

特別寄稿

Shinshu Experience for Being a Good Neurosurgeon

Duan Hongzhou¹⁾²⁾1) *Department of Neurosurgery, Shinshu University School of Medicine*2) *Department of Neurosurgery, Peking University First Hospital, Beijing, China***Introduction**

Matsumoto is a small city in the middle of Japan and about 250 kilometers away from Tokyo. Shinshu University Hospital is the largest hospital in Matsumoto. Although the volume of the neurosurgical operations is just about 300 cases a year, three world famous neurosurgical professors come from here. Professor Kenichiro Sugita was the founding professor in the neurosurgical department and a genius in innovation¹⁾. At present, the neurosurgeons in Japan and in other countries continue to benefit from the Sugita head holding apparatus and Sugita aneurysm clips²⁾. Professor Shigeaki Kobayashi is the second professor, he served as president of both the Japanese Congress of Neurological Surgeons and Japan Neurosurgical Society, and he is now an honorary president of the World Federation of Neurosurgical Societies³⁾. He brought the department into the twenty-first century. Currently, Professor Kazuhiro Hongo, the present head in charge of the neurosurgical department, organizes the department and focuses on minimally invasive neurosurgery based on the preoperative simulation, neuronavigation system, and the intraoperative neurophysiological monitoring. Under his superb guidance, there is a marked expansion of the department's clinical and research activities. His contribution to aneurysmal surgery and skull base surgery has won him outstanding reputation in the world⁴⁾. In China, there are so many neurosurgical centers with the surgical volume more than 300 cases a year, but the reputation of these centers in the world is not as high as Shinshu University Hospital. I am lucky to spend six months in the neurosurgical department of Shinshu University Hospital studying and training, and observing their meticulous work. After introspection of the working mode, I think there are some aspects that deserve our Chinese neurosurgeons learning.

Passion

During training in Shinshu University Hospital, I have been very impressed with the neurosurgeons' hard work. Sometimes I thought this phenomenon may be related to Japanese culture, but later I found that the neurosurgeons work hard day by day without feeling tired or exhausted. So one day, after observing a complicated operation last for 16 hours and seeing the operator still looking full of energy, I couldn't help but ask why he did not feel tired. He didn't answer my question directly but asked me "Don't you think this operation is interesting and challenging? This is the most interesting case I've met. You see, there is a variation of this vessel, it goes around the bottom of the tumor...". He explained to me with his artistic drawing in enthusiasm. At that moment, I knew that passion was a strong motivation in his neurosurgical practice and this would not be decreased by long duration of procedures or physical strain.

Detailed surgical planning

The surgical planning is the preoperative method of pre-visualizing a surgical intervention, in order to predefine the surgical steps and furthermore the precise structures in the context of computer-assisted surgery. The preoperative surgical planning is an essential step in minimally invasive neurosurgery. The more details that are considered in the surgical planning, the less operative complications will happen. Take acoustic

schwannoma as an example, in Shinshu University Hospital, the preoperative surgical plan includes not only the indication, approach, gross surgical procedure, and anticipatory outcome⁵⁾. Before the operation, there is a preoperative conference, during which the following will be discussed: the surgical goal, feared complications, anaesthesia, patient's surgical position, equipment and monitoring during the operation, expectation of operative time and blood loss, the shape and length of the skin incision, surgical approach, the size of craniotomy, the location of drilling holes, whether mastoid air-cells will be opened or not, the shape of dural incision, how to reduce the intracranial pressure by aspiration of CSF, how to locate the tumor, how many critical neurovascular structures will be encountered during exposure of the tumor, the relationship between the tumor location and surrounding structures, the location of facial nerve, whether the posterior lip of internal auricular canal (IAC) will be drilled or not, how much drilling should be done to make a clear exposure, how to manage if the air-cell of the IAC was opened, how to make a resection of the tumor, how to identify the facial nerve, what's the strategy if the tumor is adherent to the facial nerve or the brain stem, how to repair the dura, how to close the wound, etc. After all the details above are taken into account and the operation is performed according to the preoperative detailed planning, the patient's outcome will be as good as expected and the complications will be limited to minimum.

Multiple means in escorting the neurosurgical procedures

Nowadays, neurosurgery has entered to a new era of minimally invasive neurosurgery. In consideration of the importance of neural function and difficulty of neural remoldability, how to protect the patient's function and avoid making a new neurological deficit during the operation become more and more important. One way to solve this problem is rich experience; the other way is multiple means in escorting the surgical procedures. Shinshu University Hospital selects the latter one. With the preoperative simulation, the neuronavigation system, and the intraoperative monitoring, the neurosurgeons here can perform complicated skull base operations safely, and many brain stem lesions which were formerly considered unresectable in forbidden zone several years ago are able to be safely resected without any new neurological deficits in Shinshu University Hospital⁶⁾⁷⁾.

Rumination

As Professor Hongo says, "there are not so many cases for Japanese neurosurgeons to practice", so they need to do every case well. They do each operation just as making an exquisite handicraft with sufficient patience and great passion. In Shinshu University Hospital, Professor Hongo requires every surgeon to make a schematic drawing before the operation. "When you are drawing, you are thinking, it will not only benefit you to know deeply the anatomical structures you will encounter during the operation, but also promote you to find out some solutions to solve the problems you might face." During the operation, you will compare the actual findings and views with the preoperative schematic diagram, and this will help you correct some false information or knowledge. After the operation, you also need to make another drawing, but this time it's the precise drawing of the operation, during this procedure, you will review the whole operation again, from the position of the patient to the shape of the craniotomy, from the detailed relationship between tumor and surrounding tissues to the surgical technique in dissection and resection, all details are reviewed and ruminated on." So the surgeon will think at least three times for one case, which will not only deepen the operator's knowledge about the anatomical structures but also increase his experience in solving many problems. In this way, the neurosurgeon can draw inferences about other cases from one instance.

Attach great importance to follow-up

The Japanese neurosurgeons consider their patients as their private and precious wealth. This is embodied not only when they do operations as carving arts, but also when they follow up their patients. They always want to know how is the patient's condition, whether the patient's symptom improved, or if the new operative technique had made the patient avoid some complications. With the feedback information from the patients, they enhance their confidence and improve their techniques. Just as a famous Chinese neurosurgeon said, patients are the best teachers for doctors. As there is a good relationship between the doctors and the patients in Japan, the compliance of the patients is good and they are willing to receive follow-up investigations and examinations. This forms a virtuous circle.

Summary and communication

All Japanese Neurosurgeons like to attend the annual Japanese Neurosurgical Society Conference. They make full use of this platform. By communicating with others, they learn new techniques, broaden their vision and solve clinical problems. Shinshu University Hospital's neurosurgeons take an active part in such conferences; they expand Shinshu University's influence by showing new methods or good outcomes of difficult cases. Beyond taking an active part in international conferences, the neurosurgeons in Shinshu University Hospital also devote themselves in writing many innovative papers which were published on high quality international journals. Till now, there are hundreds of English papers published, which further won them high reputations in the international neurosurgical society.

At the end of each year, there is an annual complication conference in Shinshu University Hospital. During the conference, each neurosurgeon reports his cases with complications, analyze the reason, and propose solutions to avoid further similar complications. And there is also a local complication meeting organized by regional neurosurgical society. Each hospital communicates some valuable cases and experiences. In this way, it can make up the shortfall by sharing the bitter experiences; each neurosurgeon can learn from others and will take great care when facing similar cases in future.

Invention and innovation

The first neurosurgical professor Kenichiro Sugita was a genius inventor. During his whole life, he invented and improved over hundreds of useful neurosurgical tools including the famous Sugita clip and Sugita head-holder system. Following his steps, professor Shigeaki Kobayashi and professor Kazuhiro Hongo also contribute to invention of new instruments and equipments including breakthroughs in the areas of neurosurgical robotics and tele-surgery⁸⁾. The high speed in transferring the clinical problems to innovations provides Shinshu University Hospital a strong competitiveness in the neurosurgical field, and makes them leading the trend.

Conclusion and prospect

Passion provides a constant power. Detailed surgical planning, preoperative simulation, navigation system, and the intraoperative monitoring escort the surgical procedures and guarantee the safety and minimally invasiveness of the procedure. Repeated rumination and close follow-up helps the neurosurgeons get sufficient feedback. Good summary and communication win them a high academic reputation and invention & innovation are the magic weapons they lead the neurosurgical trend.

Specific and exact decisions make the difference between failure and success.

1) Kobayashi S: Kenichiro Sugita (1932-1994): a man of innovation. World Neurosurg 75: 354-360, 2011

特別寄稿

- 2) Koyama J, Hongo K, Okudera H, Nitta J, Kusano Y, Kobayashi S : Modified, multipurpose, radiolucent sugita head frame for intraoperative cerebral angiography. *Neurosurgery* 51 : 989-992, 2002
 - 3) [Http://www.aans.org/en/International%20Activities/Kobayshi%20Bio.aspx](http://www.aans.org/en/International%20Activities/Kobayshi%20Bio.aspx)
 - 4) Hongo K, Tanaka Y, Horiuchi T, Tada T, Kobayashi S : Internal carotid artery rotation technique to expose an aneurysm neck : technical note. *Neurosurgery* 52 : 455-457, 2003
 - 5) Tanaka Y, Hongo K, Tada T, Kobayashi S : What is the best method for reporting tumor diameter in vestibular schwannoma ? *Neurosurgery* 53 : 634-637, 2003
 - 6) Ogiwara T, Goto T, Aoyama T, Nagm A, Yamamoto Y, Hongo K : Bony surface registration of navigation system in the lateral or prone position : technical note. *Acta Neurochir (Wien)* 157 : 2017-2022, 2015
 - 7) Kyoshima K, Kobayashi S, Gibo H, Kuroyanagi T : A study of safe entry zones via the floor of the fourth ventricle for brain-stem lesions. Report of three cases. *J Neurosurg* 78 : 987-993, 1993
 - 8) Hongo K, Kobayashi S, Kakizawa Y, Koyama J, Goto T, Okudera H, Kan K, Fujie MG, Iseki H, Takakura K : NeuRobot : telecontrolled micromanipulator system for minimally invasive microneurosurgery-preliminary results. *Neurosurgery* 51 : 985-988, 2002
-