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ASSESSING S_3 NEUROMODULATION EFFICACY

Aims of Study

S_3 neuromodulation has been performed for a variety of lower urinary tract dysfunction for more than 10 years. There is now extensive literature evidence showing S_3 neuromodulation to be of potential benefit to patients with detrusor overactivity and women with urinary retention. However, it remains difficult for a single centre to assess the efficacy of its neuromodulation service against the published evidence. This is due to a variety of factors: the complexity of the patient population undergoing neuromodulation, the small number of implants performed per centre, difficulties in measuring implant efficacy and the nonconformity in the way results have been reported all add to the difficulties of single service assessment.

This study reviewed the S_3 neuromodulation service of a single U.K. centre, established over the past six years. The aim of the review was to determine whether the service matched the success and complication rates recorded elsewhere and to gain insight into the ways in which neuromodulation services should be standardised in the future in order to improve the worldwide knowledge of this complex patient group.

Methods

Over the past six years a heterogeneous group of 52 patients with severe lower urinary tract symptoms underwent a temporary period of percutaneous S_3 nerve stimulation. Patients were selected on the basis of clinical presentation, urodynamic assessment and failure to respond to conservative management. Positive results following the test stimulation led to 29 patients receiving definitive S_3 neuromodulator implants.

The hospital notes of all patients who had received S_3 neuromodulator implants were reviewed retrospectively for details of pre-operative symptoms, urodynamic and PNE assessment, operative complications and post-implant bladder function. At the time of review 21 patients were continuing to use their neuromodulator implant to improve bladder function. An up-to-date assessment of patients who were still using their implant was made using frequency / volume charts for a two-week period. Those patients who were willing to consent then had their neuromodulator switched off for a period and repeated frequency / volume charts.

With the benefit of six years experience, all implanted patients were graded on the basis of their presenting clinical history, urinary symptoms, urodynamic findings and PNE assessment as to whether they would be expected to respond well to their neuromodulator implant. This grading was compared to the actual success / failure rate of the implant procedure.

Results

23 female and 6 male patients were implanted; average age 45 years (range 16 – 73). The patients had a variety of urinary symptoms including urgency / frequency, urge incontinence, retention and incontinence with voiding difficulty. The group included patients with symptoms of both idiopathic and neurogenic origin and it was noted, in addition, that several patients had significant psychological factors in their histories. 28 of the implanted patients are living; one patient has died of causes unrelated to the neuromodulation. The average follow-up period for the patients is 2.96 years (0.25 – 6.08), representing 85.83 patient-years of follow-up.

55% of patients received appear to gain benefit from their neuromodulator (average implant years = 3.1), while 28% derive no benefit from their implant (average implant years = 3.6). The remaining 17% experienced inconsistent results requiring increased programming support from the Medical Physics team. Several patients were found to have a lengthy ‘hang-over’ effect once the neuromodulator is switched off. No correlation was found between the expected response to neuromodulation and the actual patient benefit.

The surgical implant procedure is straightforward and well tolerated. However, problems with loss of stimulator benefit (thought to be due to CNS accommodation) and generator site pain have led to a 38% re-operation rate. 1 patient has had the neuromodulator explanted. A further patient has never had the neuromodulator programmed due to lead shock at switch-on.

Conclusions

Neuromodulation is a useful technique, which is well tolerated and can be used successfully in a range of

lower urinary tract dysfunction. It remains difficult to determine which patients will benefit from this procedure. The success, complication and re-operation rates noted in this single centre review appear in keeping with the published literature. However, differences in case mix and the variety of definitions for success available for comparison make this difficult to estimate.

Improved knowledge and care for this complex patient group would be gained through standardisation of pre-operative, PNE and post-implant procedures in terms of measuring urinary symptoms and assessing subjective improvement through quality of life scores.