

1. **Features and Natural History of Ulnar Neuropathy at the Elbow: An Audit and Questionnaire Survey.** ¹Robyn Brown, ²Simon Freilich, ²Tom Tidswell, ¹Marsha Y Morgan (¹UCL Institute for Liver & Digestive Health, Royal Free Campus, University College London Medical School and ²Department of Neurophysiology, Royal Free Hospital, Royal Free London NHS Foundation Trust, London, UK).

Introduction: The natural history of ulnar neuropathy at the elbow (UNE) is unclear. Acquisition of this information is important as it will inform decisions in relation to treatment which will, in turn, impinge on outcome.

Methods: All patients attending the Department of Neurophysiology at the Royal Free Hospital, London, between 1 June 2011 and 30 April 2012 in whom an EMG/NCS diagnosis of UNE was made were identified from departmental/hospital databases. Information on demography, potential risk factors, severity of the nerve injury, neurological co-morbidities and outcome were obtained, where possible, from hospital records and EMG/NCS reports. All patients were included in a questionnaire survey aimed at further identifying demographics, risk factors, mode of presentation, time delays in accessing services and outcome.

Results: A total of 215 patients were identified (98 men: 117 women; median [range] age 51 [19-93] years). Questionnaire responses were obtained from 45 (19 males: 27 women; age 51 [26-71]; response rate 21%). The responders were demographically and clinically representative of the entire cohort. The key findings were: In 7% the UNE was classified, using Padua criteria, as severe; 34% as moderate; 31% as mild and 25% as very mild; women were significantly more likely to have mild disease (78% cf. 22%; $p < 0.0001$)

The prevalence of additional/coexisting neuropathic conditions was high; 53% carpal tunnel syndrome; 9% cervical radiculopathy and 6% polyneuropathy; the presence of concurrent neurology was significantly higher in men than in women (89% cf. 11%; $p < 0.001$)

Delay times for referral for electrophysiological testing varied considerably from zero to 216 months

Surgical treatment was associated with symptomatic improvement in 71% of patients; support/splinting, physiotherapy and lifestyle changes were associated with improvement in 78 to 91% of patients; conservative treatment was more efficacious in those referred early.

Conclusion: The results of this survey have provided data useful for the design of clinical trials aimed at determining the optimal treatment for UNE.

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Introduction: Ulnar Neuropathy at the Elbow (UNE) is the second most prevalent entrapment neuropathy of the upper limb. The efficacy of surgical treatment, when indicated, is widely acknowledged (1). However, there is little or no evidence regarding the efficacy of conservative measures for the management of mild to moderate UNE (2). The aim of this study was to assess the efficacy of this management approach.

Methods: Patients with symptoms suggestive of UNE were identified from departmental referral letters, were appointed and underwent electrophysiological testing in line with BSCN guidelines. All patients with confirmed mild to moderate UNE, according to Padua criteria, were then randomised to receive either conservative management *viz.* elbow splinting and an advice leaflet or nothing; all were referred back to their primary referring physician. Patients were recalled after 6 weeks for review and further electrophysiological testing. The primary outcome variable was a change in electrophysiological data.

Results: Thirty-seven patients with suspected UNE were identified from referrals between 1 February 2013 and 27 May 2013. Nine did not attend; 16 were excluded because they did not have UNE on testing; three refused consent. The remaining nine patients completed the trial. Six patients were randomized to elbow splinting and advice; four (66%) were compliant with splinting while all were compliant with advice. Electrophysiological improvement was seen in five (83%). Three patients were assigned to usual care; none showed spontaneous electrophysiological recovery.

Conclusion: Significant difficulties were encountered in recruitment, compliance, recall and the repeatability of neurophysiological testing which limited the number of patients included in the trial and hence the conclusions that can be drawn. Referrals direct from specialist clinics would optimise patient recruitment and allow completion of the trial.

1. Caliandro P, La Torre G, Padua R, Giannini F, Padua L. Treatment for ulnar neuropathy at the elbow. *Cochrane Database Syst Rev.* 2012 Jul 11;7:CD006839.

2. Caliandro P, La Torre G, Padua R, Giannini F, Padua L. Treatment for ulnar neuropathy at the elbow. *Cochrane Database Syst Rev.* 2011 Feb 16;(2):CD006839.

2. **A Randomised Controlled Trial of Conservative Management of Mild to Moderate Ulnar Neuropathy At The Elbow.**

3. **Audit of Reporting EEG Normality or Abnormality by Clinical Physiologists.** K. Jothi, J.D.P. Bland and Z.

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Traditionally EEGs are reported by consultants in clinical neurophysiology. A retrospective audit was carried out between 1st of September to 31st of October 2012, to compare EEG interpretation by clinical physiologists (CP) with the final reports written by the consultants (NP). 7 senior CP with various levels of experience independently wrote their opinion of the normality of the EEG on an audit sheet following completion of factual reports. Two consultant neurophysiologists (CN) with diverse subspecialty interests noted whether they agreed or disagreed with the CP. 165 EEGs (134 routine, 30 partial sleep deprived and melatonin assisted and 1 activation) age ranges from 13 days to 98 years (mean 33 years) were included. Sixty-nine recordings (41.8%) were declared normal, 48(29%) abnormal and 48(29%) uncertain by CP. 93(56%) were reported normal and seventy two (44%) abnormal by NP. Of 69 EEGs reported as normal by CP, 6 were reported as abnormal by NP. Of 48 EEGs classified as 'uncertain' by CP, 50% were normal and 50% abnormal on final report. The commonest cause for disagreement between CP and NP was focal slow and sharp components. In general, inter-rater agreement was moderate ($k = 0.48$) for normal and slight ($k = 0.12$) for abnormality.

4. Effect of Roux-en-Y Gastric Bypass Bariatric Surgery on Diabetic Peripheral Neuropathy. A. Nicotra¹, L.L. Chuah², N. Khalil¹, N. Baqai², C. Graham², A.D. Miras² and C.W. le Roux^{2,3} (¹Department of Clinical Neurophysiology, Charing Cross Hospital, Imperial College Healthcare NHS Trust, London, UK, ²Imperial Weight Centre, Imperial College London, London, UK ³Department of Experimental Pathology, UCD Conway Institute, University College Dublin, Ireland).

Roux-en-Y gastric bypass (RYGB) bariatric surgery improves glycaemic control in obese patients with Type 2 diabetes mellitus (T2DM). However, its effect on diabetic peripheral neuropathy has not been studied before.

We prospectively investigated the impact of RYGB on peripheral neuropathy in 35 obese patients with T2DM (Mean age: 49 years; disease duration: 11 years; BMI: 45). Preoperatively and 1 year after surgery participants underwent nerve conduction studies (NCS) and Thermal Threshold Testing (TTT).

At 1-year post surgery, RYGB achieved significant ($p < 0.001$) reduction in BMI. NCS parameters did not change significantly. TTT showed worsening ($p < 0.001$) of LL cold and warm perception threshold.

Our preliminary results suggest that RYGB does not cause detrimental effects on large fiber function. It remains unclear whether a small

fiber dysfunction could be a complication of RYGB 1 year postoperatively.

5. The Utility of Evoked Potential for the Diagnosis of Hepatic Encephalopathy —It's All in the Processing. ¹M. Rayan, ²C. W. Jenkins, ²I. M. Head, ¹R. Bayford and ²M. Y. Morgan. (¹Department of Natural Sciences, Middlesex University, London, ²UCL Institute for Liver & Digestive Health, Royal Free Campus, University College London Medical School, London, UK).

Introduction: Various EP paradigms have been utilized for the diagnosis of hepatic encephalopathy (HE) but, with the exception of the cognitive P300, the results have been inconsistent and hence the techniques are not generally utilized. In previous studies signal analysis was confined to measurements in the time-domain. The aim of this study was to apply frequency-domain processing of EPs in patients with cirrhosis in relation to their neuropsychiatric status

Methods: Seventy patients with cirrhosis (47 men: 23 women; mean age 55.1 [37–78] years) were classified, using clinical, psychometric and EEG criteria as: unimpaired ($n=27$; 38.6%) or as having minimal ($n=13$; 18.6%) or overt ($n=30$; 42.6%) HE. Forty-eight healthy subjects (25 men: 23 women; mean [range] age 39.8 [22–68] years) served as controls. Visual (VEPs), brainstem auditory (BAEPs) somatosensory (SSEPs) and P300 cognitive auditory EPs were recorded under standardized conditions, in a single sitting. EP signals were processed using Power Spectral Density Estimates (PSD).

Results: Conventional signal processing identified significant differences in EPs between controls and patients but few if any significant differences in the patient subgroup. In contrast frequency domain processing better differentiated the patient subgroups (Table 1)

Conclusion: Frequency-domain analysis of EPs should be used to compliment time-domain analysis in patients with HE.

6. Comparison of Video Quality- Home VT vs Inpatient Telemetry. S. Biswas, R Luz and F. Brunnhuber. (King's College Hospital, London, UK).

We retrospectively compared the quality of Home Video Telemetry (HVT) with Inpatient Telemetry, considering IP Telemetry (IPT) as gold standard, to evaluate our current attended Home VT practice, which has been modified over the years, from 2005-2012. A previous study was conducted in 2008 using the Test-Re-Test design on 5 paediatric patients.

Patients ($n=28$) referred for diagnostic or presurgical evaluation were included in each group.

Data were collected from IP and HVT referral spreadsheets, King's ePR and videos were reviewed.

Consensus scoring, by 2 scorers were carried out of the events only. Clusters of events were considered as one event.

Variables compared included- visibility of body part of interest; visibility of eyes; time of event; lighting; contrast; sound quality; quality of picture when amplified to 200%

Data were quantified and statistical evaluation carried out using Shapiro-Wilk Test and Chi-square Tests. P-value of ≤ 0.05 was considered statistically significant.

Results: Significant differences were demonstrated in- Lighting and Contrast distributions between the two groups (Home VT performed better in both)

Quality of Picture When Amplified was slightly better on the HVT group.

Conclusion- HVT is not inferior to IPT; in fact it surpasses IPT in certain aspects like lighting and contrast.

7. **Sensory Ganglionopathy and the Blink Reflex: Characterising the Electrophysiological Findings. T. Alam¹, AStJE. Barker¹, M. Hadjivassiliou² and D.G. Rao¹. (¹Department of Neurophysiology ²Department of Neurology, Royal Hallamshire Hospital, Sheffield, UK).**

Sensory ganglionopathy (SG) is characterised by asymmetrical sensory fibre degeneration with pathological involvement at the level of the dorsal root ganglion. We interrogated the Neurophysiology department database looking for patients diagnosed with SG in whom the blink reflex was also performed in order to determine the electrophysiological features of trigeminal ganglion involvement.

21 patients were identified as having been diagnosed with SG. 3 patients were excluded due to not fulfilling proposed diagnostic criteria or the presence of confounding pathology. Blink reflex abnormalities were seen in 6 of 18 patients. 1 patient had unrecordable components of the blink reflex and 1 patient showing prolonged R1 and R2 latency. The remaining 4 patients showed prolonged R2 latency only.

Abnormalities of the blink reflex are seen in the context of SG, a finding which is consistent with the patchy nature of the disease. However, although prolonged R2 latency is not uncommon, prolongation of R1 latency or complete abolition of the response is not usual, even in patients with unrecordable sensory responses from the limbs. We wonder if this is representative of a varying degree of vulnerability of different pathways involved in the generation of the blink reflex.

8. **Somatosensory Evoked Potentials Can Be Reliably Recorded Following Moderate Hypothermia Post Cardiac Arrest. N. Kane,**

Agyepong Oware and Philip Blackwell. (Department of Clinical Neurophysiology, University Hospitals Bristol, UK).

Bilateral absence of the N20 somatosensory evoked potentials (SSEPs) reliably assist in accurately predicting poor outcome in comatose patients after cardiopulmonary resuscitation for cardiac arrest (CA), and have been accepted into the AAN Guidelines for outcome prediction.¹ However, the studies were largely carried out before the widespread introduction of therapeutic hypothermia (TH) and concern has recently been raised that this may alter their predictive value, following report of a patient with bilateral absent N20 responses who survived CA.² We report 10 adult patients who underwent median SSEPs recordings following reversal of moderate TH for treatment of CA (32-34 degrees Celsius); in 4 patients bilateral responses were present and 3 patients survived, whilst 6 had bilaterally absent N20 responses and all died. Other than an isoelectric trace EEG features did not add useful prognostic information. Provided patients have been re-warmed SSEPs can be recorded and appear to remain reliable in outcome prediction after CA in this small sample.

1. Wijdicks E et al Neurology 2006; 67: 203-210.

2. Leithner C et al. Neurology 2010; 74:965-969.

9. **Diagnosis of Carpal Tunnel Syndrome Using a Web-Based Questionnaire. J. D. P. Bland¹, P. Weller² and S. Rudolf³. (¹East Kent Hospitals University NHS Trust, ²City University, London and ³University of Manchester, UK).**

The diagnosis of CTS is generally held to be clinical, supported by nerve conduction or imaging studies. We explored the ability of a patient completed questionnaire on a website to predict whether nerve conduction studies would reveal abnormalities consistent with CTS in patients referred to the Canterbury neurophysiology department for suspected CTS between April 2011 and August 2013. All patients referred for testing were invited to visit the website before their appointment. Of 4916 new cases 2655 (54%) successfully completed an online questionnaire. Of patients evaluated by the website as having a $< 20\%$ chance of CTS 81% had normal NCS and 7% only minor nerve conduction abnormalities. Only 3% proved to have CTS which would be immediately considered for surgery. This group of patients constituted 26% of all patients who completed the web questionnaire. Conversely, of patients evaluated by the website as having a $> 70\%$ chance of CTS (26% of referrals), 86% were confirmed on NCS. Not only is the web-based questionnaire able to identify groups of patients with high and low probabilities of CTS without medical intervention, there is also a significant

positive correlation between the web-evaluated probability of CTS and the severity of nerve conduction abnormalities ($p < 0.0001$, $r = 0.3$).

10. Clinical Manifestations of Leprous Neuropathy: A Study of Two Cases. D. P. Breen¹, J. Deeb¹, U. Mahadeva², D. N. Lockwood³ and A. Radunovic¹. (¹Essex Centre for Neurological Sciences, Queen's Hospital, Romford, ²Department of Histopathology, St Thomas' Hospital, London and ³Hospital for Tropical Diseases, University College London, London, UK).

Whilst leprosy remains a common disease worldwide, only 129 cases were reported in England and Wales between 2001 and 2010.¹ This poses a diagnostic challenge for clinicians who may never have seen a case before.

Alongside a literature review, we will present two cases of leprosy neuropathy to highlight different ways in which *Mycobacterium leprae* can damage nerves:

Case 1 – 75 year-old man of Indian origin presented with clinical and electrophysiological evidence of mononeuritis multiplex (particularly affecting his thickened ulnar nerves). Biopsy of skin lesions revealed non-necrotising epithelioid granulomas in the dermis, extending into subcutaneous fat and seen within damaged nerves. Acid-fast bacilli were also identified within the nerves.

Case 2 – 52 year-old lady presented several years earlier with characteristic leprosy skin lesions and was commenced on antimicrobial treatment. She had now developed paraesthesia affecting the hands and feet. Nerve conduction studies revealed peripheral neuropathy of axonal type and bilateral median neuropathies (having been normal at the time of diagnosis).

References

Public Health England. Memorandum on leprosy 2012 on behalf of the Panel of Leprosy Opinion. London: Public Health England. May 2013.

11. An Investigation of Language, Auditory Processing and Decoding Skills in Children with Rolandic Epilepsy and their Siblings. H. Cockerill, A. Smith and D. Pal (Department of Clinical Neuroscience, Kings College, London. UK)

Children with Rolandic Epilepsy have impaired neurocognitive skills which often persist after clinical remittance of the disease and siblings of these children are found to be at risk of similar impairments despite the absence of epilepsy. This suggests that these deficits are not the direct result of seizure activity and supports the concept of a neurocognitive endophenotype in RE. To investigate these novel findings 20 probands and 23 epilepsy free siblings completed neuropsychological assessment of auditory processing, nonword reading and language. Auditory processing was significantly impaired in

probands and siblings however phonological nonword reading skills were unaffected. IQ was found to be normal. Both groups scored higher on performance IQ than verbal IQ (only significant in siblings) demonstrating a deficit of language compared to visuo-spatial and abstract reasoning skills. These findings support the theory for a genetic basis of epileptic activity and neuropsychological deficits in RE and clinically highlight the importance of educational support for probands as well as aiding acknowledgement of the need for similar intervention for siblings.

**Abstracts of BSCN Scientific meeting
4 October 2013**

Abstracts have not been peer-reviewed.