SNACC

SOCIETY FOR NEUROSCIENCE IN ANESTHESIOLOGY AND CRITICAL CARE

Suneeta Gollapudy, M.D Associate Professor, Director of Neuroanesthesia, Medical College of Wisconsin, Milwaukee, WI

Quiz team; Shobana Rajan, M.D; Verghese Cherian, M.D

This quiz is being published on behalf of the Education Committee of the SNACC.

1. **A 19 Y/O MALE PATIENT WITH HISTORY OF DEVELOPMENTAL DELAY AND INTRACTABLE EPILEPSY IS SCHEDULED FOR MAGNETOENCEPHALOGRAPHY (MEG). WHICH OF THE FOLLOWING STATEMENTS IS *TRUE* REGARDING ANESTHETIC MANAGEMENT:**

A. Anxiolytic, like midazolam should be given to keep him calm during the procedure .
B. Dexmedetomidine use is controversial as spike activation may occur.
C. High dose propofol interferes with signals.
D. Low dose propofol alone, is a good alternative.

Go to Q2

A. Anxiolytic, like midazolam should be given to keep him calm during the procedure.

Choosing the right anesthetic agent has been shown to reduce the failure rate from 35.5% - 5.8%. Benzodizepines should be avoided for premedication as they prolong the duration of the MEG scan and the failure rate upto 73%

Chui J, et al. The anesthetic considerations of intraoperative electrocorticography during epilepsy surgery. Anesth Analg. 2013;117:479-86

Incorrect
Try again

B. Dexmedetomidine use is controversial as spike activation may occur.

Dexmedetomidine seems to be the best drug to be used in MEG scans as there is no adverse effect on interictal activity. Dexmedetomidine infusions help with patient immobility and are not associated with any signal artifacts.
Sevoflurane use is controversial as spike activations may occur.

Chui J, et al. The anesthetic considerations of intraoperative electrocorticography during epilepsy surgery. Anesth Analg. 2013;117:479-86

Incorrect
Try again

C. High dose propofol interferes with signals.

Propofol has been shown to decrease MEG spike frequency from 79% to 36% in patients with nonlesional epilepsy where MEG is recommended, hence use of propofol may not be the best choice. High doses of propofol (>200mcg/kg/min) were associated with high frequency artifacts and interference with the identification of epileptiform signals.

Back to Q

Konig MW et al. Influence of anesthetic management on quality of magnetoencephalography scan data in pediatric patinets: a case series. Pediatr Anesth 2009;19:507-12.

Next Q

D. Low dose propofol alone is a good alternative

Low dose propofol infusion(<100 mcg/kg/min) does not produce artifacts or interfere with signal quality but has to be used with fentanyl or other adjuvant to keep the patients immobile. Hence, used alone, it is not a good alternative.

Incorrect
Try again

2. A 19Y/ MALE PATIENT WITH HISTORY OF DEVELOPMENTAL DELAY AND INTRACTABLE EPILEPSY IS SCHEDULED FOR ELECTRODE MAPPING. WHICH OF THE FOLLOWING STATEMENTS REGARDING THE INVASIVE MAPPING OF SEIZURES IS *INACCURATE*;

A. Intracranial electrodes are indicated when seizure focus cannot be localized by other tests.
B. Grid electrodes provide high amplitude EEG signal and are usually placed under MAC anesthesia.
C. The electrodes can be bulky , hence brain relaxation and hyperventilation is required.
D. Depth electrodes give information on a focal area of seizure.

Go to Q3

A. Intracranial electrodes are indicated when seizure focus cannot be localized by other tests.

This is true. Also when the tests give discordant results-like EEG showing left sided lesion when in fact it is on the right on the MRI, intracranial electrodes are indicated. They record the events with minimal interference from muscle, blood, tissue, and hence provide detailed analysis.

Chui J, et al. The anesthetic considerations of intraoperative electrocorticography during epilepsy surgery. Anesth Analg. 2013;117:479-86
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Incorrect
Try again

B. Grid electrodes provide high amplitude EEG signal and are placed under MAC anesthesia.

Grid electrodes are usually placed in direct contact with cortex and thus provide good EEG signals but their placement requires a large craniotomy, are usually long procedures and require general anesthesia

Back to Q

Next Q

C. The electrodes can be bulky , hence brain relaxation and hyperventilation is required

Brain shrinkage is required, hyperventilation is required but should be done carefully as hypocapnia can precipitate seizure.

Chui et al

Incorrect
Try again

D. Depth electrodes give information on a focal area of seizure

They provide recordings from deep structures like the amygdala and hippocampus. They are usually used in conjunction with strips and grids so that multiple sample signals are obtained to gather sufficient data to avoid false localization.

Chui et al.

Incorrect
Try again

3. **45 Y/O PATIENT IS SCHEDULED FOR EPILEPTIC FOCUS REMOVAL WITH ECOG MONITORING. IF DURING THE SURGERY THEY ARE UNABLE TO ELICIT SEIZURES ON ECOG, THE FOLLOWING OPTIONS WOULD BE USEFUL *EXCEPT*;**

A. Methohexital.
B. Propofol.
C. Alfentanyl.
D. Etomidate.

Go to Q4

A. Methohexital.

Pharmacoactivation of epileptiform discharges can be done intraoperatively or preoperatively using anesthetic agents to provide better seizure signal. Methohexital 25-50mg can be given to elicit the signal.

A. Shetty,et al., Anesthesia considerations in epilepsy surgery, International
B. Journal od Surgery (2015)1-6, http://dx.doi.org/10.1016/j.ijsu.2015.07.006

Incorrect
Try again

B. Propofol

Propofol has been used to treat refractory status epilepticus. Studies show that the gradual dosing of propofol did not show any change in spike frequency, hence is not used for eliciting seizures .

Back to Q

Chui et al, and A. Shetty .

Next Q

C. Alfentanyl.

Alfentanyl has shown to activate signals in the hippocampal and parahippocampal regions and also elicit seizures as seen on ECoG. Dosage is 50-75mcg/kg IV.

Incorrect
Try again

Ragazzo PC, Galanopoulou AS. Alfentanil-induced activation: a promising tool in the presurgical evaluation of temporal lobe epilepsy patients. Brain Res Brain Res Rev 2000;32:316-27

D. Etomidate.

Etomidate is considered safe, specific and reliable when it is used to identify the seizure focus. Usual dose is 0.1 mg/kg..

Pastor J et al. Etomidate accurately localizes the epileptic area in patients with temporal lobe epilepsy. Epilepsia 2010;51:602-9

Incorrect
Try again

4. **A 42 YEAR OLD MALE IS SCHEDULED FOR SEIZURE FOCUS RESECTION UNDER MAC ANESTHESIA. HE IS ON PHENYTOIN, WHICH HE DID NOT TAKE THIS AM. YOU DECIDE TO USE DEXMEDETOMIDINE DURING SURGERY. ALL ARE TRUE ABOUT DEXMEDETOMIDINE USE IN THIS SURGERY, *EXCEPT*:**

A. It causes sedation
B. Its pharmacokinetic profile may be altered.
C. Pharmakodynamic responses may be altered.
D. Requirement may be increased .

Go to Q5

A. It causes sedation.

Dexmedetomidine is a α-2 agonist, and acts by reducing the release of norepinephrine from the locus ceruleus. Hence, has been used during neurosurgery, where patients are required to be asleep yet easily arousable. Also, it has no/minimal effect on respiration hence patients do not develop hypercapnia.

Flexman, A et al. Enzyme-inducing Anticonvulsants Increase Plasma Clearance of Dexmedetomidine: A Pharmacokinetic and Pharmacodynamic Study. Anesthesiology 05 2014, Vol.120, 1118-1125

Incorrect
Try again

B. Its pharmacokinetic profile may be altered.

Dexmedetomidine is biotransformed in the liver by the cytochrome P450 enzyme complex. Hence its clearance is decreased in patients with liver dysfunction. Phenytoin is potent enzyme inducer, hence increases the clearance of dexmedetomidine.

Flexman, A et al. Enzyme-inducing Anticonvulsants Increase Plasma Clearance of Dexmedetomidine: A Pharmacokinetic and Pharmacodynamic Study. Anesthesiology 05 2014, Vol.120, 1118-1125

Incorrect
Try again

C. Its pharmacodynamics response may be altered.

Patients with seizure disorder may have autonomic dysregulation secondary to activation of the sympathetic nervous system and although one may hypothesize that dexmedetomidine which is a sympatholytic could have altered pharmacodynamics, sedation scores observed in patients with seizure disorder on phenytoin show no difference.

Back to Q

Flexman, A et al. Enzyme-inducing Anticonvulsants Increase Plasma Clearance of Dexmedetomidine: A Pharmacokinetic and Pharmacodynamic Study. Anesthesiology 05 2014, Vol.120, 1118-1125

Next Q

D. Requirements may be increased.

Patients taking phenytoin have a higher clearance of dexmedetomidine-upto 43%, hence require higher than normal mainatainence doses of dexmedetomidine to achieve desired level of sedation.

Flexman, A etal. Enzyme-inducing Anticonvulsants Increase Plasma Clearance of Dexmedetomidine: A Pharmacokinetic and Pharmacodynamic Study. Anesthesiology 05 2014, Vol.120, 1118-1125

Incorrect
Try again

5. 27 YEAR OLD MALE WITH A HISTORY OF INTRACTABLE SEIZURES IS SCHEDULED FOR A TEMPORAL LOBECTOMY WITH ECOG MONITORING, UNDER GENERAL ANESTHESIA. WHICH OF THE FOLLOWING, WOULD INHIBIT ECOG:

A. Sevoflurane 1.5 MAC
B. Sevoflurane 1.5 MAC + Dexmedetomidine
C. Sevoflurane 1.5 MAC + Remifentanyl 2.5mcg/kg/min
D. Sevoflurane 1.5 MAC + N2O 50%

Back to Q1

A. Sevofurane 1.5 MAC.

Sevoflurane at high concentrations is epileptogenic. The spike activity increases significantly with increasing concentration. The spike wave index (% durations of spike and wave) increases from 1.99 %+/- .96% at 1 MAC to 6% +/- 4.45% at 2 MAC

Lijima T et al. The epileptogenic properties of the volatile anesthetics sevoflurane and isoflurane in patients with epilepsy. Anesth Analg. 2000 Oct;91(4):989-95

Incorrect
Try again

B. Sevofurane 1.5 MAC + Dexmedetomidine

Sevoflurane at high concentrations is epileptogenic. Dexmedetomine does not seem to affect spike activity when used with high concentration Sevoflurane.

Oda Y et al. The effect of dexmedetomidine on electrocorticography in patients with temporal lobe epilepsy under sevoflurane anesthesia. Anesth Analg. 2007 Nov;105(5):1272-7

Incorrect
Try again

C. Sevofurane 1.5 MAC + Remifentanil

Sevoflurane at high concentrations is epileptogenic. Remifentanil increases the spike frequency in epileptogenic area while suppressing activity in normal area

WASS, CT; et al. The Effects of Remifentanil on Epileptiform Discharges during Intraoperative Electrocorticography in Patients Undergoing Epilepsy

Surgery. *Epilepsia (Series 4)*. 42, 10, 1340-1344, Oct. 2001. ISSN: 00139580.

Incorrect
Try again

D. Sevoflurane 1.5 MAC + 50% N20

Induction of nitrous oxide significantly reduces the spike frequency when used in combination with sevoflurane, hence it should be used cautiously or not used at all during epileptic surgery with ECoG monitoring.

Kurita N et al Effects of Nitrous Oxide on Spike Activity on Electrocorticogram Under Sevoflurane Anesthesia in Epileptic Patients
Journal of Neurosurgical Anesthesiology
Issue: Volume 17(4), October 2005, pp 199-202

Back to Q

End of set

GO TO Q !