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President’s Message

Diversity and Neuroanesthesiology

George A. Mashour, MD, PhD
SNACC President

I am very proud to be at the helm of an amazing organization and also humbled to be in the company of the many past presidents of SNACC who I have looked up to as luminaries. However, in reviewing the roster of SNACC’s past leaders since the first president took office in 1974, it is notable that only around 16% have been women. Although three of my six predecessors were women, it is concerning that only men comprise the current Executive Committee of SNACC officers. Further, in more than a decade of being a faculty neuroanesthesiologist, I cannot recall an under-represented minority being on the executive committee or serving as president. We could ask similar questions with a broader definition of diversity and I fear the answer would be disappointingly similar – or worse.

There is evidence across multiple academic fields and metrics that women and under-represented populations face biases and challenges that are not encountered by their white male counterparts. There is also evidence regarding the value of diversity for high-level problem solving. As such, we might ask, ‘Could the impact of SNACC be enhanced if we had more diverse perspectives? Is the impact of neuroanesthesiology limited by a lack of diversity? If so, what can we do about it?’ To address these questions, I have developed a SNACC Diversity Task Force to generate strategies that move us forward with a new focus on unmet opportunities in diversity and inclusivity. We need to ensure that SNACC and its leadership represent the breadth of our patients, disciplinary expertise and perspective required to make a true impact.

As this initiative develops, I will ask for your input, support, and involvement. The future leaders of SNACC are in agreement that this must be a priority, and one that extends beyond my tenure as president. We, as an organization, need to ensure that we are fully including and leveraging the remarkable talent in the field as well as creating a rich palette of role models for the next generations of neuroanesthesiologists.

Editor’s Corner

Reza Gorji, MD
SNACC Newsletter Editor

I hope you enjoy another edition of the SNACC newsletter. I recently came back from the IARS meeting in Washington, DC. There were many cutting-edge topics discussed at the meeting. Neuroanesthesia and critical care were well represented. The neuroanesthesiology division chairs and fellowship directors meeting occurred on May 8, 2017 in Washington, DC. There is a comprehensive report by Drs. Jeffrey Pasternak and Deepak Sharma on page four of this newsletter. Other topics included hypothermia, neuroprotection and management of perioperative neurological dysfunction. Much more of this will occur at SNACC’s 45th Annual Meeting being held in Boston, Massachusetts on October 19-20, 2017. Registration is now open for this meeting. Dr. Rafi Avitsian has put together a very nice informational page which is found on the Mobile Meeting Guide by clicking here. The topics in the program promise to educate as well as enrich the meeting attendees.

As always, thank you for your membership in SNACC and a reminder that contributions to the newsletter are always welcome.
With gratitude,
Reza Gorji, MD

It’s Time to Apply for the 2017 William L. Young Research Award!

Applications are now being accepted for the 2017 William L. Young Neuroscience Research Award

CLICK HERE for more information and to download the application.

DEADLINE IS MONDAY, JULY 17, 2017.
Voting Opens on June 26th!
For more information about the candidates, CLICK HERE.
The topic of accreditation of neuroanesthesiology fellowships has been a subject of debate and discussion for several years. Most recent efforts at accreditation involved a SNACC task force led by Dr. Andrew Kofke that pursued the possibility of accreditation by the UCNS (United Council of Neurological Sciences) in 2016. Unfortunately, the proposal was not approved by the UCNS and this led to a fresh debate of whether other options for accreditation should be pursued. Several prominent neuroanesthesiologists including past and current SNACC leaders have opined against accreditation while several others have strongly argued in favor of accreditation. In order to address this issue and to gain deeper insight into the perceptions of SNACC members and trainees, a survey was conducted by SNACC. To further the conversations on this topic and relay the survey results to the neuroanesthesiology division leaders and fellowship directors, and provide a forum for discussing various aspects of neuroanesthesia education, SNACC sent out an invitation for an in-person meeting. This SNACC-sponsored meeting was held on May 8, 2017, from 8:00-11:00 during the Annual Meeting of the International Anesthesia Research Society (IARS) at the Grand Hyatt hotel in Washington, DC. The 39 attendees consisted of Canadian and US neuroanesthesiologists. The primary goals of the meeting were to:

1. Provide an opportunity for neuroanesthesiology division chairs and program directors from different institution to meet one another and make connections.
2. Determine future plans for neuroanesthesiology fellowship training, including planning a revision of the current curricular guidelines and determining the need for accreditation and a possible path for accreditation.
3. Discuss ways to potentially increase interest in neuroanesthesiology as a subspecialty.
4. Plan for ways to improve the education and training of future neuroanesthesiologists.

Following introductions, SNACC President Dr. George Mashour provided an overview of the process that he used to develop the prior SNACC Neuroanesthesiology Curricular Guidelines published in the January 2013 issue of the Journal of Neurosurgical Anesthesiology. Dr. Mashour also discussed the need to revise the guidelines and presented his three pillar vision for neuroanesthesiology and perioperative neuroscience that consists of:

1. The perioperative care of neurosurgical patients.
2. The neuroscience foundations of anaesthesiology.
This was followed by a rich discussion between the participants. Several attendees opined that the neuroanesthesiologists should function as, and be recognized as, consultants for all perioperative issues related to the nervous system. While most anesthesiologists are able to perform the anesthetic for a straightforward neurosurgical procedure, the emphasis should be on developing expertise as opposed to simply being able to do a case. Having a strong curriculum detailing the desirable expertise of a neuroanesthesiologist is critical. The participants expressed the value of the published curricular guidelines in starting new programs in North America as well as in parts of Latin America. Multiple participants emphasized the importance of inclusion of a strong research component in curricular guidelines. The participants discussed the importance of attracting bright and talented residents to the subspecialty. While the field of anesthesiology is based on the foundation of neuroscience, it appears that not many neuroscience graduates consider this as a clinical specialty to pursue after medical school. It is critical that the medical students be exposed to anesthesiology at an early stage and efforts directed to attract the best students to anesthesiology. This is likely to result in a strong pool of potential candidates pursuing neuroanesthesiology fellowships. SNACC could play a role in this by encouraging and actively supporting resident involvement in various SNACC activities.

It was noted that many neurosurgical procedures in the US and North America are not currently staffed by neuroanesthesiologists. It is important, and in the best interest of patients, that these cases be done by physicians with appropriate training. Curricular guidelines are helpful in identifying the training needs. However, the value of allowing flexibility in the curriculum was underscored. Many participants thought that certification at the end of training in neuroanesthesiology is often desired by recruiters and hence, may be important.

It was noted that while many neuroanesthesiologists and SNACC members are doing important work in the field of neurologic outcomes of surgery, SNACC as an organization should have a bigger role and emphasis in this area. A suggestion was made to consider joint meetings with other organizations and partner with them in efforts to specifically address the neurologic outcomes of surgery such as delirium, postoperative cognitive dysfunction and anesthetic neurotoxicity.

Dr. Jeff Pasternak presented a synopsis of a survey that he did with colleagues at SNACC to pursue accreditation options for neuroanesthesiology fellowships. In the past, SNACC had considered multiple options for fellowship accreditation, including using the American College of Graduate Medical Education (ACGME). However, use of the ACGME would have limitations including non-applicability to international neuroanesthesiology fellowships, limitations on fellows also serving as instructors potentially impacting the future of many current programs due to financial restraints, and reducing flexibility in training. Non-ACGME fellowships allow the fellows to be better financially compensated than ACGME fellows, and ACGME accreditation may therefore make neuroanesthesiology fellowships less financially attractive to the applicants. Some participants shared their institutional experiences of adverse effects of ACGME accreditation on obstetric anesthesia and regional anesthesia fellowships. Dr. Kofke summarized unsuccessful attempts to utilize the UCNS and the IARS to serve as potential accrediting bodies. Dr. Kofke presented an additional paradigm modeled after the CAST System used by the Society of Neurological Surgeons (www.societyns.org/fellowships/CAST_Structure.asp) for accreditation of neurosurgical fellowships. In this paradigm, SNACC would potentially serve as the accrediting body for both US and international neuroanesthesiology fellowship programs. In essence, SNACC conducted on behalf of the SNACC Neuroanesthesia Education Special Interest Group. The detailed results of the survey will be presented at the SNACC Annual Meeting in Boston in October, 2017. Briefly, there were 423 completed surveys from attendings, fellows, and residents. Overall, 61% felt that neuroanesthesiology fellowship programs should seek some sort of accreditation with 47% of respondents feeling that accreditation would increase interest in the specialty. Respondents felt that increasing neurocritical care and monitoring training during fellowship would increase interest, and that the primary reasons for low interest in neuroanesthesia fellowship training were the perception of either limited job opportunities in private practice or lack of a special skill set acquired during neuroanesthesiology fellowship training. Among residents, there was a strong feeling that neuroanesthesiology fellowship training is helpful but not necessary, even for the care of complex neurosurgical patients.

Dr. Andy Kofke provided the group with an overview of prior work that he did with colleagues at SNACC to pursue accreditation options for neuroanesthesiology fellowships. In the past, SNACC had considered multiple options for fellowship accreditation, including using the American College of Graduate Medical Education (ACGME). However, use of the ACGME would have limitations including non-applicability to international neuroanesthesiology fellowships, limitations on fellows also serving as instructors potentially impacting the future of many current programs due to financial restraints, and reducing flexibility in training. Non-ACGME fellowships allow the fellows to be better financially compensated than ACGME fellows, and ACGME accreditation may therefore make neuroanesthesiology fellowships less financially attractive to the applicants. Some participants shared their institutional experiences of adverse effects of ACGME accreditation on obstetric anesthesia and regional anesthesia fellowships. Dr. Kofke summarized unsuccessful attempts to utilize the UCNS and the IARS to serve as potential accrediting bodies. Dr. Kofke presented an additional paradigm modeled after the CAST System used by the Society of Neurological Surgeons (www.societyns.org/fellowships/CAST_Structure.asp) for accreditation of neurosurgical fellowships. In this paradigm, SNACC would potentially serve as the accrediting body for both US and international neuroanesthesiology fellowship programs. In essence, SNACC conducted on behalf of the SNACC Neuroanesthesia Education Special Interest Group. The detailed results of the survey will be presented at the SNACC Annual Meeting in Boston in October, 2017. Briefly, there were 423 completed surveys from attendings, fellows, and residents. Overall, 61% felt that neuroanesthesiology fellowship programs should seek some sort of accreditation with 47% of respondents feeling that accreditation would increase interest in the specialty. Respondents felt that increasing neurocritical care and monitoring training during fellowship would increase interest, and that the primary reasons for low interest in neuroanesthesia fellowship training were the perception of either limited job opportunities in private practice or lack of a special skill set acquired during neuroanesthesiology fellowship training. Among residents, there was a strong feeling that neuroanesthesiology fellowship training is helpful but not necessary, even for the care of complex neurosurgical patients.

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would provide a fellowship platform in the form of revised fellowship guidelines and monitor adherence to the guidelines for programs that would pay for accreditation by SNACC. Another round of detailed discussion followed. Accreditation versus no accreditation was addressed and the majority supported some form of accreditation because they believed that this is important for the applicants and recruiters. Overall, there was interest in this CAST paradigm among the group with some members still interested in utilizing the ACGME as the accrediting body as ACGME accreditation may increase interest in neuroanesthesiology fellowship training.

The issue of incorporating neurocritical care training, including the pros and cons as well as logistic implications were discussed at length. While all participants believed that exposure to neurocritical care is essential, it was suggested that future efforts toward accreditation should focus primarily on neuroanesthesiology. It was pointed out that there is a general lack of anesthesia leadership in neurocritical care in the United States. The participants thought it was important for the neuroanesthesiologists to be able to demonstrate their value. It is important that the neurosurgeons should be made aware of our expertise and they should advocate for fellowship-trained neuroanesthesiologists. Some programs have started a neuroanesthesia rotation for neurosurgery residents and, at certain places, neuroanesthesia faculty mentor neurosurgery residents. Research collaborations with neurosurgical colleagues are also important in building a positive image of the subspecialty. While all agreed that research exposure during fellowship is important, many participants suggested that the fellowship training should also be relevant to private practice. It is important to identify the skill sets defining neuroanesthesiologist. Funding issues were discussed at length and most participants felt that institutional funding for non-ACGME options would be relatively easy.

Dr. Deepak Sharma presented his vision for a Neuroanesthesiology Master Class for neuroanesthesiology fellows. This would consist of an in-person, potentially two-day, session involving hands-on training in core neuroanesthesia skills. There would be additional online modules to be completed before/after the in-person training. The Master Class would serve as a standardized platform for providing all neuroanesthesiology fellows with a knowledge base and skill set that would be considered critical for fellowship training. Taught by experts in the field, fellows would receive instruction about core concepts as well as hands-on skills including neuromonitoring, scalp blocks, transesophageal echocardiography, ultrasound and crisis management in perioperative neurosciences. This endeavor would only be successful if there was buy-in from fellowship directors to support their fellows’ attendance, including providing the fee for the course. There was overwhelming support of this idea with some discussion of potential options, such as live on-line lecture streaming and possible attendance of residents and staff.

In conclusion, it was decided that for next steps, SNACC will plan to organize a task force to reconsider possible accreditation options for neuroanesthesiology fellowships. This will include assessing the feasibility and requirements necessary for SNACC to potentially serve as the accrediting body. SNACC will also revise the prior curricular guidelines to include Dr. Mashour’s three pillar vision of neuroanesthesiology, as well as finding other possible resources for programs that can be contained within the guidelines. SNACC will also work to develop and implement a Neuroanesthesiology Master Class, initially focused on training of fellows and the possibility and implications of opening this class to a wider audience. SNACC will also develop a platform for communication among neuroanesthesiology fellowship and program directors.

Overall, this was a very productive meeting. SNACC hopes to host similar meetings in the future.

**Meeting Attendees**

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<th>Indranil Chakraborty</th>
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<td>Umeshkumar Athiraman</td>
<td>Claudia Clavijo</td>
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<td>Eugenia Ayrian</td>
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<td>Rafi Avitsian</td>
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<td>Phil Bickler</td>
<td>Dhanesh K. Gupta</td>
<td>Lingzhong Meng</td>
<td>Lauryn Rochlen</td>
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<td>Maria Bustillo</td>
<td>Michael Hrycelak</td>
<td>David Miller</td>
<td>Kate Rosenblatt</td>
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<td>M. Dustin Boone</td>
<td>Leslie Jameson</td>
<td>Guido Musch</td>
<td>David Schreibman</td>
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<td>Deepak Sharma</td>
<td>Vinod Singh</td>
<td>M. Angele Theard</td>
<td>Barbara VandeWiele</td>
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<td>Dhanesh K. Gupta</td>
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THANK YOU TO OUR SPONSORS AND EXHIBITORS TO DATE FOR THE
SNACC 45th Annual Meeting
October 19-20, 2017
The Westin Boston Waterfront • Boston, MA

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Join these Exhibitors at the SNACC 45th Annual Meeting
Connect with 300+ leading physicians and other practitioners who care for patients with neurological disorders at SNACC’s 45th Annual Meeting. The SNACC meeting will take place on October 19-20, 2017, immediately preceding the ASA Annual Meeting in Boston, Massachusetts.

CLICK HERE for exhibit opportunities.
Neurophysiologic Changes During Intracranial Aneurysm Clipping

Howell V¹, DO¹; Collins M¹, MD¹; Tarnal V, MD², FRCA

¹ Fellow, Division of Neuroanesthesiology, University of Michigan Medical School, Ann Arbor, Michigan
² Clinical Assistant Professor, Division of Neuroanesthesiology, University of Michigan Medical School, Ann Arbor, Michigan

A 71-year-old male with six-month onset of headaches presented for permanent clipping of a nine-millimeter wide-necked left middle cerebral artery aneurysm. Past medical history was significant for hypertension, anxiety and asthma. Current medications included alprazolam, atenolol, fluticasone, formoterol, ipratropium/albuterol sulfate.

ASA standard monitors and a left radial arterial catheter were used for monitoring. Induction of general anesthesia was accomplished using propofol, fentanyl and rocuronium. Anesthesia was maintained using propofol infusion and 0.5 aged adjusted MAC of isoflurane to achieve optimal conditions for neurophysiologic monitoring (EEG and SSEP). Baseline neurophysiologic monitoring was established (Legend 1; Legend 2).

Prior to application of two temporary clips to the proximal left MCA aneurysm, burst suppression was established with propofol boluses and increased infusion rate (Legend 3). Within one minute of application of temporary clips, a 50% decrease in the right median nerve SSEP amplitude was reported. At two minutes, there was a 60% decrease in amplitude (Legend 4). Temporary clips were removed and within six minutes SSEPs returned to baseline. These changes in the right median nerve SSEP amplitude were again noted during second placement of temporary clips. The surgeon deflated the aneurysm and placed three permanent clips across the aneurysm neck. During these maneuvers, which lasted approximately thirteen minutes, right median nerve SSEP amplitude decreased to 10% of baseline (Legend 5).

The upper extremity SSEPs returned to baseline within thirteen minutes of removing the temporary clips (Legend 6). Intraoperative indocyanine green (ICG) video-angiography and Doppler flow confirmed normal blood flow through the left MCA and absent flow through the aneurysm sac. The patient was extubated and admitted to the neurosurgical intensive care unit for post-operative management. On post-operative day one, the patient developed an expressive aphasia secondary to left basal ganglia hemorrhage. These symptoms improved without intervention and the patient was discharged on post-operative day six in neurologically stable condition.

Discussion

Surgical clipping of unruptured aneurysms often involves temporary occlusion of the parent vessel to avoid intraoperative rupture and avert resultant ischemia and postoperative neurologic deficits. Placement of temporary clips is not without potential of cerebral hypoperfusion, particularly in the setting of inadequate collateral circulation. Intraoperative neurophysiologic monitoring (IONM) has been utilized in the operating room since the 1980’s as a way of monitoring for such ischemic events and for predicting postoperative deficit. Specificity of varying modalities ranges from 84-100%. Somatosensory evoked potentials (SSEP), as was used in our case, permit continuous assessment of cortical perfusion and cortical grey matter ischemia, detecting decreases in cerebral blood flow and allowing for corrective measures to be taken prior to irreversible neuronal damage. Such corrective measures may be performed by the surgeon (removing/manipulating the clip, adjusting the retractor) or by the neuroanesthesiologist (increasing the blood pressure to augment collateral flow). Other causes of cerebral ischemia during aneurysm surgery which may be detected by SSEP signal changes include: artery clip stenosis or occlusion, retraction injury, aneurysm rupture, mechanical injury to the artery or perforator, mean systemic blood pressure <50 mmHg, intraoperative vasospasm and embolic events. Historically, intra-operative changes to evoked potentials are considered significant when a 50% decrease in cortical amplitude is reached, as was seen in our case. This reduction in signal amplitude was seen with temporary clip placement and reversed with the removal of the clips. During temporary clip placement with signal reduction cerebral metabolism was reduced through initiation of burst suppression and mean arterial pressure was maintained at baseline with the use of a phenylephrine infusion. Reversibility of signal changes during unruptured aneurysm clipping heralds preserved neurologic function postoperatively, as was the case for our patient.

IONM is commonly used during neurosurgical procedures and the cause of changes in signal may be more elusive than in the case presented. A neuroanesthesiologist is perfectly situated to assist in the determination of IONM changes as they are in constant attendance of changes in anesthesia, physiology, positioning and surgical progress. The algorithm on the next page includes the possible mechanisms of intraoperative changes and ways to optimize patient and surgical factors.
Troubleshooting intra-operative changes to evoked potentials and EEG: IOM change appreciated: First communicate the change to the surgeon and rule out a technical cause.

Legend 1. Baseline SSEP of the upper extremities; peripheral, subcortical and cortical responses.

Legend 2. Post-induction EEG revealing adequate depth of anesthesia.

Legend 3. EEG demonstrating burst-suppression.

Legend 4. Right upper extremity SSEP showing 60% decrease in amplitude of cortical median nerve signal 3m 20s after temporary clip placement.

Legend 5. Right upper extremity SSEP showing 90% decrease in amplitude of cortical median nerve signal 13m after temporary clip placement.

Legend 6. Right upper extremity cortical SSEP returns to baseline 13m following temporary clip removal.

References
Beginning in January 2016, the American Board of Anesthesiology (ABA) updated the Maintenance of Certification (MOC) requirements that a Diplomate must meet within ten years of certification. Below are some frequently asked questions about MOCA 2.0.

1. What is MOCA 2.0?

MOCA stands for Maintenance of Certification for Anesthesiology. The 2.0 designates this as the second iteration of the MOC requirements for Anesthesiology. MOC is required for all 24 specialties within the American Board of Medical Specialties. Each independent board creates the specific requirements for their Diplomates within each Part. The four Parts are:

- Part 1: Professionalism and Professional Standing (PPS)
- Part 2: Lifelong Learning and Self-Assessment (LLSA)
- Part 3: Assessment of Knowledge, Judgement and Skills (KJS)
- Part 4: Improvements in Medical Practice (IMP)

The specific requirements for MOCA 2.0 can be found on the ABA website at: www.theaba.org. Differences between traditional MOCA and MOCA 2.0 are discussed below. The goal of MOCA 2.0 is to ensure that ABA Diplomates are continuously learning and demonstrating proficiency in their field in order to provide safe patient care.

2. How do I enroll in MOCA 2.0?

After receiving your primary certification in anesthesiology and/or certification in an ABA subspecialty, you will automatically be enrolled in the MOCA process. In January of each year you will need to confirm your enrollment and pay the fee ($210 for primary certification, $100 for any additional subspecialty certifications) through your ABA Portal account. You must pay this fee annually in January. Your certifications are time-limited for ten years. You will need to complete the necessary requirements within the ten-year cycle. Following completion of a ten-year cycle, a new ten-year cycle will begin again.

3. What are the changes to the CME requirements (LLSA) in Part 2?

First of all, you should make sure that the information in your ABA Portal account is accurate and reflects your current practice. Your Portal account is also how you will be able to follow your MOCA 2.0 progress. Through your ABA Portal account, you will be able to record CME credits. Some conferences, such as SNACC and ASA, will directly report your CME participation to the ABA. You should follow-up to make sure that those credits appear in your account. In MOCA 2.0, you need to document 250 Category 1 credits over your ten-year cycle. Of those 250, 20 must have the Patient Safety designation. Look for the MOCA Patient Safety designation for certain courses at conferences, or online as Patient Safety modules on the ASA Education Center website. www.asahq.org/education

4. Is there still a high-stakes written examination in MOCA 2.0?

Great news – no! The written examination has been replaced by the MOCA Minute (Part 3 KJS). The MOCA Minute is an interactive multiple choice tool that can be accessed via email, your ABA Portal, or the MOCA Minute app. You will need to complete 30 MOCA Minute questions per quarter (120 for the calendar year). Questions are focused on general anesthesiology topics, as well as subspecialty topics that you designate in your ABA Portal. The ABA has set a minimum performance standard for the MOCA Minute. Again, you can follow your progress on your ABA Portal account.

5. What is this whole Part 4 component about?

Part 4 has undergone the most significant and confusing changes in the MOCA 2.0 system. There is an expansion of project options that can be completed for Part 4 credit, which works in the Diplomates’ favor and attempts to align credit for projects that a Diplomate may already be involved with, such as Quality Improvement or Independent Study. The list of options is available on the ABA website, www.theaba.org/MOCA/MOCA-2-0-Part-4. Each activity is given a weighted point value based on time dedicated to the project. The ABA has also determined the maximum number of points from any activity that can be claimed in five years of the 10-year cycle. Twenty-five points of Part 4 activities are required for each five-year portion of the ten-year cycle, for 50 points total in the ten-year cycle.

6. What if I fail to meet any of these requirements in the given 10-year time frame?
There is some small flexibility in the system and each case will be looked at independently by the ABA Board of Directors. On the ABA website and on your Portal, you will have a designation of “Not meeting MOCA requirements” until all requirements are fulfilled. Again, keeping your ABA Portal account up to date should help to prevent any lapses.

7. This all seems so confusing! How can I keep track of what requirements I need to fulfill?

If you can’t tell, I strongly recommend keeping your ABA Portal account accurate and checking it frequently to monitor your progress. Ensuring the ABA has your correct contact information is the best way to make sure you receive any important communications from the ABA. Every year at the Annual ASA Meeting (and at some additional national meetings as well), one of the ABA Board of Directors will have a Q&A session. I always find these extremely helpful to attend! Please also feel free to contact me at rochlenl@med.umich.edu with any questions, or the ABA directly at (866) 999-7501.

About the Author: Dr. Rochlen is a Clinical Assistant Professor in the University of Michigan Department of Anesthesiology. She is an ABA Examiner, but has no involvement with the ABA Board of Directors or the MOCA development process. Dr. Rochlen just finds this topic fascinating and enjoys talking about it!
Thursday Symposia:
• Basic Science Symposium: The Basic Science of Fluid Therapy
• Ultrasound in OR and ICU Workshop
• Simulation in Neurosciences Workshop at Boston Children’s Hospital
• Clinical Science Symposium: Neuromonitoring
• Career Development Workshop
• Dinner Symposium – Perioperative Monitoring of the Brain: Assessment of Consciousness and Improving Outcomes

Friday General Session:
• Maurice Albin Keynote Lecture – Neuroregeneration: How Far Have We Gone? What Is Ahead?
• Mini-Symposium One: Brains and Machines
• Mini-Symposium Two: Perioperative Coagulation and Anticoagulation
• New Science Session – GOLIATH Enjoying a SIESTA: An Update On Anesthesia for Endovascular Treatment of Ischemic Stroke
• Plenary Session – Reading and Doing Neuroscience Research: Problem, Solution and An Insight From Augustina Otero

SNACC Panel at the ASA Meeting - The Neuroscience and Clinical Implications of the Emergence of General Anesthesia
Sunday, October 22, 2017 • 1:10 - 3:10 pm • Boston Convention Center - Room 252AB

SNACC Mobile Meeting Guide - Everything About the Meeting at snaccmmg.societyhq.com
**Answer:**

Intrinsic malignant tumors of the brain are Astrocytomas, Oligodendroglioma, Ependymomas and less frequent Gangliogliomas and Pleomorphic Xanthroastrocytomas.

Astrocytomas have the following histological grades:

- Grade I: Pilocytic Astrocytoma
- Grade II: Diffuse Astrocytoma
- Grade III: Anaplastic Astrocytoma
- Grade IV: Glioblastoma

Grade I and II are low-grade tumors while III and IV are high-grade tumors.

Oligodendrogliomas are differentiated into:

- Grade II: Well-differentiated Oligodendrogliomas
- Grade III: Anaplastic Oligodendrogliomas
- Ependymomas: Tumors that come from the ependymal cell lining the ventricular surface
- Other rare tumors: Gangliogliomas and Pleomorphic Xanthroastrocytomas