

# ANESTHESIOLOGY™ 2014

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Session: L137  
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## **An Acute Ischemic Stroke Coming to Your Neuroangiography Suite**

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### **Stem Case and Key Questions Content**

It is 10:05 am on a regular operating room day for you when you get a call from the Neuroangiography (NA) fellow. He has been alerted by the stroke pager of a possible stroke case en route to the hospital with a possibility of a need for angiography and intravascular treatment. His exact words are:

“All I know at this time is that the patient is a 62 year old female who has had right hand weakness and aphasia in the shower this morning. I will definitely update you if I hear more.”

- 1) *Describe your next course of action if you do not even have a patient name or clinic number.*
- 2) *Describe strategies to ensure getting adequate patient information in a timely manner.*

At 10:27 the fellow pages you informing that the patient has arrived in the Emergency Department via “life flight” from an outside hospital. He has a patient name and clinic number and mentions that he is on his way to the ED to examine the patient. Stroke team is already in the ED evaluating the patient. You check the electronic medical record system and the only information on this patient is an outpatient visit to the ED 3 years ago for a cut finger wound, which includes a medical history of Diabetes Mellitus and hypertension. The rest of the information does not give you much.

- 3) *Explain the course of action by the Stroke team when patients arrive in ED.*
- 4) *What are the vital questions you would need answered if you can talk to the Stroke team leader?*

The fellow calls you again as he had promised and mentioned that the exact time of symptoms was 7:35 and that in the first hospital they had seen worsening symptoms and sent the patient to this hospital for further evaluation. He believes they will need to come to the angio suite but has to wait for the imaging study.

- 5) *List important findings in the CT scan that may exclude the patient from having an intravascular therapy*
- 6) *Discuss if intravenous TPA administration will be a contraindication to angiographic therapy*
- 7) *List current methods of intravascular therapy in acute stroke*

The next call from the fellow indicates that they are en route to the angio suite. You greet the patient at the door. She looks alert and anxious, on nasal cannula, has two IVs and the

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transport monitor shows the last BP taken as 182/101. As you wheel the patient into the suite you start asking questions. She has some word finding problems but answers appropriately.

8) *List important issues you would discuss with the patient in a short period of time*

9) *If the patient was aphasic what would you do?*

You decide on an intra-arterial catheter for invasive BP monitoring; however after 3 tries in the radial artery and 10 minutes you still haven't gotten the arterial line in.

10) *What other options do you have for monitoring, describe your monitoring and anesthetic plan*

11) *Discuss the hemodynamic goals during different stages of the procedure, how would this have been different if the patient had received TPA?*

You start a propofol infusion and sedation. The interventionalist places an arterial catheter and performs a diagnostic angiography which shows a thrombus in the left Middle Cerebral Artery.

12) *Why is immobility important?*

As the interventionalist extracts the thrombus he asks for a decrease in BP

13) *Is this a reasonable request and where would you keep the blood pressure*

The final angiogram is underway when the interventionalist informs you about "dye extravasation"

14) *What is the significance of this finding and how would you proceed?*

15) *Describe the expected hemodynamic changes*

The patient is unresponsive now, and the fellow informs that there is dilation of left pupil. He calls for the neurosurgery resident.

17) *What is your plan for hemodynamic control during ventriculostomy placement and ICU transport to improve brain protection?*

## **Model Discussion Content**

Speed of diagnosis and transportation in acute ischemic stroke has opened new opportunities for medical and interventional treatments. Anesthesiologists should see their role in the management of these patients far and beyond providing pain relief and airway management for general anesthesia or sedation. The goal is to deliver best care to improve outcome after ischemic stroke. The question is "What is the best care?" From the perspective of an interventionalist the best patient is one that does not move, does not complain of pain and has the exact requested BP at each point of time. However we realize that in reality patients may have large swings in their mental status as well as hemodynamic values especially after an acute ischemic stroke. The main goal in facing patients with acute ischemic stroke is to identify the patients who have salvageable brain tissue with treatment including revascularization. Time is of utmost importance, every 10 minutes can cost an average of 2 million neurons.

Neurologists are the main constituents of the stroke team in most tertiary centers with an ultimate goal of finding the best treatment in a timely manner. One of the treatments is intravascular mechanical thrombectomy or thrombolytic therapy. This treatment is currently

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being performed by interventional neurosurgeons or neuroradiologists, justifying involving these groups as soon as there is a report of a stroke case being en route or arrived to the hospital. Currently, although hard to believe, but there is little evidence on best anesthetic practice for a better outcome in ischemic stroke patients. In other words if no value has been shown, it is hard to claim the right to be involved in the treatment in a timely manner.

On the other hand there is no argument that the faster we proceed in preparing the patient for the procedure, the less neurons will undergo necrosis or apoptosis. The limited time availability can decrease the accuracy of a pre-operative evaluation and optimization of a patient entering the procedural suite. There have been instances that the age and gender are the only information relayed before the arrival of a patient to the tertiary health center, in part because of the inability of the patient to communicate with the first responders. Thus in regards of the acuity and prior health information the acute stroke patient is similar to an acute trauma patient wheeled in to the emergency department. Some tertiary centers who accept stroke patients for interventional treatment have incorporated specific communication protocols to be informed about an incoming acute stroke patient as soon as possible. Thus even if there is not much time for pre-operative evaluation, this will give us enough time for staffing assignments and preparation of the procedure room. The usual set up for an interventional case is similar to an operating room setting. Since a strict blood pressure control may be indicated during the intra-arterial treatment of these patients preparing an invasive arterial blood pressure monitoring can save valuable time.

Usually patients with acute ischemic stroke are transported to an imaging suite for a rapid scan for diagnostic confirmation and treatment rationalization. If the stroke is diagnosed as amenable for intra-arterial treatment, the patient is then transported to the interventional suite. In situations where the interventional suite is within the vicinity of the scanning facility the anesthesiologist (or the provider) would be close enough to start preoperative evaluation. In some instances where the interventional suite is not in the immediate vicinity of the imaging, it is better that the stroke team inform the anesthesia team as they move the patient. This will allow the anesthesia team to meet the patient in a timely manner and decrease wasted time.

Since the mental status and communication abilities of these patients is within a wide range, obtaining a personal medical history from the patient may or may not be possible. Reflecting to medical charts (especially if the patient has been admitted previously to the same hospital) may be helpful mostly if the hospital is equipped with electronic charting system not to waste time for ordering a paper chart. If there are any family members a quick history including any previous anesthetic complications and allergies as well as current medications is very helpful. The opposite end of the spectrum is the patient whose speech is intact and there is an opportunity to have a detailed history but the time constraint allows for only highlights of important and relevant history to be obtained.

As mentioned previously the monitoring method may include strict blood pressure control, however if the anesthesiologist determines that obtaining an invasive arterial line is delaying the procedure excessively it is better to start the case without an arterial line and attempt on getting one during the case. In such situations the arterial (usually femoral) line accessed by the interventionalist could be used intermittently if there is a need to see the invasive blood pressure.

Another main discussion issue during this PBLD is determining the appropriate anesthetic

method for this procedure. Since this procedure is possible in a variety of anesthetic depths there is still a need to determine which would benefit the patient more. Previous publications mostly by interventionalists have been retrospective. A majority of these studies lack a good description of definitions in level of anesthetic management (i.e. general, monitored anesthesia care, sedation, conscious sedation, etc.). However most of these studies show a worse outcome if the patient undergoes general anesthesia. There are no explanations of the results, just some hypothetical conclusions of general anesthesia taking longer period to accomplish or having a higher rate of deleterious hemodynamic parameters.

Currently there is a need for well-designed studies addressing the optimal anesthetic management of these patients, including not only the anesthetic method, but also the effect of anesthetics on brain protection, optimal hemodynamic parameters, rescue methods of interventional complications and monitoring methods.

## References

- 1) Avitsian R, Somal J. Anesthetic management for intra-arterial therapy in stroke. *Curr Opin Anaesthesiol.* 2012 Oct;25(5):523-32. doi: 10.1097/ACO.0b013e32835774ee.
- 2) Shaikh S. Anesthesia considerations for the patient with acute ischemic stroke. *Semin Cardiothorac Vasc Anesth* 2010; 14:62-63
- 3) Molina CA, Selim MH. General or local anesthesia during endovascular procedures: sailing quiet in the darkness or fast under a daylight storm. *Stroke* 2010; 41:2720-2721
- 4) Gupta R. Local is better than general anesthesia during endovascular acute stroke interventions. *Stroke* 2010; 41:2718-2719.
- 5) Jumaa MA, Zhang F, Ruiz-Ares G. Comparison of safety and clinical and radiographic outcomes in endovascular acute stroke therapy for proximal middle cerebral artery occlusion with intubation and general anesthesia versus the nonintubated state. *Stroke* 2010; 41:1180-1184.