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LAPAROSCOPIC IMPLANTATION OF NEUROMODULATORS FOR URINARY AND MOTORIC REHABILITATION OF PARAPLEGIC INDIVIDUALS DUE TO MULTIPLE SCLEROSIS.

Introduction

The laparoscopic implantation of neuromodulation electrodes was first described in 2008[1] as a rescue procedure in patients with local complications of a Brindley procedure. Due to its successful results and lesser invasiveness, it was then used as a primary procedure in spinal cord-injured patients, aiming to improve locomotion and bladder function[2]. Long term data has shown improvement in voluntary motor function and sensitivity, suggesting positive effects on neuroplasticity[3].
The objective of this video is to demonstrate the technique for laparoscopic implantation of electrodes for bilateral neurmodulation of femoral, sciatic and pudendal nerves and describe our initial experience with two Multiple Sclerosis patients.

Design

Our first implantation was performed on a 44 year-old woman with 14-year history of primarily progressive MS. Since one year before the procedure she was on a wheelchair due to spastic paraplegia and wearing diapers due to urge urinary incontinence. Urodynamic evaluation revealed increased bladder sensitivity and detrusor overactivity, leading to complete bladder emptying after 201mL of saline infusion.
The second case is that of a 54 year-old woman with a 20-year history of gradually progressive MS. Since two years before the surgery she was on an electric bike due to spastic paraplegia and wearing diapers due to urge urinary incontinence, and had already failed interferon, gamaglobulin, intrathecal cortisone and intracranial stem-cell therapies. Urodynamics revealed detrusor overactivity with phasic contractions followed by reduction in electromyographic perineal activity.
The proposed therapy for both patients was the laparoscopic implantation of neuromodulation electrodes on the femoral nerves, to promote quadriceps contraction and modulate spasticity; on the lumbosacral trunks to enhance plantar flexion of the feet and on the pudendal nerves to improve continence.
The procedure starts with the dissection of the femoral nerve, on the lateral border of the psoas muscle. Dissection is then extended to the obturator fossae and carried down to the ischial spine, revealing the sciatic and pudendal nerves.
Intraoperative stimulation of the pudendal nerve promotes pelvic floor contraction and is used to confirm the identification.
Dissection of the femoral, sciatic and pudendal nerves is performed on the contralateral side.
A quadripolar electrode is then implanted with two poles into the Alcock's canal and the two other laying over the lumbosacral trunk and tied to the pelvic pectineal line.
The proximal poles of the electrodes are exteriorized and connected to the test cable, to confirm a successful implantation. Another electrode is implanted on the contralateral side in a similar fashion. The other two electrodes are implanted posteriorly to the femoral nerves and tied to the transversus abdominalis muscles.
All the electrodes are then peritonized and, if the test phase is successful, a double channel 16-pole rechargeable IPG is implanted.

Results

After surgery, both patients presented full recovery of urinary symptoms. One of them now finds it easier to stand up for transfers and daily activities and the other managed to advance from the wheelchair to the walker.

Conclusion

The laparoscopic implantation of neuromodulation electrodes provides improvement of bladder and motor functions in multiple sclerosis patients in the short term.

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