEL

Aims of Study

A peripheral nerve evaluation test (PNE test) is carried out before the implantation of a sacral neuromodulator. The aim of the PNE test is to determine the response of the patient to this type of therapy. Published reports and our own results reveal that up to 80% of patients do not respond to PNE stimulation. We attempted to improve the efficacy of the PNE test by testing the effect of two different stimulation signals.

Methods

PNE foramen electrodes were placed in S3 in 6 ITN anesthetised Göttinger minipigs. Firstly, detrusor instabilities were induced by the intravesical instillation of formalin. A 10-minute stimulation phase with both a quasitrapezoidal (QT) signal and a rectangular signal followed. An interval of 30 min. elapsed between the two series of stimulation. The attained pressure values were registered on a urodynamic unit and evaluated as contractions and amplitudes per minute.

Results

After formalin instillation, the average number of involuntary detrusor contractions per minute was $3.5 (\pm 0.8)$ and pressure was $7.2 (\pm 1.1)$. Subsequent NaCl instillation and QT stimulation reduced the contractions to 0.3 per minute (± 0.3) and pressure to $0.8 (\pm 0.4)$ per min. Stimulation with a rectangular signal, as used in the PNE test, followed after an interval of 10 min. $1.1 (\pm 0.1)$ contractions per min and an amplitude of $5.1 (\pm 2.4)$ per min were registered with this type of stimulation.

The acquired data clearly demonstrates that QT stimulation more effectively suppresses uncontrollable detrusor contractions in the minipig than the conventional rectangular stimulation presently applied in the PNE test. Assumably, the A-delta fibers are more effectively stimulated with QT signals. Clinical trials will verify the improved response to QT signal stimulation in PNE tests.

Conclusions

The application of QT signal stimulation in clinical PNE tests could lead to improved diagnostics with peripheral nerve evaluation and consequently to a successful outcome in more patients with detrusor instability.