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CASE REPORT

Sacral nerve stimulation for fecal incontinence. First successful case in Greece

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Abstract

Introduction: Sacral nerve modulation (SNM) is an established and successful treatment for fecal incontinence. We present the first successful case in Greece, performed in our department.

Patients and Methods: A 60-year-old female patient presented with a 5-year-old history of fecal incontinence. The Cleveland Clinic Florida (CCF) Incontinence Score was 15. Endoanal ultrasound did not show defects of the internal or external anal sphincter. Conservative and pharmacological therapy was unsuccessful. The patient subsequently underwent a total pelvic floor repair, which was also unsuccessful. After discussing further options, the patient gave consent for percutaneous nerve evaluation (PNE), for possible permanent stimulator implantation.

Results: A quadripolar lead was placed percutaneously through the dorsal S3 foramen under local anesthesia. This was connected to a test stimulator (Medtronic Interstim Model 3625, Minneapolis, MN). The stimulator was activated for a period of 4 weeks. At the end of the test period, the CCF Incontinence score was 5. This was considered successful. A permanent stimulator (Medtronic Interstim Implantable Pulse Generator Model 3058, Minneapolis, MN) was then implanted under local anesthesia. Two months after permanent implantation, the Wexner Score has not increased.

Conclusion: SNM is a relatively simple, safe and minimally invasive technique for the treatment of fecal incontinence. Hippokratia 2011; 15 (4): 366-369

Key words: fecal incontinence; sacral nerve stimulation

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There is a profound impact of fecal incontinence (FI) on quality of life and often results in degradation to the social and mental status of individuals affected by this disease[1]. Sacral nerve stimulation (SNS) was first developed to treat urinary disorders. It has been a treatment option in patients with fecal incontinence since 1995[2]. Satisfactory long-term results of SNS have been reported, and it is now part of the treatment algorithm for FI. SNS is indicated in patients with fecal incontinence, in whom conservative therapy (dietary modifications, antidiarrheal medications, with or without biofeedback) and/or conventional surgical therapy (sphincteroplasty, total pelvic floor repair) has failed. A period of test stimulation is employed; selection of patients for implantation of a permanent neurostimulation device is based on clinical improvement during test stimulation. We present the first successful case of SNS for fecal incontinence in Greece, performed at the 1st Surgical Department of the Aristotelian University, Thessaloniki.

Case Report

A 60-year-old female was referred to our clinic with FI. She had undergone no previous anorectal procedures and had two vaginal deliveries. Her body mass index was 29. There were no other co-morbidities. She had failed conservative treatment for incontinence, which included increased dietary fibre and loperamide. She subsequently underwent a total pelvic floor repair (anterior levatoroplasty and posterior puborectalis plication), which also failed. She was then considered for test stimulation for potential SNS.

Preoperative evaluation consisted of an endoanal ultrasound, which did not show defects in the external or internal sphincter (Figure 1). A bowel diary was complet-

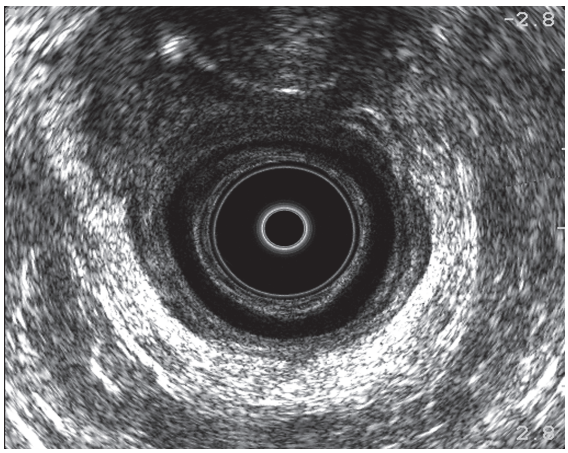

Figure 1: Endoanal ultrasound demonstrating intact internal and external anal sphinchter

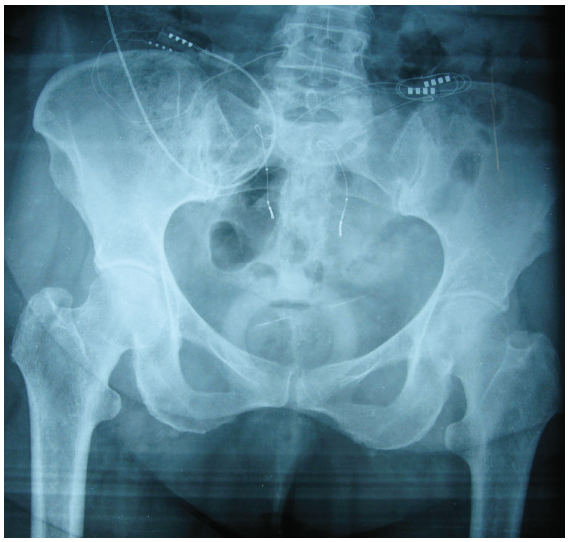

Figure 2: Postoperative radiogram showing PNE electrodes in S3 (test stimulation procedure)

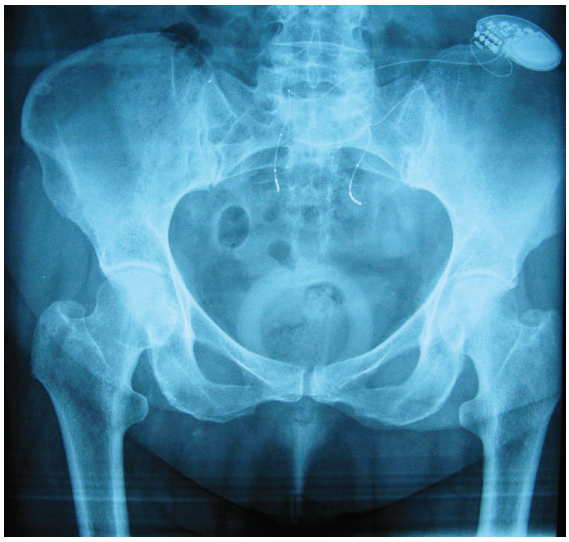

Figure 3: Postoperative radiogram showing permanent generator in place

ed, pointing out the frequency of incontinence episodes. The Cleveland Clinic Florida (CCF) fecal incontinence score was used to assess severity of incontinence. This is a validated scoring system for fecal incontinence, used by a large number of colorectal surgeons. The score ranges from 0 (normal continence) to 20 (maximum incontinence) [3].

The patient gave consent for percutaneous nerve evaluation (PNE), for possible permanent stimulator implantation.

A quadripolar lead was placed percutaneously through the dorsal S3 foramen under local anesthesia. This was connected to a test stimulator (Medtronic Interstim Model 3625, Minneapolis, MN) (Figure 2). The stimulator was activated for a period of 4 weeks. Initial stimulation parameters were a pulse width of 210 μsec, a frequency of 14 Hertz and amplitude of 1.5 V. At the end of the test period, the patient recorded a greater than 50% reduction in incontinent episodes. This was considered a successful result. A permanent stimulator (Medtronic Interstim Implantable Pulse Generator Model 3058, Minneapolis, MN) was then implanted under local anesthesia (Figure 3). Six months after permanent implantation, the number of incontinent episodes has not increased, and there have been no complications related to the procedure.

Discussion

Fecal incontinence is defined as either the involuntary passage or the inability to control the discharge of fecal material through the anus[4].

Fecal incontinence is a devastating, nonfatal illness that may result in considerable embarrassment and anxiety in individuals affected. FI affects 2-17% of people living in the community, and up to 50% of nursing home residents[5]. FI affects people of all ages, but its prevalence is higher in women, the elderly, and in nursing home residents[4]. It is worth noting that many patients with FI do not voluntarily report this problem to their physicians.

Incontinence occurs when one or more mechanisms that maintain continence are disrupted. Factors necessary for fecal continence are firm and bulky gastrointestinal contents, a passively distensible, capacious and evacuable reservoir (rectum), and an effective barrier to outflow (sphincter mechanism, hemorrhoids, anorectal angle) [6].

Risk factors associated with FI include obstetric trauma, as a result of sphincter damage and/or pudendal nerve damage during vaginal delivery, previous anorectal procedures, and rectal radiation therapy. Several neurological conditions, such as multiple sclerosis, stroke and spinal cord injury and Parkinson's disease may lead to fecal incontinence.

The inability to maintain continence depends on several factors and it is sometimes difficult to isolate a single origin. Disruption of the anal sphincter muscles following vaginal childbirth is a primary risk factor for the development of FI. In addition, neuromuscular denervation and idiopathic dysfunction contribute to the complexity of proper diagnosis of the disorder[1].

Evaluation

A detailed history is used to assess the frequency, severity and nature of incontinence. The effect of FI on the patient's quality of life (QOL) can be also noted. A number of incontinence scales have been developed, but none are routinely used in practiced. The CCF-Florida score is a validated system used by many colorectal surgeons.

The physical examination is of paramount importance. Inspection of the perianal area may reveal a patulous anus, anatomic deformity, dermatologic lesions or rectal prolapse. The digital rectal exam examines resting anal tone, assessing the internal anal sphincter (IAS), ex-

ternal anal sphincter (EAS) contraction and puborectalis contraction.

The next step in evaluating FI is the utilization of several diagnostic tests. Manometry is used to assess anal sphincter tone, strength and maximum squeeze pressure. Endoanal ultrasound examines the integrity of the IAS/EAS. It is very sensitive in detecting disruptions of the sphincter complex. Pudendal nerve terminal motor latency measures conduction time through the terminal portion of the pudendal nerve to the EAS. This may detect stretch injuries from vaginal delivery. Finally, dynamic pelvic MRI may provide information about pelvic floor anatomy and function.

Treatment

Management of FI is usually tailored to the specific cause. Initial therapy includes dietary modifications designed to alter stool consistency and delivery of stool to the anorectum. This may be achieved by administration of bulking agents and psyllium fibre to the diet. Antidiarrheal medications, such as loperamide, and atropine sulphate, may also achieve this goal. Biofeedback has also been a component of therapy for FI. This is done by enhancing the patient's ability to perceive rectal distention; increasing the contraction amplitude of striated voluntary muscles of the pelvic floor achieves this. Biofeeedback may also enhance the coordination of sensory and muscular components of the pelvic floor[5, 6]. Dietary manipulation and biofeedback offer few benefits to patients with severe FI; it should be utilized in patients with mild forms of the disease[1,7].

Anal sphincteroplasty has been used for many years in patients with a known sphincter defect. The surgical technique most frequently performed has been an overlapping spincteroplasty. This operation is highly effective for acute sphincter disruption. However, the durability and effectiveness in patients with nonacute disruption is inferior. Although short-term improvement in continence score is observed in up to 85% of patients, failure rates of approximately 50% or greater have been reported at 5 years' follow-up[1,5]. Total pelvic floor repair, which entails puborectalis plication and anterior levatoroplasty, has had similar, if not inferior, results. The artificial bowel sphincter (ABS) has been available since the early 1990s, but relatively high infection rates associated with the device and technical difficulty with implantation have prevented its widespread use. Antegrade colonic enemas by way of appendicostomy or cecostomy are effective in keeping the large bowel free of contents and may eliminate episodes of incontinence. These procedures are associated with high complication rates, approximately 40%[5]. Finally, a diverting colostomy may be fashioned in patients with refractory FI.

Sacral nerve stimulation for the treatment of FI was introduced by Matzel et al. in 1995[2]. The entire process is divided in two stages; test stimulation, also known as peripheral nerve stimulation (PNE) and definitive implantation. During PNE, an electrode is inserted into the S3 sacral foramen. This is connected to an external stimulator; verification of proper position of the electrode is done by observing contraction of the perineum and the homolateral great toe during stimulation. Fluoroscopy may also be used. Two types of electrodes may be utilized; a temporary electrode or a permanent tined electrode. A test period of approximately one month is usually employed. Stimulation parameters for the external device are: continuous stimulation, a frequency of 14-15 Hertz, and duration of stimulation of 210 μsec. Implantation of the permanent stimulator is performed after successful PNE trial. PNE is considered successful if the patient reports a 50% decrease in the number of incontinence episodes per week or a 50% reduction in the number of days with incontinence per week. For this reason, a meticulously recorded bowel movement diary is mandatory. The permanent stimulator is similar to a cardiac pacemaker in appearance, is implanted under local or general anesthesia, and has a battery life of about 7 years. Interrogation of the stimulator and changes in all parameters can be performed at any time by the treating surgeon.

Several hypotheses exist as to the mode of action of SNS; the precise mechanism remains unclear. There are indications that SNS works on several levels. It is postulated that SNS exerts its effects not only through the sacral roots from the spinal cord but also at supraconal levels in the central nervous system. After successful SNS, anal resting tone is increased, rectal capacity is increased and colon transit time is decreased[13]. The initial use of SNS for FI was restricted to patients suffering from incontinence as a result of a functionally deficient, but anatomically intact sphincter. Temporary test stimulation (PNE) is now used liberally in various pathophysiological conditions resulting in FI. These include rectal cancer surgery, radiation, scleroderma and patients with damage to the external sphincter, as long as the defect is less than 30% of the anal circumference. Inflammatory bowel disease is considered a contraindication to SNS

In most series, PNE has been sucessful in 73-78% of patients, regardless of etiology of FI [8,11]. In a long term follow-up study of up to 14 years, 44% of patients achieved full continence [9]. Device-related adverse effects have been reported in up to 24.5% of patients in larger series [12]. Explantation of the permanent stimulator has been reported in 3.5%-12% of patients. The infection rate was 1-1.6% in these series [12,13].

Finally, failure of either PNE or permanent implantation does not preclude success; in one series 84% of patients had a successful repeat PNE and 44% of patients with revision of the permanent device had a successful outcome [13].

SNS is considered an established treatment for FI [14]. The indications for PNE have been broadened. Both temporary and permanent stimulation procedures are minimally invasive; morbidity of these procedures is low. Test stimulation (PNE) is highly predictive. It offers the opportunity to assess treatment efficacy before proceeding to a permanent implant. Clinical benefits, as well as

improvement in the quality of life of patients, have been demonstrated both in single-center and multicenter prospective studies in the short and mid-term. Long-term follow-up studies are anticipated; the single such study available has reported encouraging results [10].

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