

CLINICAL CHALLENGES INTERVIEW WITH THE BRAZILIAN SOCIETY OF NEURORADIOLOGY (SBNR)

The Brazilian Society of Neuroradiology (SBNR) is the first Medical Society in the world to build a national curriculum with interventional simulation implemented. We got the opportunity to discuss and understand the rationale with the executives of the society and founders of this initiative:



Prof. Dr. Carlos Clayton Macedo de Freitas, Interventional Neuroradiologist at Hospital das Clínicas, São Paulo State University, Brazil, and Vice President of SBNR.



Prof. Dr. Michel Frudit, Interventional Neuroradiologist at Hospital São Paulo, São Paulo Federal University, Brazil, and former President of SBNR.



Prof. Dr. Francisco Mont'Alverne, Interventional Neuroradiologist, General Hospital of Fortaleza, Brazil, and former President of SBNR.

To standardize interventional neuroradiology training in Brazil, SBNR has developed and implemented a simulation-based program consisting of hands-on training, remote proctoring, and online classes. The program became available to all society fellows in 2021.

What is SBNR, what do you do? What is the vision and mission of SBNR?

C: SBNR has two basic missions: To educate and support physicians in their daily practice. We are a society linked with the Brazilian College of Radiology. All SBNR members and fellows come from three different specialties: neurosurgery, neurology, and radiology.

M: Since no other societies are focusing on interventions, SBNR represents the majority of all interventionalists. There are certain challenges between the different clinical specialties that we want to solve to ensure the best patient care. We are fighting in a good way to bring the majority of the interventionists to this society.

F: In Brazil, we have almost 270 interventional neuroradiologists, and 70% of them are certified by

SBNR. To practice interventional neuroradiology in Brazil, you must be evaluated by our society and authorized to perform an intervention.

C: In 2019 we built a new educational platform and created a proficiency-based curriculum. When developing a training program, it is important to combine theory with practical experience. Simulation is great in this context, as it enables hands-on procedural training in a safe and patient-free environment. Our program is based on three pillars: knowledge, skill, and attitude.

To develop practical skills and get the hands-on training you need access to cases. We started to implement our curriculum during the burden of the ongoing Covid-19 pandemic. Suddenly the hospitals had a high percentage of covid patients, and there was a lack of real patient cases for the traditional 'master-apprentice' training methodology within radiology. How can you implement a new curriculum without patient cases? We discussed potential solutions with Mentice Renan Cancissu (LATAM Business Manager), which resulted in us creating a remote course for different centers that was proctored online.

What did the learning environment for trainees look like in Brazil before simulation was implemented?

F: About sixteen training centers (University Teaching Hospitals) in Brazil oversaw the training of interventional neuroradiologists. We found that the procedural training volumes differed between all the training centers, and the education had a very heterogeneous structure. Not only from a pedagogical point of view, there was no homogenous theoretical program.

Furthermore, we found that the structure of interventional neuroradiology training was a global issue. We began to question ourselves: how can we implement homogeneous training in Brazil? How can we ensure that the trainee graduates with a high level of proficiency in the most essential areas of their interventional specialty?

To solve these educational challenges, we built a new curriculum with a lot of focus on hands-on skill training related to each competence. When we decided to develop a structure for the practical part of the training program, we decided to involve Virtual Patient simulation. The old training model (still the standardized global practice) was “see one, do one, teach one”. We wanted to develop a new model: “observe one, train on the simulator, then treat a patient”, with the final goal to transform the training model into “never treat a patient without having trained on the simulator”.

The focus is specifically on virtual simulation, as it enables us to get more precise metrics. It can be used to define the proficiency of a trainee and provide valuable data on when that trainee is ready to perform a real patient procedure, assessed in accordance with Entrustable Professional Activities (EPAs).

It is a challenge to determine when a trainee is ready to treat a real patient, especially since our judgment is by nature - based on our professional experience and emotions. Instead, it is important that the trainee is assessed rationally and fairly based on scientific evidence. The minimal level threshold validated and formulated to measure the trainee and to ensure high quality and proficiency of the interventional procedure is key.

Simulation helps us solve the educational challenges for fellow training and allows us to get precise metrics in terms of the development of each trainee.

C: We need to be able to measure the proficiency and knowledge of the trainee, to know when he or she is ready to perform a real procedure. From my experience, some trainees need more time to develop their skills. This provides an unfortunate burden on the trainee, the senior physicians, the team, and everyone involved in the fellowship programs. When we developed the curriculum, one of our main focuses was the assessment of proficiency. In the patient-free and safe learning environment of simulation, it is possible to quickly identify, improve, or even correct potential technical skillset limitations of the trainees.

How do you ensure that all physicians have a high supply of patients that provide a natural increase in experience and in turn ensure optimal procedural outcomes?

C: It is challenging since these areas are an active part of our function as a society. We need to analyze all centers to see how many cases each fellow has done per year. The training volume of trainees must increase, it is impossible to proficiently treat e.g., an aneurysm in the brain if you only get to treat one per year. If we add a simulator to each center, we could increase virtual patient training volumes and thus improve the level of proficiency among fellows.

M: Several centers lack a proper training program for their fellows, and we cannot certify a center under these terms. We are trying to make connections between the centers, and potentially move the fellows between them so that they get the possibility to train other procedural variances.

Simulation allows us to teach the fellows all the procedural steps, what equipment and devices are needed, and everything that is important to know before performing a real procedure on a patient.

This is a very impressive commitment from SBNR to the clinical community in Brazil. What was the defining moment that made you decide to act for change in the national educational system?

C: It all began in 2019 when we analyzed the data that we received from all sixteen training centers in Brazil (today there are twenty-two centers). When we went through the data, we discovered the educational heterogeneity that existed in all these centers. Each center taught their fellows in their own way, which meant that there were sixteen different approaches to teaching. As SBNR, we are responsible for certifying new INRs in Brazil, and the certificate is signed by the government’s minister of education.

Imagine the situation that occurred when sixteen centers, each with their own educational strategy, sent their fellows to us for certification by the end of the fellowships. The fellows were evaluated with a three-step test, and the test result and proficiency levels varied greatly since they all had received different types of training. The fellows were not to be blamed here.

In 2019 we started receiving data, and more than thirty experts in education and Interventional Neuroradiology met in Sao Paulo for discussions. In 2020 we finished the curriculum, and in 2021 we began to implement the platform.

Today we have another level of fellow training in Brazil. The twenty-two centers are now collaborating, and we have monthly meetings with all the fellows where we discuss a chosen topic. We work as one group now, which is fairer for the fellows. The platform enables us to share knowledge and new information effectively and to increase the proficiency level among the centers. As a uniformed team, it enables us to offer a higher quality of treatment to the patients and to ultimately improve the patient experience and outcome.

What has the main impact been from the implemented simulation training?

M: People have started to realize the importance of simulation as an educational tool.

F: I would say that we can divide the impact of educational changes into three parts. First, we have the cultural aspect. We are all part of the same team now and are working towards the same goal. We have realized that we are facing the same challenges, which is essential for a functioning society.

The second aspect is that we as a society can promote more equal training in Brazil. The heterogeneity is lower. It is clear that we are moving towards the same goal and are communicating in the same language in terms of training.

The third aspect is that we now can ensure a more fair evaluation of the fellows ensuring the right proficiency level to pass. By using the simulator and measuring certain metrics, we are now able to see improvements among the fellows.

It is also important to mention that not all training aspects have improved: Why is that? We are testing some hypotheses right now. We must have a program in place to ensure that the simulator is used correctly and that the learning objectives are achieved. The course supervisor is vital in this setting.

What does the future of simulation and interventions look like?

M: I believe that the use of simulation will increase a lot, together with artificial intelligence in the future. We will learn with simulation, and when we upload a case in the simulator, all the treatment possibilities will be there, because the system will have figured it out before us.

C: I see a benefit of using the simulator for adoption and continuous proficiency-based learning of vascular robots, as we see that some centers in the world are transitioning into robotic-assisted interventions. For the upcoming year, the focus will be on increasing the usage of simulation training for complex procedures and complications, as these are the situations you learn most from.

F: In the future, it could be an advantage to implement simulation in daily clinical practice to support decision making, case planning, and mission rehearsal by using real patient data sets in advanced software applications such as Mentice simulation.

