Case Report

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Propofol, An Alternative to Amobarbital in Wadas Test in Electro corticography Based Epilepsy Surgery for Determining Dominance of Brain

Pravesh Rajbhandari, MS
Department of Neurosurgery
Annapurna Neurological Institute and Allied sciences

Pranaya Shrestha, MS
Department of Neurosurgery
Annapurna Neurological Institute and Allied sciences

Samir Acharya, MS
Department of Neurosurgery
Annapurna Neurological Institute and Allied sciences

Resha Shretha, MS
Department of Neurosurgery
Annapurna Neurological Institute and Allied sciences

Basant Pant, MD PhD
Department of Neurosurgery
Annapurna Neurological Institute and Allied sciences

Address for correspondence:
Pravesh Rajbhandari, MS
Annapurna Neurological Institute and Allied sciences
Maitighar, Kathmandu, Nepal
Email: praveshreema@gmail.com

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Amobarbital which is used rampantly for Wadas test is not available in Nepal and to find a dominant hemisphere in a functional Electro corticography (ECoG) based epilepsy surgery is a must. So we have used propfol under Digital Subtraction Angiography (DSA) for both cerebral hemisphere.

Key Words: DSA, ECoG, epilepsy surgery, propofol, wadas test

Annapurna Neurological Institute and Allied Sciences (ANIAS) has been performing ECOG based epilepsy surgery for many years with good results. The semiology of the patient should be concordant with Electro Encephalography (EEG) reading and Magnetic Resonance Imaging (MRI) findings. Determination of dominant hemisphere in terms of language and memory function is important and is done by the WADA test. This test is usually done by short-acting barbiturate (amobarbital) pushed into an internal carotid artery.[2,3,7,10,13,14] However Amobarbital is not available in Nepal, so Propofol an anesthetic agent acting on the central nervous system is used.[1,6] Its chemical structure is 2,6 diisopropil fenol, it is insoluble in water and is delivered diluting it with equal proportion with normal saline (10 mg/1 ml of solution).

Case Report

A 34-year-old lady with intractable complex partial seizure on four anti-epileptic drugs (Leveteracetam 500mg BD Lamotrigine 50mg morning 100mg night Carbamazepine 400 mg BD Clonazepam 2 mg HS) for 14 years presented with frustration. MRI finding was suggestive of left hippocampal atrophy and video EEG finding showed phase reversal in left fronto-temporal lobe. Being a left sided pathology, Wada test was deemed necessary **(Figure 1, 2)**.

She was attached to standard monitoring (ECG,SPO2,NIBP) and 2l of oxygen was given by nasal prong.

Wada test was performed from right femoral artery access with 5 F 135 degree vertebral catheter introduced first in left then right internal carotid artery. First digital substraction angiography (DSA) was performed to confirm abscence of persistent Trigeminal artery and then the patient was re-educated about the procedure with memorizing objects according to the three procedures (Seattle, Montreal and Interview procedures).[3]

She was asked to lift both upper limbs and 10 miligram of propofol mixed with same amount of normal saline was injected in left internal carotid artery and after 10 seconds her right arm went into complete paresis and then her speech arrested for two minutes which later changed to mumbling of speech for 2 minutes and it recovered slowly by 4 minutes. Then her motor and speech returned and

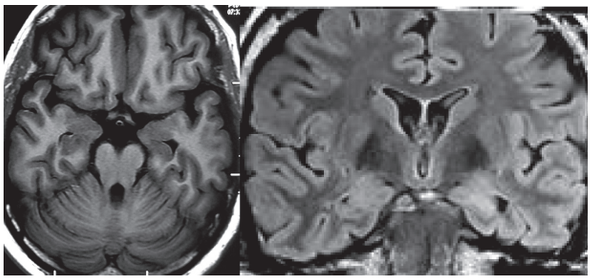

Figure 1: MRI Brain showing hippocampal atrophy

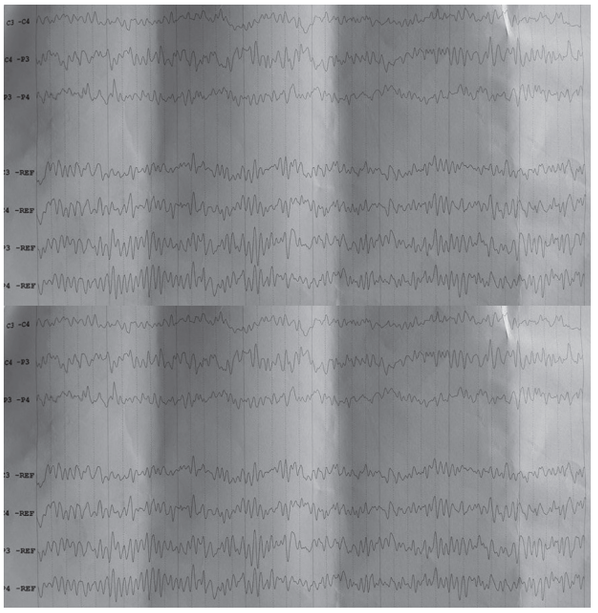

Figure 2: EEG showing epileptiform discharges

her memory test was performed by the Montreal Seattle and Interview procedure that includes naming reading and remembering objects, which suggested that she had difficulty.

The same procedure was done on the right internal carotid arterial access with left upper limb paresis no speech arrest and without memory loss and time period explained above. Under both procedure she recovered fully by 15 minutes and without any complains and complications hemodynamically stable.

The patient was then prepared for ECoG based epilepsy surgery keeping in mind that her left brain was dominant from Wada test, and left fronto-parieto-temporal craniotomy was performed with 4 electrode ECoG performed on frontal and superior middle and inferior temporal gyrus alternatively suggesting of phase reversal in middle and inferior temporal gyrus focusing more towards the tip.

Thus the ictus zone was identified and amygdala hyppocampectomy along with 3 cm of middle and inferior temporal gyrus corticotomy was performed **(Figure 3)**. The post operative recovery was uneventful. Her Glasgow

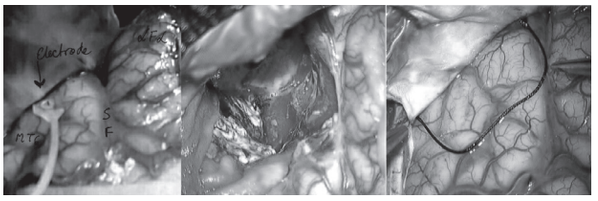

Figure 3: Per-operative images, LFL(Left Frontal Lobe), SF(Sylvian Fissure), MTG(Middle Temporal Gyrus)

coma scale was 15 with no neurological deficit along with intact speech. Her long term memory deficit is gradually improving. Her antiepileptic medication is being gradually tapered.

Discussion

Provocative or superselective Wada testing is a prerequisite while performing ECoG based Epilepsy surgery in dominant hemisphere. Propofol an alternative to Amobarbitol[4,8] is one readily available anesthetics that has been used intraarterially for intracranial testing. Its safety-margin, low incidence of side effect and effectiveness in inducing controlled transitory losses of neurological function in the perfused areas have been reported.[9,11,12] Propofol acts in CNS and is delivered as an emulsified solution of soyabean oil and glycerol microdroplets. Its effect may be mediated by inhibition of the N-methyl D-aspartate receptor modulating calcium influx presynaptically and direct activation and potentiation of the gamma-amino-butyric acid-A and glycine CNS receptors postsynaptically through chloride channels.[5] Dose as low as 10mg have been used. [9,12]

Adverse effects of intravenous propofol include cardiopulmonary dysfunction, related to dose and infusion time, pain in the injection site; and allergic reaction. Other adverse events have been reported in the literature and are related to intracarotid propofol administration as mentioned by Mikuni et al.[9]

Non invasive technique is also in the market like functional MRI(fMRI) which can abandon the ICP but still it can be used when contraindicated like in pediatrics patients, low IQ , pacemaker, perceptual impairment and inconclusive language activation mapping in fMRI.

Conclusion

As Wadas test still remains the gold standard test which still remains useful in the coming years and propfol its short half life with minimal side effect in proper dosing can be a replacement to amobarbital in our set up where its not available.

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