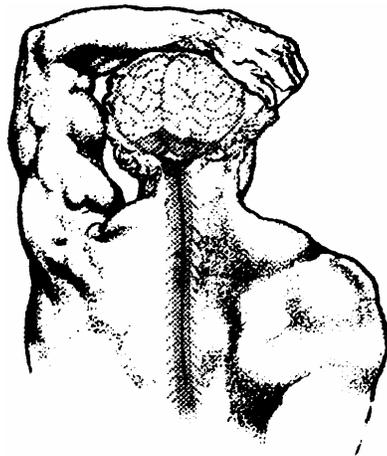


Neuromodulation Society of United Kingdom and Ireland

Joint Scientific Meeting with

British Stereotactic and Functional Neurosurgery Group



National Railway Museum Conference Centre

York

Friday 16th – Saturday 17th November, 2007



Contents

	Page No.
Faculty and acknowledgements.....	2
Meeting information.....	3
Scientific programme	4
Plenary Lecture Abstracts.....	11
Free Paper Abstracts.....	15
York map.....	38

Faculty and acknowledgements

Welcome to the 2007 Joint Annual Scientific Meeting of NSUKI and BSFNG.

The Council and the organising committee of the NSUKI would like to thank the following faculty for their participation in the meeting:

Professor Jon Raphael	Birmingham City University, Birmingham
Dr Sam Eldabe	James Cook University Hospital, Middlesbrough
Dr Simon Thomson	Basildon and Thurrock University Hospitals, Basildon
Dr Jon Valentine	Norfolk and Norwich University Hospital, Norwich
Mr Brian Simpson	University Hospital of Wales, Cardiff
Professor Mark Johnson	Faculty of Health, Leeds Metropolitan University, Leeds
Professor Karel Everaert	Ghent University Hospital, Ghent, Belgium
Professor Rod Taylor	Peninsula Medical School, Universities of Exeter & Plymouth
Dr Liong Liem	St. Antonius Ziekenhuis, Nieuwegein, The Netherlands
Dr Karen Simpson	Seacroft Hospital, Leeds
Dr David Christmas	Ninewells Hospital & Medical School, Dundee
Dr David Cunningham	The National Clinical Audit Support Programme, London
Mr Lawrence Watkins	The National Hospital for Neurology and Neurosurgery, London
Dr Thomas Simopoulos	Beth Israel Deaconess Medical Center, Boston, USA
Mr Owen Sparrow	Wessex Neurological Centre, Southampton General Hospital
Dr Richard Talbot	St. James Hospital, Dublin, Eire

In addition, we would also like to thank the presenters of our free papers, details of which can be found in the Free Papers section.

The NSUKI and BSFNG are very grateful to the following companies for their support of the 2007 ASM:

Advanced Bionics
Advanced Neuromodulation Systems
Codman
EISAI
Medtronic
Neurotechnics
Pfizer
Seren Medical

Meeting information

The meeting will take place in the Conference Centre in the Great Hall of the National Railway Museum (NRM), Leeman Road, York, YO26 4XJ

Registration

Please register either on the Thursday evening at The Royal York Hotel satellite symposium or at the Great Hall entrance of the NRM on the Friday morning.

Badges

Badges must be worn at all times during the meeting for security reasons and as evidence of your entitlement to lunch. The museum will be open to the public during the meeting.

Badges are colour coded as follows:

White Delegates

Blue Speakers

Yellow Technical Exhibitors

In order to help us keep costs down for future meetings, please remember to hand in your badge at the registration desk when you leave the meeting.

Evaluation forms

Please hand your completed evaluation form either to a member of staff at the registration area or send/fax it to the conference organisers whose details can be found on the form.

Certificates of attendance

Certificates of attendance will be made available to delegates from noon on Saturday.

The meeting has been accredited with eight CPD points from the Royal College of Anaesthetists.

Parking

Parking is available free of charge for delegates at the NRM. The exit code for the car park barrier will be posted in the Walker Suite.

Mobile phones

Delegates are reminded to keep mobile phones switched off during all sessions.

Venue Contacts

NRM Conference Centre
Registration Desk

01904 686223
07926 770170

Annual Dinner

The annual dinner will start with a drinks reception at 8.00 p.m. on Friday 16th November, at The Merchant Adventurers Hall, Piccadilly, YO1 9XD. The Hall is located in the centre of York, a short walk (10 to 15 mins) from the hotels. A map of York is printed inside the back cover.

Scientific Programme

Thursday 15

Royal York Hotel

18.00 - 19.30	Registration
19.00	Buffet Supper
19.30 - 21.00	Eisai Symposium Ziconotide - A Practical Guide <i>Session Chairman: Professor Jon Raphael</i>
19.30 - 20.00	Practical issues in Ziconotide therapy <i>Dr Sam Eldabe (Middlesbrough)</i>
20.10 - 20.40	How to make the economic argument in clinical practice <i>Dr Simon Thomson (Basildon)</i>

Friday 16

National Railway Museum, York

08.00 - 09.00	Registration
09.00 - 09.10	Introduction <i>Dr Jon Valentine, President NSUKI</i>
09.10 - 09.45	Neuromodulation, past present and future <i>Mr Brian Simpson (Cardiff)</i>
09.45 - 10.30	Stimulation induced analgesia <i>Professor Mark Johnson (Leeds)</i>
10.30 - 11.15	Free Paper Presentation (Session 1) <i>Chairman: Dr Jon Valentine</i>
10.30 - 10.40	1. Cost Effectiveness of Spinal Cord Stimulation for failed back surgery syndrome: a four country European Survey - SURF <i>Morag Brookes, James Cook University Hospital, Middlesbrough</i>
10.40 - 10.50	2. Hypogonadotropic hypogonadism and low dose intrathecal morphine therapy: how common is it? <i>Rui Duarte, Birmingham City University</i>
11.00 - 11.10	3. Does physical functioning improve following spinal cord stimulation and is this correlated with patients' reports of pain? <i>Selina Johnson, The Walton Centre, Liverpool</i>
11.10 - 11.20	4. Demographic characteristics of neuropathic pain patients diagnosed with failed back surgery syndrome. <i>Simon Thomson, Basildon and Thurrock University Hospitals</i>
11.20 - 11.45	Coffee break

11.45 - 13.00

Parallel Session A (NSUKI)

Walker Suite

Session Chairman:

Simon Thomson

11.45 – 12.30

Urological Pain Syndromes

Professor Karel Everaert (Ghent, Belgium)

12.30 – 13.00

Free Paper Presentation (Session 2)

Chairman: Simon Thomson

12.30 - 12.40

5. Audit of Subcutaneous Electrical Nerve Stimulation using precision (Advanced Bionics) technology

Aamir Zuberi, St. Vincent's University Hospital, Dublin

12.40 - 12.50

6. SENS in the treatment of chronic pain

Michael Hanssmann, St Vincent's Hospital, Dublin

12.50 – 13.00

7. Pain Management Programmes: Do They Have a Role In Producing Suitable SCS Candidates and Rescuing Those Who Fail SCS Treatment?

Mark Draper, Walton Centre, Liverpool

13.00 - 14.30

Lunch Break

13.15 – 14.00

Medtronic Lunchtime lecture

Session Chairman: Peter Toomey

The PROCESS Study

Spinal Cord Stimulation v Conventional Pain Management,

6 and 12 month results

Professor Rod Taylor (Plymouth)

11.45 - 13.00

Parallel Session B (BSFNG) Allport Room
Session Chairman: Paul Eldridge

11.45 - 12.30

Neurosurgery for mental disorders; past, present and the future
Dr David Christmas (Dundee)

12.30 – 13.00

Free Paper Presentation (Session 3) *Chairman: Paul Eldridge*

12.30 - 12.40

8. Spinal Cord Stimulation for chronic pain (failed back surgery syndrome)
M. Sabarini, International Spine Clinic, Berlin, Germany

12.40 - 12.50

9. High Cervical Spinal Cord Stimulation for Facial Pain: A Retrospective Case Series
Clair Haslam, The Walton Centre, Liverpool

12.50 - 13.00

10. Dorsal Column Spinal Stimulation for intractable pain following limb amputation
Richard van Groningen, Bart's and The Royal London Hospitals, London

13.00 - 14.30

Lunch Break

13.15 – 14.00

Medtronic Lunchtime lecture
Session Chairman: Peter Toomey

The PROCESS Study
Spinal Cord Stimulation v Conventional Pain Management,
6 and 12 month results
Professor Rod Taylor (Plymouth)

14.30 - 16.45

Parallel Session C (NSUKI)

Walker Suite

Session Chairmen:

Simon Thomson

Jon Raphael

14.30 - 15.00

Sub-Cutaneous Stimulation

Dr Liong Liem (Nieuwegein, The Netherlands)

15.00 - 16.15

Programmable Vs Non Programmable Pump Debate

15.10 - 15.30

For Non-programmable Pumps

Dr Jon Valentine (Norwich)

15.30 - 15.45

Tea Break

Programmable Vs Non Programmable Pump Debate

15.45 - 16.05

For Programmable Pumps

Dr Karen Simpson (Leeds)

16.05 - 16.15

Discussion

16.15 - 16.45

Quick Fire Case Report Presentations (Session 6)

16.15 - 16.20

18. Difficulty in recharging a pulse generator: The first sign of infection?

Fay Garner, The James Cook University Hospital, Middlesbrough

16.20 - 16.25

19. Remifentanyl sedation for insertion of spinal cord stimulation electrodes

Dr McDonnell, Leeds Teaching Hospitals, Leeds

16.25 - 16.30

20. Spinal Cord Stimulation in a Patient with Implanted Cardioverter-Defibrillator

A Gulve, James Cook University Hospital, Middlesbrough

16.30 - 16.35

21. Resolution of sexual dysfunction following implantation of a SCS in a patient with failed back surgery syndrome.

S Basu, Queen's Medical Centre, Nottingham

16.35 - 16.40

22. Ziconitide in neuropathic pain: an adverse event?

L Bastiman, James Cook University Hospital, Middlesbrough

Plenary Lecture in Walker Suite

16.45 - 17.15

An Implantable Device Registry

Dr David Cunningham, (London)

17.15 - 17.55

NSUKI AGM

14.30 - 16.45

Parallel Session D (BSFNG) Allport Room
Session Chairman: Roger Strachan

14.30 - 15.10

BSFNG AGM

15.10 - 15.30

Free Paper Presentation (Session 4)

15.10 - 15.20

11. Early Experience with PPN Stimulation for a Dopa-Unresponsive Hypokinetic-Dystonic State
Jeremy Rowe, Royal Hallamshire Hospital, Sheffield

15.20 - 15.30

12. Subthalamic nucleus stimulation in Parkinsons disease: trends in pre-operative and post-operative requirements for Levodopa
C. Oluigbo, The Queen Elizabeth Hospital, Birmingham

15.30 - 15.45

Tea Break

15.45 - 16.45

Free Paper Presentations (Session 5) *Chairman: Roger Strachan*

15.45 - 15.55

13. Bilateral deep brain stimulation for primary cervical dystonia: Long term follow up in a series of ten patients
F. Cacciola, The Walton Centre, Liverpool

15.55 - 16.05

14. The shared GABAminergic mechanism lends itself to treatment of dystonia in Complex Regional Pain Syndrome with spinal cord stimulation.
Sandeep Kapur, Russells Hall Hospital, Dudley

16.05 - 16.15

15. Return of the Phantom: validation of a neurosurgical robot
Sam Eljamel, Ninewells Hospital & Medical School, Dundee.

16.15 - 16.25

16. Preservation and improvement of vision by dose attenuation during stereotaxic radiosurgical treatment of large skull base tumours
Michael Torrens, Hygeia Hospital, Athens, Greece.

16.25 - 16.35

17. Early experience with the NexFrame stereotactic system for placement of Deep Brain Stimulation Electrodes
P Byrne, Walton Centre, Liverpool

Plenary Lecture in Walker Suite

16.45 - 17.15

An Implantable Device Registry
Dr David Cunningham, (London)

18.00

Museum closes

Saturday 17

National Railway Museum, York

08.00 - 08.30

Breakfast at Walker Suite, NRM Conference Centre

08.30 - 10.30

The Advanced Bionics Symposium

Session Chairman: Jon Valentine

08.30 - 09.30

Occipital Nerve Stimulation in Headache, The PRISM Study

Mr Lawrence Watkins

(Queen's Square, London)

09.30 - 10.30

Spinal Cord Stimulation for Axial Back Pain

Dr. Thomas T. Simopoulos

(Beth Israel Deaconess Medical Center, Boston USA)

10.30 - 11.00

Coffee Break

Session Chairman: Jon Valentine

11.00 - 11.45

Electrical Stimulation for the Facilitation of Limb Function

Mr Owen Sparrow (Southampton)

12.00 - 12.45

Analysis of patient preferences during the trial period of SCS

Dr S. Eldabe (Middlesbrough)

12.45 - 13.15

Human Spinal Proteomic Biosynthesis

Dr Richard Talbot (Dublin)

13.15 - 14.00

Lunch

14.00

Close of meeting

Plenary Lecture
and
Free Paper Abstracts

Plenary Lecture Abstracts

Neuromodulation: Past, Present and Future

Brian A Simpson
University Hospital of Wales
Cardiff
UK

Electrical stimulation was used for many centuries to control pain in a crude way employing natural sources particularly electric fish. However, once electricity could be “man made”, stored and controlled it rapidly became a very popular treatment and general nostrum, peaking in the mid nineteenth century which became known as the golden age of medical electricity. Electricity was commonly and effectively used to provide analgesia for minor operations such as dental procedures during the second half of the nineteenth century but acquired such a bad reputation generally that its use was banned in the USA in 1910.

The modern era of neuromodulation began in the 1960s with the Gate Theory of pain control and with the realisation that damage to the nervous system could generate pain, combined with the consequent move away from destructive neurosurgical procedures. Stimulation of deep brain structures and the spinal cord then followed an undistinguished course which almost resulted in their demise in the 1970s and at that point cerebellar stimulation was introduced and appeared effective in spasticity and epilepsy management but has since become obsolete. Peripheral nerve stimulation came and went, for technical reasons. The success of DBS in movement disorders particularly Parkinson’s disease over the last 20 years has encouraged a revisiting of DBS for pain. Recently the targets and the indications for neurostimulation have increased enormously. The targets include the motor cortex, sacral roots and the vagus nerve. Newer indications include visceral disorders, obsessive compulsive disorder and depression, cluster headache and occipital neuralgia. SCS in peripheral vascular disease seems to be waning but its use in cardiac ischaemia is steadily gaining acceptance. Peripheral nerve stimulation is enjoying a renaissance.

The modern era has seen considerable technological advances and now the biggest problems relate more to the prominence of “evidence based medicine” and in persuading commissioners of the value of neuromodulation. There is a considerable onus on practitioners to publish more evidence but fundamental questions such as how outcomes are best assessed also need to be addressed. What constitutes appropriate evidence in this diverse and potentially enormous field needs to be debated and a better understanding of both the mechanisms of action and of the conditions being treated is badly needed.

Neuromodulation is on a cusp: it could become a major branch of medicine in its own right but equally there is a real risk of decline as has occurred in the past.

[The peculiar world of] Stimulation-induced analgesia

Professor Mark Johnson

**Professor of Pain and Analgesia,
Faculty of Health,
Leeds Metropolitan University,
Leeds,
UK**

To the lay person the world of pain may appear bizarre. For example, pain can persist without a physical injury, exist at the site of a body part that has been removed, or be entirely absent despite the presence of a serious injury. Pain can be reduced by electrically stimulating the skin, inserting needles at points on the body surface or using a mirror to provide an illusion that an amputated limb is still present. Establishing the clinical effectiveness of these strange techniques is fraught with difficulties.

This presentation will take you on a haphazard journey through the peculiar world of pain and stimulation induced analgesia. I will try to convey the simple physiological concepts that underpin our understanding of pain and its modulation using examples from pain medicine. I will also highlight methodological inadequacies that have hindered definitive conclusions about the effectiveness of stimulation induced analgesic techniques by using transcutaneous electrical nerve stimulation (TENS) as an example.

Urological Pain Syndromes

**Professor Karel Everaert,
Department of Urology
Ghent University Hospital,
Ghent, Belgium**

Chronic pelvic pain is a disorder with in men and women a mean prevalence of 15% (4-24%) of the population. However the disorder has many faces, disease names and therapies most of these depending on gender of the patient, the pain localization and the medical specialty they encounter. Most diagnoses and therapies are symptom driven and have some common characteristics as: a lack of diagnostic (\pm 1%) and therapeutic success (acceptable in short time evaluation, poor in long-term studies), a separate psychological profile, pelvic floor dysfunction (80%), congestion (90%), upregulation/sensitization and sexual dysfunction. As such chronic pelvic pain syndromes are similar to complex regional pain syndromes. Therapy is symptomatic pharmacotherapy (pain therapy (> neuropathic pain therapy), anti-inflammatory treatment, smooth and striated muscle relaxants), pelvic floor training and electrostimulation (TENS etc...), electrical neuromodulation (spinal or sacral neuromodulation).

Tabel 1: Chronic Pelvic Pain Syndromes

	Urology	Gyneacology	Gastro-enterology
Men	Interstitial cystitis Chronic prostatitis Chronic testicular pain		Irritable bowel syndrome
Women	Interstitial cystitis Urethral syndrome	Allen Masters syndrome	Irritable bowel syndrome

Pelvic mononeuropathies and organ defined disease are clearly to be distinguished from these chronic pelvic pain syndromes and need causal (i.e. nerve release when relevant) and/or symptomatic therapy (i.e. peripheral nerve stimulation). The main clinical challenge is not to miss these “low probability” disorders in the diagnostic work-up of our chronic pain patients but on the other hand to avoid unnecessary diagnostic examinations and their linked costs and risks. This task is extremely difficult as most of these disorders have a low prevalence, aspecific symptoms and demand for a “high suspicion” attitude. Typical urological examples are chronic ureteral calculi, urethral diverticulae, carcinoma in situ of the bladder, urological cancers, typical mononeuropathies like the Alcock syndrome and entrapment of the ilioinguinal or ileohypogastric nerve. As more specific markers of the chronic pelvic pain syndromes are lacking, only clinical experience is helpful which is “weak” in an era of EBM. In urology it is advised to do a thorough history taking and physical examination, a urine analysis and an ultrasound and only proceed to more invasive or expensive examinations in case of “suspicion” based on the first line evaluation. It is necessary to inform the patient from this diagnostic work-up to avoid medical shopping afterwards.

It is obvious that these causal pain disorders can up-regulate into more generalized chronic pelvic pain syndromes. This has been clearly demonstrated for acute cystitis and acute prostatitis resulting in a long-lasting inflammation like interstitial cystitis (animal experiments) and chronic prostatitis type 3b (no bacteria or white blood cells but elevated cytokines). Similar findings are found for the irritable bowel syndrome.

We shouldn't forget that a larger group of patient will spontaneously improve their symptoms over time ($> 30\%$ improvement/cure). Careful watching is therefore part of the therapy helping the patient with relieving his most bothersome symptoms and changing his/her lifestyle (stop cycling instead of nerve relief or electrical neurostimulation) and in only a minor part of the patients, surgery will be helpful and necessary. Only recently pelvic organ specialists have adequate surgical tools in the therapy of their chronic pain patients but they have not the experience of the pain clinicians dealing with these patients and they might therefore be tended to a more aggressive approach. Ideally organ specialists are linked to a pain centre.

Free Paper Abstracts

1.

Cost effectiveness of spinal cord stimulation for failed back surgery syndrome: a four country european survey - SURF

Brookes ME¹, Taylor RJ², Damhieu P³, Fowo S⁴, Schütze G⁵, Eldabe S¹, Date A¹, De Andrés JA⁶, Marín M⁷, Franco Gay DL⁸, Moreau J⁹, Varma T¹⁰, Haslam C¹⁰, Grall C², Grandmottet B³, Taylor RS¹¹

¹ Department of Pain & Anaesthesia, James Cook University Hospital, Middlesbrough, UK

² Health Economics Facility, University of Birmingham, UK

³ Department of Neurosurgery, CHU Hôpital de la Cavale Blanche, Brest, France

⁴ Department of Neurosurgery, CHU de Toulouse Rangueil, Toulouse, France

⁵ Department of Pain and Anesthesia, Marienhospital, Iserlohn-Letmathe, Germany

⁶ Pain Unit, Valencia General Hospital, Valencia, Spain

⁷ Department of Anaesthesia and Pain Clinic, Donostia Hospital, Donostia - San Sebastian, Spain

⁸ Pain Clinic, Hospital de Cruces, Barakaldo, Spain

⁹ Neurosurgical Practice, Marienhospital, Aachen, Germany

¹⁰ Department of Neurosurgery, The Walton Centre for Neurology & Neurosurgery, Fazakerley, UK

¹¹ Peninsula Medical School, Universities of Exeter & Plymouth, UK

Presenting Author: Morag E. Brookes, New Pain Clinic, James Cook University Hospital, Middlesbrough, TS4 3BW, UK Tel: 01642 282820

Senior Author: Professor Rod Taylor. Email: rod.taylor@pms.ac.uk

Background and Aims

The European Survey on Utilities and Resource utilisation in Failed back surgery syndrome treatment (SURF) project aimed at collecting the health-related quality of life (HRQoL) and costs and assess the cost effectiveness of spinal cord stimulation (SCS) compared to non-surgical conventional medical management (CMM) in patients with failed back surgery syndrome (FBSS).

Methods

Resource use data was collected retrospectively across 9 pain centres, in France, Germany, Spain and United Kingdom, during the period January 2006 to October 2006. Resource data was sought for each patient using the clinic information systems and patient clinical notes. HRQoL was assessed through the EQ-5D questionnaire. A previously developed decision analytic model was used to assess health outcomes and costs over the lifetime of patients. Results are expressed as incremental cost per quality adjusted life year (QALY) and expressed in 2006 Pounds.

Results

Data was available on 157 patients (129 SCS & 28 CMM). At an average of 2-years follow up, SCS was associated with better HRQoL and gave more health gain (+0.76 QALYs) but an increased cost to CMM (+£9.805 per patient) with an incremental cost effectiveness ratio of +£12.901/QALY. Over the patient lifetime, SCS was more effective (+5.82 QALYs) and due to a reduction in downstream healthcare resource utilisation, cost saving (-£51.013 per patient) compared to CMM.

Conclusions

In both the short-term and over the lifetime SCS is a cost-effective option when compared to non-surgical medical therapy alone in selected FBSS patients. Policy makers should be encouraged to extend the use of SCS as a good value for money treatment option in the management of FBSS.

Hypogonadotrophic hypogonadism and low dose intrathecal morphine therapy: how common is it?

JH Raphael, F Alam, R Duarte, M Labib¹, H Mutagi², S Kapur²

Faculty of Health, Birmingham City University

and Departments of Clinical Biochemistry¹ and Pain Management², Russells Hall Hospital, Dudley, UK

Background

Hypogonadotrophic hypogonadism is a recognised effect of intrathecal opioid therapy (1). However, whether this occurs with chronic low dose morphine is unclear. Since the publication of the guidance from the British Pain Society (2), we have been routinely measuring hormone levels (LH, FSH, testosterone and SHBG) on male patients undergoing long-term intrathecal morphine therapy. The aim of this audit was to assess whether the risk of hypogonadotrophic hypogonadism is dose-dependent

Methods

We reviewed the hormone levels on 7 males who have been on long-term (>4 years), low-dose (<2.5 mg/day) intrathecal morphine therapy. The dose of morphine and the duration of therapy were recorded.

Results

The mean age was 55 ± 7 years (range 45-66). The mean morphine dose was 1.5 ± 0.7 mg/day (range 0.35-2.3) and the mean duration of treatment was 7.2 years (range 4-15). Serum testosterone concentrations were below the lower limit of the reference range for age in 3 patients and borderline low in 3 patients (laboratory normal range: male 20-49 years, 9.1-55.2 nmol/L; over 49 years, 6.3-26.6nmol/L). Serum LH levels were low (<2.2 IU/L) in five patients and FSH levels were within the reference range (1-7 IU/L) in all 7 patients. Based on serum testosterone, SHBG and LH levels, 5 of the 7 patients were considered to have hypogonadotrophic hypogonadism.

Conclusion

Our audit shows that hypogonadotrophic hypogonadism is common in male patients who are undertaking long-term intrathecal morphine therapy, even at clinically very low doses. In view of the potential metabolic effects of hypogonadism, we suggest that the hypothalamic-pituitary-gonadal axis should be monitored in all patients undertaking long-term intrathecal opioid therapy, even in those who are on very low doses.

References

1. Abs R, Verhelst J, Maeyaert J et al. Endocrine consequences of longterm intrathecal administration of opioids. *The Journal of Clinical Endocrinology & Metabolism* 2000; Vol. 85, No. 6 2215-2222
2. Intrathecal drug delivery for the management of pain and spasticity in adults: recommendations for best clinical practice. *The British Pain Society* 2006

Does physical functioning improve following spinal cord stimulation (SCS) and is this correlated with patients' reports of pain? - additional results from a retrospective study.

Presenting Author: Selina Johnson, Clinical Physiotherapist Specialist in Pain & Neuromodulation, The Walton Centre, Lower Lane, Fazakerley, Liverpool, L9 7LJ. 0151 529 5965. selina.johnson@thewaltoncentre.nhs.uk

S. Johnson, C. Haslam, M. Draper, P. Eldridge, T. Nurmikko, M. Sharma, T. Varma.
The Walton Centre for Neurology and Neurosurgery, Liverpool, UK and the Pain Research Institute, Liverpool, UK.

Background and Aim

The primary aim of SCS is to reduce the sensory experience of pain. The British Pain Society guidelines for SCS in chronic pain recommend that such treatment is delivered within the context of full understanding of the impact that pain has upon the patient and the extent to which pain interferes with their life (British Pain Society Guidelines 2006). Although SCS has been demonstrated to produce a reduction in pain, the effects of SCS on the domains of physical performance have rarely been reported. Therefore this study's primary aim was to assess whether physical functioning (as measured by physical performance measures) improves following SCS. The study's secondary aim was to establish whether changes in physical performance correlate with the changes in the patients' report of pain and does this correlate with function.

Method

A case series of 32 consecutive patients who had permanent SCS between June 2004 and October 2007 were reviewed. Physical performance measures were performed at one and six months post implantation. These comprised of: five minute walk test, one minute stair climb, arm endurance test, sit-stand and nine-hole peg test. The measures were selected according to the patients' presenting pain complaint and the data analysed using SPSS statistical software.

Results

8 patients had upper limb pain and 24 had lower limb pain. 28 patients to date have completed measures at 6 months and 5 are awaiting 6 months review. For all tests except upper limb endurance statistically significant improvement was demonstrated. Improvement was evident when data was compared from baseline to 1 month, from baseline to 6 months and between 1 month and 6 months. Pain reports from baseline to 1 month and baseline to 6 month demonstrate statistically significant reductions. Outcome measures with an upper limb and lower limb bias demonstrate change irrespective of the region of pain. The majority of patients at baseline achieved maximal possible score for the upper limb endurance test.

Conclusions

Overall it appears that SCS does address the physical aspects of chronic pain. Further data is being collected as part of an ongoing study. Upper limb endurance test was not utilised past baseline as the majority of patients would have been unable to improve their score for this test.

Demographic characteristics of neuropathic pain patients diagnosed with failed back surgery syndrome

Presenting Author: S. Thomson

Pain Clinic

Basildon and Thurrock University Hospitals

Basildon RN163EU

Work Tel: 01268 592 268

Email: Simon.Thomson@btuh.nhs.uk

Authors: S. Thomson¹, L. Jacques²

¹Pain Clinic, Basildon and Thurrock University Hospitals, Basildon, UK

²Department of Neurosurgery, Montreal Neurological Institute and Hospital, Montreal, Canada

Background and aims:

Neuropathic pain (NeuP) commonly affects the back and legs and is associated with severe disability and psychological illness. It is unclear how patients with predominantly NeuP due to failed back surgery syndrome (FBSS) compare to patients with other chronic pain conditions. The current study presents data on characteristics associated with FBSS patients compared to those with complex regional pain syndrome, rheumatoid and osteoarthritis, and fibromyalgia.

Methods:

The PROCESS trial randomized 100 patients from 12 centers to spinal cord stimulation (SCS, n=52) plus conventional medical management (CMM) or CMM alone (n=48). Patient parameters collected at baseline included age, sex, previous surgeries, time since last surgery, employment, primary source of pain, severity of back and leg pain (VAS), health-related quality of life (HRQoL), level of disability, medication and non-drug therapies. Reference population data was drawn from the literature.

Results:

At baseline, patients in the PROCESS Study had a similar age and gender profile compared to other conditions. Back pain severity was similar across conditions, but PROCESS patients suffered from greater leg pain and had lower HRQoL. PROCESS patients commonly took opioids, while antidepressants and NSAIDs were more often used for other conditions. Prior to baseline, 87% of patients had tried at least 4 different treatment modalities.

Conclusions:

Patients suffering from chronic pain of neuropathic origin following FBSS, often fail to obtain adequate relief with conventional therapies and suffer greater pain compared to patients with other chronic pain conditions. Alternative treatments such as SCS should be considered earlier in the treatment continuum.

5.

Audit of subcutaneous electrical nerve stimulation using precision (Advance Bionics) technology.

Dr. A. Zuberi, Dr. P. Murphy, Dr. C. Power, Dr. R. Walsh, Ms. A. Caffrey,
Ms B.Brennan, Mr. R Perez, Dr. D. O'Keeffe
Department of Pain Management, St. Vincent's University Hospital, Elm Park, Dublin 4, / AMNCH,
Tallaght Dublin 24.

AIM / BACKGROUND:

Aim for this audit was:

- To assess the efficacy of subcutaneous electric nerve stimulation as a treatment for chronic pain management.
- To assess the use of Advance Bionics (Precision) technology on 50 patients.

METHODS:

All the 50 patients with Advance Bionics (Precision) device implanted in the last two years are questioned retrospectively about, **1)** Mean duration of SENS implant **2)** Site of implant **3)** Mean pain relief **4)** Patients satisfaction **5)** Mean frequency of battery recharging, **6)** Mean time taken to recharge battery **7)** Any distress during battery recharging process **8)** Preference for any other technology available.

RESULTS:- 50 Patients:	17 Males 33 Females
Mean Age:	45.52 years
Mean Duration of SENS Implant:	13.14 months
Site of Implant: Lumbosacral (46%)	9 Occipital & Cervical (18%), 23 8 Interscapular (16%), 5 Post surgical scar pain (10%), 4 Visceral pain (8%), 4 Others (8%)
Mean Pain Relief:	3 patients, No pain relief, Mean pain relief 62.60%, 22% not satisfied, 78% satisfied with pain relief
Mean Frequency of Battery Recharging:	8.4 days (ranging from daily recharging to once a month)
Mean Time to Recharge Battery:	3.07 hours (ranging from 1 hour to 6 hours)
Any Distress During Battery Recharging Process:	62% Comfortable and happy with recharging process & 38% not comfortable during the procedure.
Preference:	77.6% happy with current technology,22.4% unhappy with it.

CONCLUSION: SENS is an effective treatment for chronic neuropathic pain in carefully selected patients. In this study 78% of patients were satisfied with their pain relief & the Mean pain reduction by Visual Analogue Score reduced by (64.89%)

6.

SENS in the treatment of chronic pain

Dr M J Hanssmann, PhD m.u.hanssmann@web.de

Dr P Murphy, MD, MRCPI, FCARCSI, FFPMANZCA

Dr D O’Keeffe, MD, FCARCSI

St. Vincent’s University Hospital, Department of Anaesthesia, Intensive Care and Pain Medicine, Elm Park, Dublin 4, Ireland

Introduction / Background

Subcutaneous Electrical Nerve Stimulation (SENS) utilizing Spinal Cord Stimulator electrodes were used to control a variety of peripheral neuropathic conditions. A permanent implant modulates nerve conduction subcutaneously by the patient on demand.

Method

A retrospective review of 74 SENS-cases was performed over a four-year period in St. Vincent’s University Hospital, Dublin. A wide range of pain conditions were treated to control chronic pain including post surgical pain syndrome, hemicrania, chronic back pain, angina, and intractable migraine.

Results

The average age of the patients was 50.3 years (28-72 years) with a female/male ratio of ~2.2:1 (51/23).

Effective pain control (> 50 % pain reduction) was achieved in 67.6 % of patients.

Successful treatment was associated with significant reduction in medication utilisation.

Successful outcomes were achieved with ANS, Advance Bionics and Medtronic systems.

Complications included lead migration and infection.

Conclusion

The utilisation of Spinal Cord Stimulator (SCS) electrodes subcutaneously shows that SENS (subcutaneous electrical nerve stimulation) is an effective and sufficient tool in the management of a wide range of peripheral neuropathic pain conditions.

SENS can reduce the severity of neuropathic pain by stimulating and modulating peripheral nerves at the centre of the affected areas and helps the patient to control the pain on demand.

Improved quality of life by controlling the pain and reducing the amount of pain medication at the same time is the advantage of SENS.

7.

Pain Management Programmes: do they have a role in producing suitable SCS candidates and rescuing those who fail SCS treatment?

Presenting Author: Mark Draper, Specialist Physiotherapist in Pain and Neuromodulation, Walton Centre for Neurology & Neurosurgery, Liverpool
mark.draper@thewaltoncentre.nhs.uk

M. Draper, P. Eldridge, C. Haslam, S. Johnson, T. Nurmikko, M. Sharma, T. Varma.
The Walton Centre for Neurology and Neurosurgery, Liverpool, UK and the Pain Research Institute, Liverpool, UK.

Background and Aim

Despite exercising careful selection criteria through thorough multidisciplinary assessments, followed by optimum surgical technique, a small but significant number of patients fail spinal cord stimulation therapy (SCS). Beltrutti et al, 2004 recommend that to maximise the benefits of SCS, physical and psychological rehabilitation should be performed on a regular basis. At the Walton Centre, however, rehabilitation of this kind is offered on a case-by-case basis. It can be recommended by the neuromodulation team based on the patients' current levels of depression, coping and pain scores where stimulation is satisfactory but recovery is not. It is the purpose of this article to review a case series of patients who have undergone both SCS and a pain management programme (PMP), review the outcome of this selective referral policy and to identify if the threshold for referring into PMP requires adjusting.

Method

89 patients were identified from a data base of patients who underwent SCS implantation over a 3 year period between August 2004 and September 2007. From this group the following was identified: the incidence of referral for PMP; the reasons for referral; the different sequences of intervention (trial, implantation and PMP); the clinical reasons for next phase of treatment; diagnosis; pain region; average pain score; depression scores; 1 minute stand-ups; 5 minute walk test; self-reported function. The relative impact of PMP relative to the other interventions on pain, mood and function in each patient was interpreted and the significance of this impact was judged by a blinded experienced clinicians. Excluded from the study were 2 patients who were trialled outside of the service, 1 patient who was lost to follow-up, 2 patients who had insufficient data and 1 who discharged themselves from the PMP.

Results

The number of SCS patients referred for PMP treatment was 20 (22%). 10 underwent PMP before trial, 7 after implantation and 3 between trial and implantation. Of the 14 who were included for this review it was deemed that 5 of them benefited significantly from PMP all being on the PMP pre SCS group. Of those not referred for PMP (78%) 66.6% had positive trials and 78.9% successful stimulation.

Conclusions

There is insufficient data to make any firm conclusions but it appears so far that we should continue to reserve PMP for SCS patients who are only likely to enjoy the benefits of SCS after psychological and physical preparation but think very carefully before referring those who have not adjusted well to the implant or have developed or revealed psychological barriers to recovery post-operatively.

8.

Spinal cord stimulation for chronic pain (Failed Back Surgery Syndrome)

Sabarini M.¹

¹International Spine Clinic Berlin, Berlin, Germany

Introduction: Innovative procedures such as spinal cord stimulation (SCS) offer a non-destructive and reversible interference for treatment of chronic pain. SCS is minimally invasive procedures that can be effective in cases; where other conventional therapies did not adequately relieve pain. Failed Back Surgery Syndrome (FBSS) is an indication for SCS.

Method: From 1996 to 2004 we provided SCS to 142 patients with FBSS. All patients had previously undergone spine surgery, 310 surgeries in total.

Results: In an average of 6,3 years, 142 patients were monitored. Of these patients, 70,4% reported good to very good pain relief of more than 50%; 18,3% patients reported slight pain relief; and 11,3% had no relief. Of the 142 patients, 77,5% take less or no medication. In four cases, the generator was explanted because of unsatisfactory results; in two other cases, the generator was explanted because of infection, but one case received a new generator 6 months later. System defects were observed in two cases and electrode migration was observed in two others. These problems were corrected.

Conclusions: Spinal cord stimulation is an effective alternative for the treatment of chronic pain, in cases of FBSS, compared with re-operations and destructive treatments. It is a non-destructive, reversible treatment method, and it is cost effective.

9.

High cervical spinal cord stimulation for facial pain: a retrospective case series

Presenting Author: Clair Haslam, Nurse Consultant in Pain & Neuromodulation, The Walton Centre, Lower Lane, Fazakerley, Liverpool, L9 7LJ. 0151 529 5647

Clair.Haslam@thewaltoncentre.nhs.uk

C. Haslam, M. Draper, P. Eldridge, S. Johnson, T. Nurmikko, M. Sharma, T. Varma
The Walton Centre for Neurology and Neurosurgery, Liverpool, UK and the Pain Research Institute,
Liverpool, UK.

Background and Aims

Randomised controlled trials of spinal cord stimulation (SCS) have been undertaken for failed back surgery syndrome, complex regional pain syndrome (type 1), refractory angina pectoris and chronic critical limb ischemia (British Pain Society, 2005). However, other indications are emerging through clinical practice and experience. The aim of this case series review is to analyse case reports from five patients who had high cervical SCS implanted to treat facial pain, in order to assess whether SCS is an appropriate treatment option for this group of patients.

Methods

A retrospective case series of five patients with cervical SCS for facial pain was identified for the review from the neuromodulation database. Data comprising: demographics, aetiology of facial pain, type and position of SCS electrode, paraesthesia coverage, pain relief and complications was collected from the notes.

Results

Two patients had neuropathic pain secondary to nerve injury caused by trauma, two patients had trigeminal neuropathy, and one patient had neuropathic facial pain following debulking of haemangiopericytoma and radiotherapy. Two patients continue to experience >50% pain relief and one patient experiences only 25% pain relief. Two patients experienced diminished effectiveness of SCS after several years of significant pain relief. Five electrodes were revised, two IPGs were repositioned and two were removed, two electrodes were replaced due to malfunction, and one full system was removed due to infection.

Conclusions

High cervical SCS may be an appropriate treatment option for patients with facial pain who have been refractory to conventional management. However, due to the technical difficulties of placing a high cervical electrode and the risks of electrode migration due to the relatively large range of movement in the cervical spine, a surgical plate electrode is useful in this group of patients. Although plate electrodes are thought to be more stable, migration and positioning remain an issue. In this small case series, two out of five patients reported significant long-term pain relief. These results are comparable with those reported by Green et al (2006) in seven patients with deep brain stimulation (DBS) for neuropathic cephalgia. In their case series, three out of seven patients reported >50% pain relief. However, a larger cohort of patients is required to draw reliable conclusions for SCS and DBS in this patient group and there remains the technical challenge of predicting which patients will benefit.

10.

Dorsal Column Spinal Stimulation for intractable pain following limb amputation

R van Groningen, 14 Westblock, Brodlovelane, London E1W 3EA, 02073777000 ext 3381, richardm3blue@aol.com,

John H McAuley, Richard van Groningen, Christopher R Green, Habib Ellamushi.
Dept of Neurostimulation, Bart's and The Royal London NHS Trust, Whitechapel, London E1 1BB, United Kingdom

Background and aims:

Dorsal column stimulation (DCS) by high frequency electrical pulses has been used since the early 1970's for relief of chronic intractable pain following limb amputation. The effectiveness of DCS for amputation-related pain when using modern techniques and providing ongoing after-care is reviewed by assessment of all such cases managed in the Neurostimulator Clinic at the Royal London Hospital from 1981 to 2006.

Methods:

Twelve amputation-related pain patients had quadripolar plate electrodes (Resume; Medtronic Inc., Minneapolis, USA) inserted epidurally by laminectomy over the thoracic or cervical dorsal spinal cord and connected to remotely controlled subcutaneously implanted stimulators (Itrel2, Itrel3, Synergy; Medtronic).

Results:

Lasting worthwhile benefit of initial mean magnitude 66.4% ($\pm 15.5\%$ SD) over a median period of stimulation of 11 years was achieved in 7 patients. Benefit waned in only 2 of these patients (over 2 and 19 years). Of the other 5 patients, 2 were lost to follow-up after a year having initially had benefit, 2 had no stimulation in the pain region, and 1 had spontaneous relief of pain. Continued successful stimulation often required frequent changes of stimulating electrode contacts. Revision procedures for technical problems or pain at the battery site were universally successful, apart from revision of electrode location for stimulation in the wrong area, which was successful in 2 of 5 cases.

Conclusions:

Successful DCS in many patients with amputation-related pain otherwise resistant to treatment indicates that the procedure merits continued use with further efforts to refine patient selection and technique.

11.

Early experience with PPN stimulation for a Dopa-unresponsive hypokinetic-dystonic state

Presenting author: Jeremy Rowe, Dept of Neurosurgery, Royal Hallamshire Hospital, Sheffield S10 2JF. Tel 0114 2261200. Email Jeremy.Rowe@sth.nhs.uk.

J Rowe¹, C Isaac², ID Wilkinson³, CAJ Romanowski⁴, A Khan⁵ and TZ Aziz⁶. Depts of Neurosurgery¹, Neuropsychology², Academic Radiology³, Neuroradiology⁴, Neurology⁵, Royal Hallamshire Hospital, Sheffield; and Nuffield Dept of Surgery, University of Oxford⁶.

Background and aims There has recently been increasing interest in the pedunculo-pontine nucleus (PPN) as a target for treating movement disorders. Experimentally this is based on observations that blocking GABA and activating the PPN improves hypokinesia and axial instability in the Parkinsonian primate model. We describe here our preliminary experience treating a unique patient, which offers insights into the physiology of this nucleus.

Methods: Clinical details A 27 year old male was referred with a diagnosis of generalised dystonia, but at referral it was evident that he had profound hypokinesia, albeit with dystonic posturing when he moved. The onset had occurred acutely in childhood. At referral he was wheelchair bound, with generalised muscle wasting, poor axial stability, requiring analgesics for back pain and muscle spasms in his legs. He also had laryngeal/pharyngeal involvement, with problems with oral secretions, and was barely able to phonate an affirmative or negative sound. Despite these problems, detailed neuropsychological assessment indicated good cognitive function. Scanning revealed a striking symmetrical pattern of damage to the neostriatum bilaterally, almost certainly of a metabolic origin, no cause for which has been identified. A formal trial of l-Dopa therapy was undertaken, this having no effect on his movement disorder.

Surgical details With fully informed consent and approval from the Hospital Clinical Ethics Board, PPN electrodes were inserted bilaterally. Targeting used high resolution T2 and FLAIR sequences fused to a stereotactic CT space, with superimposed diffusion tensor fractional anisotropy maps. The target was 16mm deep to the AC-PC line, 2-3mm behind the PC and 7mm lateral to the midline.

Results The most striking early change was his speech. Within two days he was articulating a range of words appropriately. His ability to manage oral secretions also improved. His dystonic pain improved, and the leg spasms stopped, his analgesics being discontinued in the first postoperative week. Axial stability improved, with him becoming able to sit independently without support. In keeping with the primate model, these effects are seen at low frequency stimulation (30-35Hz) and are less marked with higher or lower frequencies. Also in keeping with the primate model, the effects can be achieved with unilateral stimulation only.

Conclusions The selective striatal damage in this patient should decrease PPN activation, which we have attempted to reverse with stimulating electrodes. This has ameliorated a dopamine unresponsive state. This has implications for other dopamine unresponsive Parkinsonian conditions, particularly those featuring nigro-striatal degeneration.

Subthalamic nucleus (STN) stimulation in Parkinsons disease : trends in pre-operative and post-operative requirements for Levodopa.

C.O Oluigbo¹, M Narasimha², H Pall², R. D. Mitchell¹Departments of Neurosurgery¹ and Neurology², The Queen Elizabeth Hospital, Birmingham, B15 2TH, United Kingdom

Presenting Author : Mr C. Oluigbo, Department of Neurosurgery, The Queen Elizabeth Hospital, Birmingham, B15 2TH. (Tel : 07951961183, E-mail : chimaoluigbo@yahoo.com)

Senior Author : Mrs R. Mitchell, Department of Neurosurgery, The Queen Elizabeth Hospital, Birmingham, B15 2TH. (Tel : 0788182031, E-mail : rosalind.mitchell@uhb.nhs.uk)

Background and aims :

To delineate trends in pre and post-operative levodopa requirements following STN stimulation in patients with Parkinsons disease

Methods :

Case notes and clinic letters of patients who had undergone bilateral STN stimulation for PD were retrospectively analysed. Patients were followed up for 6 years. Levodopa dose equivalents of their pre-operative medications were calculated at 3 years, 2 years, 1 year and immediately pre-operatively. Post-operative levodopa requirements at 1 year, 2 years and 3 years after surgery were also determined. The mean levodopa doses for these time periods were then calculated.

Results :

12 patients were reviewed; 9 males and 3 females. The mean pre-operative levodopa requirements were 1128.7 at 3 years, 1328.3 at 2 years, 1403.4 at 1 year and 1899.5 immediately pre-operatively. Mean post-operative doses were 602.4 at 1 year, 725.3 at 2 years and 775.1 at 3 years.

Conclusions :

Levodopa requirements increased steadily in the years preceeding surgery but showed marked decrease following surgery. This postoperative decrease in levodopa requirements was maximal at the end of the first post-operative year. Levodopa requirements subsequently gradually increased after this first year at a rate similar to early pre-operative levodopa dose increments.

13.

Bilateral deep brain stimulation for primary cervical dystonia: Long term follow up in a series of ten patients

F. Cacciola, J. Osman-Farah, N Fletcher, S Alusi, A Selvan, PR Eldridge,
TRK Varma
Walton Centre for Neurology and Neurosurgery
Lower Lane, Fazakerley
Liverpool L9 7LJ

Background:

Several short term outcome studies and one long term follow up series of bilateral globus pallidus internus (GPi) deep brain stimulation (DBS) have shown it to be effective in reducing severity, disability and pain in primary cervical dystonia. It is difficult to correlate clinical characteristics and outcome due to the small number of patients reported to date. Similarly the determination of the ideal stimulation parameters is difficult and requires long term follow-up.

We report a series of ten patients, with extended follow-up periods adding information to the existing data and comparing different approaches where applicable.

Methods:

From 2002 to 2006 ten consecutive patients underwent bilateral GPi DBS for primary cervical dystonia. Toronto Western Spasmodic Torticollis Rating Scale (TWSTRS) scores were taken before electrode implantation and at follow up. The time elapsed between onset of clinical benefit and initiation of stimulation, stimulation parameters and battery life were also recorded.

Results:

All patients but one showed improvement on all three subscores of the TWSTRS. All patients who had improved would undergo the operation again indicating good patient satisfaction. The majority of stimulation used bipolar mode but with high pulse rates and voltages resulting in short average battery life. Clinical outcomes were similar to limited existing data in the literature.

Conclusion:

Bilateral GPi DBS is an effective treatment for primary cervical dystonia; however refinement of stimulator parameter settings might enhance onset of action and prolong battery life.

14.

The shared GABAminergic mechanism lends itself to treatment of dystonia in Complex Regional Pain Syndrome with spinal cord stimulation.

Presenting author: S.Kapur; Email: drsandeepkapur@hotmail.com

H. Mutagi¹, S. Kapur¹, J.H. Raphael^{1,2}

¹Department of Pain Management, Russells Hall Hospital, Dudley, DY1 2HQ, UK (Tel: 01384456111 ext 5809/ 5870)

²Faculty of Health, Birmingham City University, Birmingham, UK

Background/Aim

CRPS 1 is characterised by combinations of sensory, autonomic and occasional motor disturbances, often following limb trauma. The motor dysfunction may manifest as fixed dystonic posturing, weakness, tremor and myoclonus (1). Spinal cord stimulation (SCS) has been found useful in the treatment of motor disorders that include dystonia (2); however, despite the evidence that SCS is beneficial in CRPS 1, we found no literature describing its effects on those cases of CRPS 1 with predominant dystonic symptoms. We report on the first documented use of SCS for the management of dystonia associated with CRPS.

Methods/ Results

Case 1: A 38-year male presented with a 3 year history of bilateral upper-limb CRPS-1 with tonic flexion dystonia of the fingers causing palmar erosions. He underwent percutaneous epidural implantation of dual octrode SCS leads at C4 level. At 9 months follow-up, he continued to enjoy 80% analgesia along with slow offset (1 hour) and onset (4-10 hours) of dystonia with SCS on and off respectively. This was independent of the analgesia with SCS therapy and has enabled him to resume full-time employment.

Case 2: A 40-year male with CRPS-1 in his right leg following a biking accident presented with pain, autonomic signs and extension dystonia of the leg unresponsive to conventional measures. During a trial of SCS, with a single octopolar lead at T10 level, the dystonic symptoms and associated abnormal gait were observed repeatedly to be controlled when the stimulator was switched on by an observer without informing the patient; and yet return shortly after it was switched off. However, the patient's unrealistic expectations and psychological issues eventually resulted in abandonment of the trial.

Discussion / Conclusion

The intrathecal administration of Baclofen, a specific GABA-receptor (type B) agonist has proved beneficial in treating some CRPS patients' dystonia (1), but not their sensory or autonomic symptoms. Conversely, SCS is a proven modality in treating the sensory and autonomic symptoms of CRPS (3). Although SCS is an established treatment for motor disorders, including dystonia (2), it is not known if it has any effects upon the dystonia associated with CRPS. A recognised mechanism of SCS is GABAminergic, with an increase in spinal cord GABA levels and the reversal of these affects upon administration of the GABA antagonist bicuculline (4). Our successful use of SCS in treating dystonia associated with CRPS lends support to the hypothesis of GABA-minergic mechanisms for both the sensory and dystonic motor symptoms in CRPS.

References

1. Van Hilten, BJ, Van De Beek, WJT, Hoff JI et al. Intrathecal Baclofen for the treatment of dystonia in patients with Reflex sympathetic dystrophy. *N Eng J Med* 2000; 343:625-30
2. Waltz JM, Andreesen WH, Hunt DP. Spinal Cord Stimulation and motor disorders. *Pacing Clin Electrophysiol* 1987; 10: 180-204
3. Kemler MA, Barendse GAM, Van Kleef M et al. Spinal Cord Stimulation in patients with chronic Sympathetic Dystrophy. *N Engl J Med* 2000; 343: 618-24
4. Oakley JC, Prager JP. Spinal cord stimulation: mechanisms of action. *Spine* 2002; 27: 2574-83

15.

The Return of the Phantom: validation of a neurosurgical robot.

M. S. Eljamel, MBBCh, MD, FRCS(Ire&Ed), FRCS(NS)
Ninewells Hospital & Medical School, Dundee DD1 9SY, Scotland, UK.

Correspondence: M Sam Eljamel, Consultant Neurosurgeon
Department of Neurosurgery
Ninewells Hospital & Medical School
Dundee DD1 9SY, Scotland, UK.
Email m.s.eljamel@dundee.ac.uk
Financial Support: This project was funded by The PathFinder Grant.

Minimally invasive surgery was born out of recent advances in neuro-imaging and stereotactic technology. As a result, the scale of neurosurgical procedures will soon be so small that it will not be within the ability of the most gifted and skilled neurosurgeons of today. Hence, neurosurgical robotics is the natural evolution in this field. The aim of this study was to evaluate the performance of a new robotic system in a neurosurgical phantom, comparing it to standard frame based and frameless technology of today. In total, 19 different targets were approached by two standard stereotactic frames, the Stealth Station frameless system and the robot. The robotic system outperformed both frame-based and frameless systems in all experiments in this study. Furthermore, the robotic system had near absolute geometric accuracy, was reliable to perform the same procedure over and over without tiresomeness, variation or boredom and would be impervious to biohazards and hostile environments.

16.

Preservation and improvement of vision by dose attenuation during stereotaxic radiosurgical treatment of large skull base tumours

Michael Torrens

Gamma Knife Department, Hygeia Hospital, Athens, Greece.

Objective

Radiosurgery is often said to be contraindicated when the optic pathways and/or the brain stem are compressed. However open surgical resection is still associated with a high morbidity. We have sought to adjust planning and dosage schedules to allow Gamma Knife radiosurgery not only to avoid morbidity but sometimes to improve severe visual compromise and other neurological dysfunction.

Patients and Methods

The series consists of 21 patients with skull-base tumours near the optic pathways (meningiomas 6, pituitary adenomas 11, chordomas 4). The average volume was 9.1 cc (max 33.9 cc with diameter up to 5 cm). The techniques used to modify the dose to sensitive areas were:

1. A change of field shape by altering the number and gamma angle of incident rays,
2. Reducing the target dose adjacent to sensitive areas,
3. Fractionation (3-4 doses).

We attempted to keep the radiation dose to the optic pathway below 8 Gy. The actual dose given to the optic pathways in the whole group was:

- Mean maximum – 7.0 Gy
- Mean mean dose – 3.9 Gy
- Range – 2.2 to 13.6 Gy

The mean maximum dose to the optic apparatus in those cases with compressed chiasm and disturbed vision was 7.3 Gy.

Results

The success rate for control of the tumours by radiosurgery was 90% (19/21), similar to that for smaller targets.

There was no deterioration of visual function in any patient.

In all patients with severely compromised vision (4/4) the fields improved, examples of visual field analysis will be shown.

No severe complications were observed. Mild transient complications included trigeminal pain or numbness and unsteadiness.

Conclusion

Gamma Knife radiosurgery, using modified planning methods, is safer than generally recognized and should be employed more often as the primary treatment in preference to open microneurosurgery.

Early experience with the NexFrame stereotactic system for placement of Deep Brain Stimulation Electrodes

P Byrne, TRK Varma, PR Eldridge, F Cacciola, J Farah-Osman
The Walton Centre for Neurology and Neurosurgery, Liverpool

Introduction:

DBS (deep brain stimulation) is a recognised treatment for Parkinson's disease, dystonias, essential tremor and pain. The electrodes need to be accurately placed in the appropriate deep brain targets. Hitherto rather bulky stereotactic frames or robotic stereotactic systems have been used. A new disposable stereotactic frame has recently been introduced which is skull based and frameless called the NexFrame. We report our early experience with this system.

Methods

To date the system has been used in 9 patients all for movement disorders.

Description:

The system comprises a skull mounted single use stereotactic system, with a frameless registration based on skull mounted fiducials. CT and MR images are fused; the MR being used to identify the target and the CT scan for registration from the fiducials. Stealth system using infra-red localisation was used for planning, and for registration. Micro-electrode recordings were used.

Results:

In all cases satisfactory position of electrodes were obtained although one electrode moved in the Stim-Loc system. Advantages of the system are separating imaging and planning from time of surgery; improved patient comfort because the system can be used without head pins or bulky frame. Problems were encountered obtaining satisfactory micro-electrode recordings due to interference; the system is packaged with several small parts requiring a new system if small items are misplaced.

Conclusion:

The NexFrame has promise. It is easy to use and secures accurate positioning. Some problems remain to be solved, particularly with respect to microelectrode recording; however the disposable nature of the system means that updates to the design are easily accommodated.

18.

Difficulty in recharging a pulse generator: the first sign of infection?

Fay Garner ¹, S. Eldabe ² and R. Strachan ³

¹Clinical Nurse Specialist, ²Consultant Anaesthetist, ³Consultant Neurosurgeon

The James Cook University Hospital, Marton Road, Middlesbrough. TS4 3BW

Tel: 01642 850850

Email address: Faye.Garner@stees.nhs.uk

Introduction

The latest developments in Pulse Generator technology for spinal cord stimulation provide another option for clinicians. Where patients are using their spinal cord stimulator systems, for long periods of time and at high amplitude. The rechargeable impulse generators (IPG) can be a cost-effective solution.

Patient and Methods

A 39 year old male presented to the Pain Clinic, with low back pain and referred left leg pain in a broadly L4/5 dermatomal distribution, previous surgery included L5/S1 discectomy and decompression and a two level, posterior lumbar interbody fusion, at L4/5 L5/S1.

The patient was on large doses of Oxycontin and Gabapentin and was extremely sedated. He had a successful trial of Spinal Cord Stimulation, with two Octopolar electrodes in a staggered formation at T8 level. A Medtronic Restore rechargeable impulse generator was implanted. Ten months later, the patient presented with difficulty recharging his system. Where he reported being unable to successfully make contact with the battery. He gave a history of falling over and one of his crutches striking the battery area. On examination of the area, there was no abnormality seen.

One month later, an erythematous area developed over the battery area. Oral Flucloxacillin commenced. At Wound exploration a collection of pus was found around the IPG. The whole system was explanted.

Discussion:

Battery charging is through a process of induction with charge being transferred from a coil in the charger unit to a similar coil in the IPG. The distance between the 2 coils is crucial to the induction process. Medtronic recommend implanting the IPG to a depth no deeper than 1 cm below the skin and is parallel to the skin. If the IPG is too deep, recharging may be inefficient or unsuccessful.

In this case we believe that the patient's earlier fall had caused a haematoma overlying his IPG, which resulted in the recharging difficulty. Evacuation of the haematoma or aspiration at this stage may have prevented the infection from occurring.

Conclusions:

Swelling overlying a rechargeable IPG may present first as a difficulty in recharging. This should prompt further investigation of the nature of the swelling and possibly antibiotic cover if needed.

19.

Remifentanil sedation for insertion of spinal cord stimulation - a prospective case study in patient and operator satisfaction

Dr G. Baranidharan FRCA, Dr E McDonnell MBBS, FRCA

Department of Anaesthesia, Leeds Teaching Hospitals NHS Trust, L Ward, Seacroft Hospital, York Road, Leeds LS14 6UH

Background and Aims

Spinal cord stimulation (SCS) is an evidence based treatment for chronic pain that involves placement of an electrode in the epidural space using sensory stimulation guided by patient report. The procedure can be uncomfortable when done without sedation; too deep sedation makes it difficult to assess and optimise electrode position. It is important to achieve patient comfort and maintain cooperation. We have used Remifentanil, a potent mu opioid agonist, as both analgesic and sedative agent for SCS electrode placement and report on 12 patients. Remifentanil is an ultra short acting opioid, which is metabolised by non-specific plasma and tissue esterases with a context sensitive half-life of 3.2 minutes

Methods

All patients having first stage percutaneous SCS electrode placement where started on an infusion of Remifentanil at 0.2 micrograms per kilogram per minute (mcg/kg/min). Vital signs where monitored. The procedure was performed with local anaesthesia; patients where allowed 0.2 mcg/kg Remifentanil boluses when requested. No other supplementation was used. Once the electrode was advanced to an appropriate spinal level, sedation was stopped. We then waited for 3 minutes to program the stimulator. At the end of the procedure patients were asked to mark pain scores (0 = no pain 10 =worst pain) and satisfaction during the procedure (0 = awful 10 = very good) on a visual analogue scale (VAS). We recorded Wilson sedation scores, operator satisfaction (VAS) for programming (0= non cooperative 10= excellent) and adverse events (respiratory depression, de-saturation, bradycardia and nausea).

Results

12 patients were recruited (3 men and 9 women). The mean (range) age was 52.7 (36-76) years. 9 patients had a VAS <4 for pain. All the patients other than one had satisfaction scores >8. The person who had a satisfaction score of 5 complained of an unpleasant light headed feeling with even 0.05 mcg/kg/min dosage preventing us from giving the desired dose. No other sedative drug supplementation was necessary. 4 patients had drowsiness which settled with time; the rest where fully awake and oriented. Operator's satisfaction for programming was high at 8.45. Three patients had ventilatory depression that responded to stopping the infusion. Three patients experienced nausea. Seven patients had no adverse effects.

Conclusion

We found that Remifentanil worked very well for sedation and analgesia during the SCS electrode placement. We were still able to program the stimulator without affecting cooperation thus enabling us to perform this procedure with a good patient and operator satisfaction.

20. Spinal Cord Stimulation in a patient with implanted cardioverter-defibrillator

Dr A P Gulve, DPMed, FCARCSI¹, Consultant in Anaesthesia & Pain James Cook University Hospital, Middlesbrough, TS4 3BW UK. gulve@doctors.org.uk

Dr R A Swarm, MD², Dr J Chen, MD³ ²Dept. of Anesthesiology & Pain Management, ³Division of Electrophysiology, Washington University School of Medicine, St. Louis, USA

Introduction

Post-laminectomy radicular pain syndrome is a common indication for spinal cord stimulation. The presence of an automated implantable cardioverter-defibrillator (AICD) or cardiac pacemaker has been considered a relative contraindication to spinal cord stimulation (SCS). We report the successful use of SCS in a patient with AICD.

Case Report

A 68 year-old woman presented with a history of low back pain and right lower extremity neuropathic pain of five years duration. She had undergone L3-S1 laminectomy and L4-5 posterior fusion four years ago without improvement in pain. Four years ago, the patient required Gem[®]DR 7271 AICD implantation following ventricular fibrillation due to prolonged QT interval secondary to post-viral cardiomyopathy. She suffered from burning pain, radiating from lower back to right lower extremity, in L5 dermatomal distribution. She had marked right lower extremity spasticity and stiffness. She was unable to weight bear and was wheel chair dependent. Our initial attempts at pain management with anticonvulsants, antidepressants, opioids, muscle relaxants and spinal steroid injections failed to relieve pain.

After successful trial of SCS, a permanent SCS system was implanted. Both during SCS trial and subsequent implantation, the following steps were taken to safeguard against possible SCS and AICD interference. The defibrillator was turned off to avoid inadvertent shock. Continuous monitoring of the patient and defibrillator function was performed. A Pisces Z Quad[®]3890 lead was inserted with tip at the upper border of T8 vertebra. This was connected to Itrel[®]3 (Medtronic Inc., Minneapolis, USA) pulse generator, set to deliver, amplitude of 2.9V at 50 Hz frequency and pulse width of 450 μ s. The AICD was tested for possible interference over a range of various SCS parameters (frequency, pulse width and amplitude). After implant, the SCS patient control device was set to be within the tested parameters.

The patient reported significant relief of pain and muscle spasm with SCS, and tapered analgesic and anti-spastic medications. Both from patient-report and review of AICD event log, there has been no SCS interference with the AICD function.

Discussion

Combined use of implantable devices poses the risk of electromagnetic interference. This interference could cause inappropriate delivery of AICD shocks¹. SCS artefacts might mask ventricular arrhythmias, resulting in inappropriate inhibition of AICD. AICD shock might change SCS parameters. To minimise interference, only bi- or multi-polar devices with compact electrode spacing should be used. The sensing leads of AICD and stimulator should be spatially separated as far as possible. AICD should be set at the lowest sensitivity. In this case report, we discuss the precautions needed during simultaneous use of SCS & AICD.

Conclusion

We report safe and successful use of SCS for radicular pain in a patient with AICD. There may be a future for combinations of implantable devices in humans. However technical, medical, ethical and medicolegal issues regarding this are still unclear.

Reference1. Anderson C et al. Management of spinal cord stimulators in patients with implantable cardioverter-defibrillators. *Neuromodulation*; 2002, 5(3):133-136

21.

Resolution of sexual dysfunction following implantation of a SCS in a patient with failed back surgery syndrome.

Basu S B¹, Dale M T²

¹Consultant Neurosurgeon, and ²Consultant Anaesthetist, QMC, Nottingham, UK

Correspondence to: Dr M T Dale, Department of Anaesthesia, QMC, NG7 2UH.

Tel: 0115 924 9924. E-mail: mark.t.dale@talk21.com

Case Report

A 54 year old male with a history of sexual dysfunction underwent implantation of a spinal cord stimulator for chronic back and leg pain in 2006.

He was a life-long heavy smoker, but no other significant history was reported.

He had a discectomy in 2002 for right sided L5 / S1 'sciatica', but soon after developed severe right leg pain and fasciculations, and decreased sensation in his left leg. An MRI scan was negative, and nerve conduction tests showed a bilateral S1 radiculopathy and left L5 radiculopathy. In 2003 he underwent L4–S1 decompression. Post-operative records detailed dysuria, painful erection, and painful and premature ejaculation. There was no prior history of urological symptoms and no neurological deficits were noted. A urine culture grew coliforms and following treatment with antibiotics his urological symptoms improved.

Pain clinic records from 2004 noted similar leg complaints, recurrent urinary tract infections, chest pain, palpitations and shortness of breath on exertion. Following a trial of SCS in 2005, a history of dysuria, painful ejaculation and incomplete erection was noted. Medications included gabapentin, morphine and amitriptyline.

He had a SCS implanted in 2006 ('Resume' electrode on right T8-T10, 'Irel 3', initial settings 210 µsec, 60 Hz, 1.0 V, c +, 0 - -, 2 - -).

Post-operatively VAS pain scores decreased to 0, and all medications were stopped.

Symptoms of sexual dysfunction remained. Voltage was increased to 3.1 V, following which his sexual and urological dysfunction resolved.

He is presently being investigated for chest pain and paraesthesia of his fingers.

Discussion

There are numerous causes of urological dysfunction which could be relevant in this patient. Erection and ejaculation depend on integrated smooth muscle, vascular, neural (sympathetic via T11-L2 for ejaculation, parasympathetic via S2-4 for erection, and penile and pudendal nerves entering at S2-4), endocrine (including noradrenaline and nitric oxide), and psychological factors. Relevant contributing factors regarding erectile dysfunction relate to psychological, vascular, drugs (TCA's, anticonvulsants), spinal cord injury, inflammatory, and endocrine abnormalities (eg. opioid use). Regarding painful and premature ejaculation, chronic pelvic pain syndromes, pudendal neuropathy, and loss of co-ordinated neuro-muscular function (including drug related dysfunction eg. TCA's) could be implicated. Many of these factors were ameliorated after the SCS implant. The mechanism of action of SCS is not fully understood, and probably represents a combination of factors. Relevant to this patient could include relief of chronic pain (via segmental and/ or supra-segmental effects) with concomitant psychological improvement and cessation of drug usage, autonomic modulation, improved vascular supply, and endocrine modulation.

22.

Ziconotide in neuropathic pain: an adverse event?

L. Bastiman¹, S. Eldabe²

¹Clinical Nurse Specialist, ²Consultant Anaesthetist

Pain Clinic James Cook university Hospital. Middlesbrough TS4 3BW

Linda.Bastiman@stees.nhs.uk

Introduction

Ziconotide is an intrathecally administered, non-opioid analgesia used to treat severe, chronic pain. Psychological side effects have been observed during ziconotide therapy. We describe a case where the aetiology of the psychological symptoms remains unclear

Patient and Methods

41 years old female, born with spina bifida, diagnosed with neuropathic pain in the left lower limb at L4 and L5. At the age of 18, she underwent surgery for cord detethering. She had trials of oral baclofen, gabapentin, venlafaxine, diamorphine, ketamine, nabilone, oxycontin and MST continuous have either caused side effects or have failed to provide significant pain relief. The patient had undergone an SCS trial where paraesthesia coverage proved to be impossible. In 2002, she underwent an intrathecal analgesia trial with a single bolus, which was successful in relieving her pain for over 24 hours. She was implanted with a Synchronised EL programmable pump and over the next 4 years received morphine, clonidine, bupivacaine and hydromorphone. These had been badly tolerated or failed to obtain significant pain relief. In 2006 we started her on a trial of Ziconotide and commenced at a starting dose of 0.5mcg per day. This was increased weekly by 0.5mcg in order to reach within the effective dose range which is 6-9 mcg/daily. At a daily dose of 6.2mcg pain she perceived significant improvement (30% reduction) for the first time in five years. With VAS scores dropping from 8-9/10 to 5 /10. Five months into the ziconotide trial supplies were withdrawn and the therapy was interrupted while we applied to the local PCT for approval to fund long term. Ziconotide was replaced with normal saline. Two weeks later the patient developed confusion and was hospitalised she became gradually psychotic and was sectioned under the mental health act a final diagnosis of severe depression was made and she was started on venlafaxine and olanzapine. Unfortunately her psychotic symptoms continue to date 12 weeks after cessation of ziconotide.

Conclusion

Psychotic disorder is listed as uncommon (> 1/1,000, < 1/1,00) complication of ziconotide. This patient developed a severe psychotic episode contemporaneous with the administration of ziconotide. Side effects of ziconotide are said to subside with discontinuation of therapy. In this case, the patient continues to be psychotic 12 weeks later. This case illustrates the difficulties that can be experienced with ziconotide therapy

References:

1. Staats P, Charapata S, Royal M, et al.: the safety profile of intrathecal ziconotide: a new non-opioid analgesic 19th Annual Scientific Meeting of the American Pain Society. Atlanta, USA, abstract no.839 (2000)
2. Dissanayake S, Royal M, Wallace M: incidence of adverse in patients on long-term (at least 6 months) ziconotide (abstract no.886) J Pain. 73(4), 2 Suppl.1 (2003).
3. Lyseng-Williamson K and Perry C: ziconotide. CNS Drugs 20(4), 331-38 (2006)

Relationship between quality of life, disability and pain in patients with failed back surgery syndrome

Eldabe S¹, Manca A², Kumar K³, Buchser E⁴, Taylor RS⁵

¹Department of Pain & Anaesthesia, James Cook University Hospital, Middlesbrough, UK

²Centre for Health Economics, University of York, York, United Kingdom

³Department of Neurosurgery, Regina General Hospital, Regina, Canada

⁴Pain Clinic, Morges Hospital, Morges, Switzerland

⁵Peninsula Medical School, University of Exeter, UK

Background and aims:

Neuropathic pain patients experience very low health-related quality of life (HRQoL). However, little is known about the impact of pain and functional disability on HRQoL. Research to date often uses disease-specific quality of life measures and not general or global measures such as SF-36 or EQ-5D. This research investigates the relationship between pain, disability and HRQoL based on data from a recent randomized controlled trial of neuropathic pain patients with failed back surgery syndrome (FBSS).

Methods:

The PROCESS trial randomized 100 patients from 12 centers to spinal cord stimulation (SCS, n=52) plus conventional medical management (CMM) or CMM alone (n=48). Patients' pain, functional capacity and HRQoL were assessed at baseline and at 3 and 6 months as measured by VAS, Oswestry, SF-36 and EQ-5D, respectively.

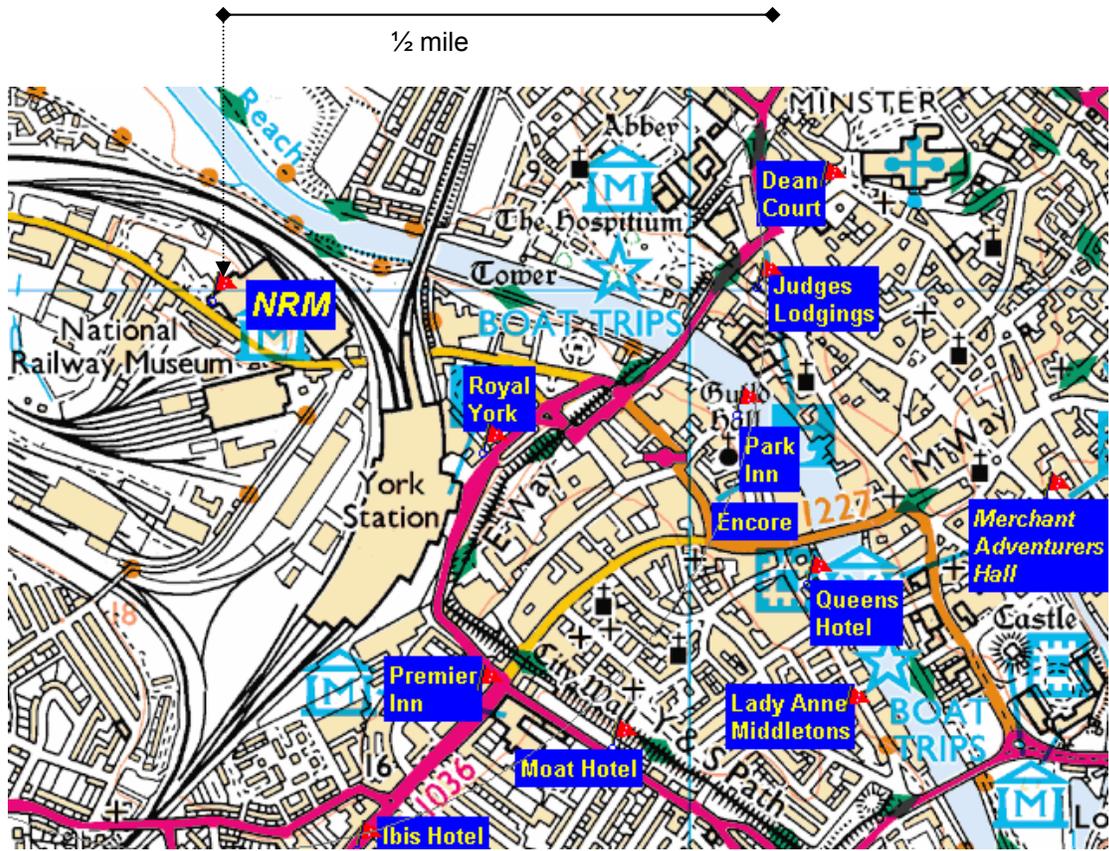
Results:

At 6 months, statistically significant differences between the unadjusted means of the two treatment groups were observed for the EQ-5D, ODI, VAS and the Physical Component Score (PCS) of the SF-36. Further, greater levels of leg and back pain were associated with lower levels of HRQoL as measured by the EQ-5D, the Mental Component Score of the SF-36, and the PCS of the SF-36. Similarly, greater functional disability, as measured by ODI, was negatively correlated with higher HRQoL as measured by EQ-5D.

Conclusions:

Pain, disability and HRQoL were highly correlated in this population of neuropathic pain patients. Evidence of the link between these types of outcome measures is needed as treatments aimed at reducing pain and disability are expected to improve HRQoL.

Map of York Hotel Locations and Merchant Adventurers Hall



The Neuromodulation Society of UK & Ireland

21 Portland Place, London W1B 1PY

www.neuromodulation.com

Tel: 0207 631 8894

Fax: 0207 631 4352

Email: neuromodulation@aagbi.org