Introduction

Fecal incontinence (FI) can affect up to 18% of the population (depending on how incontinence is defined in studies)

Posterior tibial nerve stimulation (PTNS)

- form of neuromodulation used in the treatment of fecal and urinary incontinence
- studies have shown symptom improvement of FI after PTNS but most studies are uncontrolled and use wide varieties of scoring systems/outcome reporting
- the exact mechanism of action of PTNS or its effect on physiology is completely understood.
- PTNS is proposed to act by direct modification of the peripheral nerve roots which share the same spinal roots as the neuronal innervation to the pelvic floor (L4-S3) or by central stimulation

Methods

50 patients with FI underwent 30 minutes of PTNS treatment weekly for 12 weeks. High-resolution anorectal manometry (ARM), bowel diaries and Vaizy questionnaires were performed before and after treatment. Successful treatment was determined as a greater than 50% reduction in FI episodes.

Patients who had failed conservative management, including lifestyle modification, pharmacological or biofeedback treatment were considered for PTNS.

Posterior Tibial Nerve Stimulation: Patients were positioned in a sitting position with their right foot resting on a stool. The needle electrode was percutaneously placed 5 cm cephalad to the medial malleolus and 2 cm posterior to the tibia with the tip of the needle approximately 2 cm deep to the skin. A surface electrode was placed near the medial aspect of the calcaneus of the ipsilateral limb and both were connected to the ipsilateral limb and both were connected to the stimulator. Correct placement was identified by making sure there was either a motor or sensory response.

Results

Bowel diaries: Overall 33 patients had reduction in total FI episodes, 12 had an increase and in 5 there was no change. PTNS, therefore, was successful in 44% of patients who indicated a “greater than 50%” reduction in FI.

High-resolution ARM parameters: Compared with pretreatment, there was a significant reduction in all rectal sensory volumes measures (onset of first sensation, call to stool and urgency to defecate).
Discussion

- PTNS has a demonstrable effect on rectal sensation with reduction in volume for onset, call to stool and urgency.
- Appears to offer significant benefit in some patients with FI with reduction in urgency and number of FI episodes.
- A reduction in rectal sensory volumes of up to 24% was reported across all patients compared with pretreatment.
- Findings of this study support the fact that a reduction in rectal sensory volumes may result in patients having earlier sensation of the presence of stool prior to reaching a threshold at which defecation can no longer be delayed.
  - Increased awareness of stool in the rectum could help patients reach the bathroom in time to avoid FI.
- PTNS appears to have a measurable physiological action on rectal sensory volume without effect on anal canal pressures. This change in sensory threshold might confer a benefit, which is not identified by current instruments, such as a delay between sensation and the need to defecate.

Additional studies will need to combine manometric and anatomical parameters with more detailed baseline profiles such as the presence or absence of IBS; there is also a need for better selection of patients and use of patient-reported outcomes that identify factors that affect how patients manage FI and its effects on quality of life.

Additional studies:

1) Dedemadi, et al (Perm J 2018;22:17-231) found bilateral transcutaneous posterior tibial nerve stimulation is safe and well tolerated and improves symptoms of FI.
2) Al Asari, et al (Colorectal Dis 2014Nov;16(11):O393-9) found PTNS is a valid method of treating fecal incontinence in the short term when conservative treatment has failed; it is easier, simpler, cheaper and less invasive than implanted sacral nerve stimulation with similar short term outcome.
3) Hotouras et al (Surg Today 2014Nov;44(11):2124-30) compared implanted sacral nerve stimulation and PTNS and found the effect of both treatments was similar.
4) Arroyo et al (Int J Surg 2014;12(2):146-9) found PTNS is an effective treatment for fecal incontinence associated with sphincter lesions because the number if FI episodes per week, the Wexner Score, the ability to defer defecation and the manometric determinations improved significantly.
5) Venara et al (Dis Colon Rectum 2018 Sept;61(9):1080-1088) indicated that PTNS was safe in a perioperative setting and had a potential effect on GI motility recovery.
6) Iqbal et al (Colorectal Dis 2016 Feb; 18(2):173-8) indicated that bilateral transcutaneous tibial nerve stimulation appears to be effective in a quarter of patients with chronic constipation.
7) Moya et al (Tech Coloproctol 2016 May;20(5):317-9) completed a nonrandomized study with relatively small number of patients but found that percutaneous PTNS had similar efficiency to sacral nerve stimulation in a male population.
Questions

1) Is there anyone who has used percutaneous tibial nerve stimulation in their clinic?
2) This study uses percutaneous tibial nerve stimulation using needle electrodes but other studies have indicated that transcutaneous stimulation can generate similar results. Do you use transcutaneous tibial stimulation in your clinic?
3) Given the innervation of the pelvic area is L4-S3, are there any other areas in which you use transcutaneous electrical stimulation (sacral or other)?