CORRESPONDENCE

Endovascular electroencephalography during an intracarotid amobarbital test with simultaneous recordings from 16 electrodes

Recently, Boniface and Antoun¹ reported endovascular EEG during intra-arterial amobarbital tests using an endovascular guide wire as the different electrode for bipolar recordings against an extracranial surface electrode (FZ) or an average reference. They concluded that their technique was feasible to identify intracranial epileptiform discharges and was less invasive than other intracranial EEG methods with the advantage that it was possible to move the guide wire between different intracranial sides. They also mentioned "the potential to achieve more in a bipolar format when the electrical characteristics of the electrode are optimised".

Our experience with this technique² prompted us to use a multilead catheter developed for cardiological examinations (PathfinderTM, Cardima, 47201 Lakeview Boulevard, Fremont, CA 94538, USA) with eight pairs of electrodes (electrode length 0.5 mm, interelectrode spacing 2 mm; electrode pair spacing 6 mm). This allows bipolar recording simultane-

ously from each electrode to an extracranial surface electrode (FZ) (figure). Our endovascular EEG shows pulse artefacts in some leads, which are a common problem of this technique,¹⁻³ but they were less pronounced than other recordings.¹ Using the tip of the guide wire as the different electrode, as done by previous groups,¹⁻³ has the disadvantage that recordings are achieved from a single area at one time only and that the guide wire has to be moved to record from other parts of the temporal lobe. The catheter we used, however, provides simultaneous recordings from 16 different points over a length of 72 mm of the temporal lobe. Such a technique may be of interest during pharmacological activation of epileptogenic foci with short acting barbiturates,⁴ and especially during the intracarotid amobarbital test, as this test is routinely performed during presurgical evaluation of patients with medically intractable temporal lobe epilepsy and is known to activate the epileptic focus in more than half of the patients.⁵ The clinical use of this technique awaits further evaluation in an appropriate number of patients.

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Endovascular EEG using a catheter with 16 electrodes. Bipolar recording between every single electrode and an extracranial surface electrode at FZ. (The electrodes were placed one after another over a length of 72 mm, Cat1 refers to the distal electrode at the tip of the catheter and Cat16 to the proximal electrode at the end of the line of electrodes.)

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- 1 Boniface SJ, Antoun N. Endovascular electroencephalography: the technique and its application during carotid amytal assessment. *J Neurol Neurosurg Psychiatry* 1997;62:193-5.
- 2 Stoeter P, Dieterle L, Meyer A, et al. Intracranial electroencephalographic and evoked-potential recordings from intravascular guide wires. *Am J Neuroradiol* 1995;16:1214-7.
- 3 Zeithofer J, Feldner G, Heimberger K, et al. Transarterielles EEG bei superselektiver zerebraler Angiographie. *Zeitschrift für Elektroencephalographie Elektromyographie und verwandte Gebiete* 1990;21:70-2.
- 4 Aasly J, Blom S, Silfvenius H, et al. Effects of amobarbital and methohexital on epileptic activity in mesial temporal structures in epileptic patients. An EEG study with depth electrodes. *Acta Neurol Scand* 1984;70:423-31.
- 5 Hufnagel A, Elger CE, Baker DK, et al. Activation of the epileptic focus during intracarotid amobarbital test. Electroencephalographic registration via subdural electrodes. *Electroenceph Clin Neurophysiol* 1990;75:453-63.

Standardising care and clinical trials

In his editorial on the Brain Trauma Foundation guidelines for the management of severe head injury, Kirkpatrick argues that standardisation of care is a prerequisite for the conduct of multicentre randomised trials.¹ A similar concern seems to have motivated the European Brain Injury Consortium to develop its "expert opinion" based guidelines.² This is not the case. Providing that a trial is large enough, randomisation will ensure that the intervention and control groups are identical with regard to known and unknown confounders. It is conceivable that the size of the intervention effect may vary a little depending on the other aspects of care given, but not the direction of the effect. Patients in the future will almost certainly receive different forms of care than they do today, and treatments shown to be effective today may be more or less effective in the future, but the direction of the effect will be the same. Rather than standardise care, it would be more useful to make sure that clinical trials were large enough to detect reliably moderate but clinically important treatment effects. Even though thousands of patients each year are treated with hyperventilation, barbiturates, mannitol, and steroids, clinical trials of these interventions, even in aggregate, have involved less than a few thousand patients, and for hyperventilation, mannitol, and barbiturates, existing trials comprise less than a few hundred patients. It is not surprising that the Brain Trauma Foundation was unable to define evidence based standards of care.

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- 1 Kirkpatrick PJ. On guidelines for the management of the severe head injury. *J Neurol Neurosurg Psychiatry* 1997;62:109-11.
- 2 Mass AI, Dearden M, Teasdale GM, et al, on behalf of the European Brain Injury Consortium. EBIC-Guidelines for management of severe head injury in adults. *Acta Neurochir* 1997;139:286-94.