Comparing the Differences of Anesthesia System at Tohoku University Hospital in Japan Compared to King Chulalongkorn Memorial Hospital in Thailand

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Japan is a developed country. Not only is technology highly innovated, but medicine is also developed including anesthesiology. Anesthesia in Japan has a high level of progression. There are many differences between Japanese and Thai anesthesiologist practices. The first author, PS, had a great opportunity to learn these differences at Tohoku University Hospital (TUH) for 4 weeks in April 2016. TUH is a well-known hospital around Japan. It has provided anesthesia for several years with high level of standard.



I was in front of TUH at entrance of the hospital

Department of anesthesiology at TUH, directed by Dr.Yamauchi Masanori, provide anesthetic care for many services both inside and outside operating theater including pain clinic. There are 20-30 cases a day scheduled for surgery. Around two third of them receive anesthetic care by anesthesiologists or anesthesiologist residents who are assigned tasks and supervised by senior staffs and the rest are anesthesized with local anesthetics and mild sedation by surgeon. Postoperatively, most of patients are observed in hospital at least 24 hours because Japanese insurance companies provide limited financial support only admitted cases. Development in research is one of the most important tasks at TUH. The system is welled supported by fully-equipped laboratory resources along with prompt advice from staff anesthesiologists with Ph.D. qualification.

Perioperative management

There are many interesting things regarding perioperative anesthetic management at TUH. Starting with preoperative care, TUH has preoperative rooms providing consultation to complicated patients. Every anesthesiologist, 20-25 of them, gathers in the room and spends about 20 minutes to review medical history, physical examinations and anesthesia plan of all the

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scheduled patients, 15-20 cases, every day. Surgeries performed in TUH are mostly long, difficult operations such as video-assisted esophageal surgery and re-do cardiac surgery, so the number of daily cases are not so much. City hospitals in Sendai are performing lots of easy, routine surgeries. This practice was different from my institute's practice. Mostly our anesthesiologist residents visit patients on the day before surgery and spend less time than Japanese anesthesiologists do, because they have many cases in their schedule and only limited time remained. (In Japan, all anesthesiologists visit patients on the day before surgery, too). Japanese resident anesthesiologists confirmed the points of the case a day before operation and briefly present their patient's history and anesthetic management to all staff every morning. It is a good practice because every case is reviewed and residents get helpful advice from their seniors.

Before anesthesia induction

When a patient arrives in the operation room, the patient is identified by a nurse in charge using an electronic barcode reader and the wristband on the patient. Identification, operative methods and surgical site are reconfirmed again in WHO surgical safety checklist manner[1] by all the staffs of the operation including surgeons, anesthesiologists, nurses, medical engineers and sometimes medical students before starting the anesthesia. It is another good practice because it can not only prevent errors such as wrong patient or wrong operation, but the team will have better relationship.



TUH staff identified the patient and allowed parent to go with their child to the operation room

Medications

Many anesthetic medications that are usually used in Japan are rarely used in Thailand due to the expensive cost or unavailability such as ropivacaine (0.75%-10 ml = 626 JPY), intravenous acetaminophen (1,000 mg = 332 JPY), remifentanil (5 mg = 6183 JPY) and especially sugammadex (200 mg = 10193 JPY). Since Japanese medical system is managed by Ministry of Health, Labor and Welfare, patient paid a part of the costs and national insurance system could pay most of the medical cost. Sugammadex in Thailand is limited to private hospitals. Muscle relaxants routinely used in Thailand such as atracurium and cisatracurium cannot be used in Japan. Some Japanese residents have not had the experience to use not only atracurium and cisatracurium but also neostigmine (cholinesterase inhibitor). They usually control infusion rate of propofol or remifentanil to maintain anesthesia.

In some cases, use of muscle relaxant for maintaining of anesthesia is not feasible in cases of neurosurgery monitored by motor evoked potential or in video-assisted esophageal surgery monitored by movement of the vocal cord evoked by laryngeal recurrent nerve stimulation. Many types of these surgeries are performed in THU and the anesthesiologists are accustomed to handle propofol and remifentanil.

The patient is closely monitored using disposable sensors, pulse oximetry, bispectal index, bladder temperature sensor combined with Foley catheter, cerebral oximetry and Swan-Ganz catheter for cardiac surgery. They also had new generation ultrasound (US) machines especially wireless probe US machines, which were available for both inpatients in the ward and intraoperative patients.



In that month, there was ultrasound nerve block workshop which showed new generation ultrasounds and demonstrated many nerve block techniques.

Anesthetic management

Anesthesiologists in THU often perform combine regional anesthesia (RA) and general anesthesia for perioperative pain control. Brachial plexus block, femoral nerve block and epidural block are usually performed by residents of department of anesthesia. Senior residents or staff anesthesiologists instruct catheterization for continuous peripheral nerve block and high risk nerve block. They always provide RA and central venous catheter under ultrasound guidance. For treatment of cancer pain or prolonged postoperative analgesia, they usually place disposable peripheral nerve block catheter and use disposable patient control analgesia (PCA) pump.

For obstetric anesthesia, anesthesiologists in TUH always provide combined spinal-epidural anesthesia for cesarean section. This management of anesthesia is obviously different from our routine practice of spinal anesthesia with local anesthesia and morphine. They performed epidural catheter placement at Th11/12or Th12/L1 spinal level before performing spinal anesthesia for abdominal analgesia. Then, spinal block is performed at L2/3 or 3/4 with 1.8-2.2 ml of 0.5% hyperbaric bupivacaine with 0.3 ml of 15μg of fentanyl. For postoperative analgesia, 0.25% levobupivacaine 200 ml contained with 200 μg of fentanyl is continuously infused by 4 ml/hr via epidural catheter for 2 days. They tend to avoid spinal opioid anesthesia due to prevent postoperative retracted nausea, itching or respiratory depression. I know that volume of bupivacaine for the spinal anesthesia has argument between minimum dose group and sufficient dose group in the Japanese Society of Obstetric Anesthesia. The minimum dose group administers only1-1.5ml and they usually use epidural block. On the other hand, the sufficient dose group administers over 2ml and epidural block is used when anesthetic level did not spread enough.



Epidural catheter was inserted to provide regional anesthesia for cesarean section operation and secured with well-designed sterile transparent film dressing.

Postoperative care

TUH does not have postoperative anesthetic care unit (PACU) for immediate postoperative care. All patients are directly transfered to ICU or ward for observation postoperatively. Most patients were extubated while fully awake and conscious using non-touch techniques. The patient was observed briefly until airway is patent and hemodynamic is stable before he/she is transferred to ICU or ward. Every anesthesiologist carefully manages vital sign of patient and prevents postoperative pain and nausea through anesthesia in the operating room.

Pain clinic service

TUH has a pain clinic service, led by pain expert, Prof. Yamauchi. He provides patient interventions for pain control including cancer pain, complex regional pain syndrome (CRPS), neurogenic pain, peripheral vascular disease and postoperative pain[2-4]. We have an opportunity to observe a case with shoulder CRPS taking implantation of spinal cord stimulator which I have not seen in Thailand before. It take only 2 hours between cervical epidural puncture, insertion of 2 sets of epidural electrode, adjustment of the electrodes position and implantation of the generator in her hip pocket. The result showed a good outcome, the patient could perform daily activity free from pain. Prof. Yamauchi is also a good role model for residents and medical students because his patient approach is gentle and has considerable empathy.

Good chance

Fortunately, I met expert pediatric anesthesiologist from Saitama Children's Medical Center, Dr. Kuratani. He has completed an ACGME-approved pediatric anesthesia fellowship program provided at Boston Children's Hospital in USA, and has vast experience in pediatric anesthesia[5,6]. He created anesthetic combinations that were interesting. He usually provides anesthesia for pediatric surgery with intravenous anesthetics to prevent the patients from neurodevelopmental damage and emergence agitation presumably caused by inhalational anesthetics[7,8]. He induced anesthesia with fentanyl 5-10 μg/kg, propofol 2-3 mg/kg and rocuronium 1 mg/kg as muscle relaxant in most cases and maintained with high doses of remifentanil and propofol without inhaled anesthetic. In his suggestion for beginners, the maintenance anesthetic combination formula of propofol (10 mg/ml) infusion plus remifentanil (100μg/ml) infusion volume should equal the patient's weight, e.g., total 20 ml/hour for a patient with 20 kg of body weight.



The girl underwent palatoplasty under Dr.Kuratani's care

Because the opioid-based intravenous anesthesia can provide extremely stable anesthesia and may result in extraordinaly high speed anesthesia emergence with less post-anesthesia agitation, the intraoperative titration of anesthetics is usually unnecessary. This technique has some benefits for the patient but may not be used in Thailand because remifentanil is unavailable and fentanyl infusion cannot easily replace remifentanil. Fentanyl infusion may cause delay emergence and is more difficult to titrate. In TUH, we always used fentanyl with bolus administration, not continuous infusion in pediatric patients. In the hospital at Saitama, Dr Kuratani also used fentanyl as bolus analgesics.

Providing anesthesia for preterm undergoing herniotomy is widely discussed and is still a controversy. Sole spinal anesthesia without sedation could prevent risk of postoperative apnea, but there are not so many experienced anesthesiologists. If spinal block had failed, anesthetic technique would be changed to general anesthesia. Routine practice in TUH, hernia surgery was performed in early infants. In contrast, the Saitama hospital wait until the child grows up and weighs more than 10 kg to avoid risk of complication from anesthesia in preterm. Surprisingly, the incidence of incarcerated hernia which needs surgical. reduction

is considerably low. In Saitama Children's Medical Center, the inguinal hernia repair is done by SILPEC procedure, which enables completely no visible scar after the surgery. See http://silpec.jp



Dr.Artid - Dr.Kuratani-Dr.Pipat

Conclusion

There are many different practices between Thai and Japanese anesthesiologist. It may have resulted from Thai anesthesiologists having limited resources such as anesthetics and equipment. However, both Thai and Japanese anesthesiologists still maintain the same standard levels of patient care.

Finally, I would like to express my sincere appreciation for the kindness to co-authors of this report and all the staff at TUH. I was impressed by your hospitality and the warm manner you treated me with. I have certainly gained extensive knowledge and new ideas that will assist me in pediatric anesthesia. I hope that the existing bonds of friendship and cooperation between our two institutions will continue for our mutual benefit. I thank you once again and look forward to our continued cooperation.



Warm "Sayonara" farewell with Dr.Yamauchi and TUH staffs.

References

1. World Alliance for Patient Safety. WHO surgical safety checklist and implementation manual [Internet]. [Cited 2016 July 31]. Available at: http://www.who.int/patientsafety/safesurgery/ss_checklist/en/
2. Yamauchi M, Kawaguchi R, Sugino S, Yamakage M, Honma E, Namiki A. Ultrasound-aided unilateral epidural block for single lower-extremity pain. J Anesth 2009; 23:605-8.
3. Moriyama K, Murakawa K, Uno T, et al. A prospective, open-label, multicenter study to assess the efficacy of spinal cord stimulation and identify patients who would benefit. Neuromodulation 2012; 15: 7-11.
4. Yamauchi M, Suzuki D, Niiya T, et al. Ultrasound-guided cervical nerve root block: spread of solution and clinical effect. Pain Med 2011; 12:1190-5.
5. Kuratani N, Kanmura Y. Pediatric anesthesia: current status and future directions. J Anesth 2016;30:185-6.
6. Kuratani N. The cutting edge of neonatal anesthesia: the tide of history is changing. J Anesth 2015; 29:1-3.
7. Kanaya A, Kuratani N, Satoh D, Kurosawa S. Lower incidence of emergence agitation in children after propofol anesthesia compared with sevoflurane: a meta-analysis of randomized controlled trials. J Anesth 2014; 28:4-11.
8. Kanaya A. Emergence agitation in children: risk factors, prevention, and treatment. J Anesth 2016; 30:261-7.