Appendix S1. Obstetric subspecialty training objective

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| Training objectives: |
| 1. Master the physiological characteristics of maternal and fetal; Correct interpretation of fetal heart rate monitoring. |
| 2. Master perinatal anesthesia pharmacology. |
| 3. Master the anesthesia methods for cesarean section (intraspinal anesthesia, general anesthesia); Prevention and treatment of anesthesia complications. |
| 4. Master labor analgesia technology, and obstetric autologous blood recovery technology. |
| 5. Master the perinatal anesthesia/analgesia management of high-risk medical complications and assessment of high-risk fetal status. |
| 6. Master anesthesia management of high-risk parturient with obstetric complications (preeclampsia, placental abruption, placenta previa, placental implantation, postpartum hemorrhage, amniotic fluid embolism, uterine rupture, umbilical cord prolapse, etc.). |
| 7. Master the operative skills of non-cesarean section operation during early, middle, and late pregnancy. |
| 8. Master cardiopulmonary resuscitation for pregnant women; anesthesia management of immediate cesarean section. |
| 9. Master neonatal resuscitation. |
| 10. Have the ability to improve anesthesia quality based on clinical practice; Have effective communication skills with perinatal medical team; Possess the professional spirit of undertaking professional responsibility and following ethical principles |
| 11. Have the ability to teach obstetric anesthesia to other anesthesiologists |
| 12. Have the ability to design, organize, implement obstetric anesthesia related research and publish research paper. |
| 13. Be familiar with ultrasound-guided nerve block and obstetric related ultrasound diagnostic techniques |
| 14. Be familiar with the health system to mobilize other resources to provide the best obstetric anesthesia care. |

Appendix S2. Evaluation Index of obstetric anesthesiologists in the first round

Please select the in the checkbox if you are not totally agree with the corresponding item. Put your recommendations at the blank area below the table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Category | Primary evaluation standard | Secondary evaluation standard with specific items | |  |
| Practice  ability | Ability of clinical thinking and decision-making | 1. Collection, analysis, and integration capabilities of clinical information | Including but not limited to：   1. Quick and accurate collection of clinical information of pregnant women, and make pre-anesthesia assessment (basic conditions, pregnancy related complications; ASA classification, functional status) 2. Fetal and newborn evaluation (fetal heart rate monitoring, APGAR score) 3. Mastering of systematic evaluation methods (BLS, ABCDE, SAMPLE, 5H+5T for emergent cases, etc.） |  |
| □ |
| □ |
| □ |
| 1. Capabilities of analyzing and processing of clinical problem | 1. Selection of anesthesia method, the use of drugs and the appropriate monitoring technology according to the pathophysiological characteristics of the pregnant women. 2. Familiar with key surgical procedures and their possible impact/outcome 3. Anesthesia concerns for specific patient and condition. | □ |
| □ |
| □ |
| Professionalism of obstetric anesthesia | 1. Mastering of basic theory and basic skills | 1. Mastering of pathophysiological changes during pregnancy and perinatal anesthesia pharmacology. 2. Physiological characteristics of fetus and newborns; Correct interpretation of the fetal heart monitoring. 3. Indications and contraindications of anesthesia methods (intraspinal anesthesia, general anesthesia) for cesarean section; prevention and treatment of anesthesia complications 4. Labor analgesia, post-cesarean analgesia, and nerve block analgesia for parturient, etc. 5. Anesthesia management of pregnant women undergoing non-obstetric surgery. | □ |
| □ |
| □ |
| □ |
| □ |
| 1. Anesthesia management capabilities of pregnant women with high risk | 1. Anesthesia management of maternal near miss. 2. Anesthesia management for pregnant women with non-obstetric diseases at high-risk : heart disease (such as congenital heart disease, pulmonary hypertension, aortic aneurysm, cardiomyopathy, heart failure, etc.), respiratory system, endocrine system, hematology, liver and kidney dysfunction, mental illness , Nervous system diseases, infectious diseases, multi-drug abuse, severe obesity, septic shock, etc. 3. Anesthesia management of E0-1 level immediate cesarean section | □ |
| □ |
| □ |
| 1. Ability to handle pregnancy related emergencies | 1. Obstetric hemorrhage 2. Maternal and newborn cardiopulmonary resuscitation. 3. Amniotic fluid embolism, pulmonary embolism, air embolism 4. Acute heart failure 5. Anaphylactic shock 6. Local anesthetics intoxication 7. Obstetric difficult airway | □ |
| □ |
| □ |
| □ |
| □ |
| □ |
| □ |
| 1. Mastering and application of new technique | 1. Transesophageal/thoracic ultrasound application in obstetrics, new technology for hemodynamic monitoring 2. Ultrasound guided regional nerve block and vascular puncture technique for pregnant women 3. Application of thromboelastography in obstetrics; Blood transfusions in Obstetrics; Autologous blood transfusion in obstetrics, etc. | □ |
| □ |
| □ |
| Non-technical skills | Comprehensive skills | 1. Teamwork | 1. Possessing decision-making leadership; providing constructive medical opinion 2. Multidisciplinary teamwork cooperation 3. Realizing the potential of team members | □ |
| □ |
| □ |
| 1. Communication sills | 1. Using verbal and nonverbal means to communicate effectively with patients, family members, colleagues and the public 2. Ability to coordinate and utilize public health resources, providing necessary medical-related guidance and services | □ |
| □ |
| 1. Professionalism | 1. Possess the professional spirit of assuming professional responsibilities and willingness of following ethical principles 2. Ability to continuously improve the quality of clinical anesthesia 3. Stress management ability: possessing good psychological quality, make self-adaptation and self-adjustment to work pressure 4. Compliance with laws and regulations | □ |
| □ |
| □ |
| □ |
| Teaching and research capabilities | Learning and teaching ability | 1. Independent learning ability | 1. Completion of periodic specialized training regular assessment. 2. Ability of professional English learning and communication 3. Certification for simulation evaluation | □ |
| □ |
| □ |
| 1. Teaching ability | 1. Instruct students to conduct clinical case analysis 2. Clinical teaching for residents 3. Instruct residents to conduct simulation training | □ |
| □ |
| □ |
| Research ability | 1. Innovation | 1. Ability to raise and solve clinical problems 2. Innovative ability to solve clinical problems 3. Transformation of patent to clinical application | □ |
| □ |
| □ |
| 1. Research ability | 1. Mastering of basic scientific theories and skills 2. Knowning how to performing clinical research 3. Capable of research design, organization, and overall implementation 4. Writing ability of research paper and application for research fund | □ |
| □ |
| □ |
| □ |
| 1. Research integrity | 1. Conduct research in compliance with the ethical requirements 2. Follow the requirements of scientific research integrity | □ |
| □ |

Your opinion in response to the above mentioned items.

1. Items suggested to be deleted

1. Suggested addition of new items

1. Other related opinions

Appendix S3. Items needing major revision

|  |  |  |
| --- | --- | --- |
| Selection frequency | Serial number | Major revision |
| 5 | 6-① | Adding with: Recommended for senior professional obstetric anesthesiologists |
| 4 | 3-① | Adding with: Perinatal anesthesia pharmacology |
| 3 | 5 | Changing to: Anesthesia for obstetrics needing immediate treatment in the OR and in pre-hospital emergency. |
| 2-① | Changing to: Selection of appropriate anesthesia method and anesthetic drugs according to pathophysiological characteristics of the pregnant women and surgical procedure. |
| 3-⑦ | Adding with: Prevention and treatment of anesthesia complications (reflux and aspiration, postpartum peripheral nerve injury, etc.) |
| 5-① | Adding with: Anesthesia for immediate and emergent cesarean section (high-risk fetal state perinatal, uterine rupture, umbilical cord prolapse, fetal distress, etc.) |
| 13-③ | Changing to: Performing research using interdisciplinary platform. |
| 2 | 2-② | Changing to: Familiar with the pathophysiological changes to the pregnant women that may be caused by surgical operations. |
| 3-② | Changing to: Pathophysiological changes during pregnancy |
| 4-② | Adding: Transferring of maternal and infants at high risk. |
| 5-③ | Changing to: Respiratory failure and cardiac arrest of maternal and the newborn |
| 5-⑨ | Adding with: Management of acute laryngospasm, bronchospasm and asthma attack |
| 10-② | Changing to: Fluency in professional English. |
| 12-③ | Changing to: Patent application and achievement transformation |
| 13-① | Changing to: Mastering of basic scientific theories and experimental skills for fundamental research |

Appendix S4. Reply to experts’ queries related to establishment of evaluation index.

1. It is suggested to merge secondary evaluation standard of 4 (Anesthesia management capabilities of pregnant women with high risk) and 5 (Ability to handle pregnancy related emergencies), as placental abnormalities include hemorrhage caused by placenta accreta and possible hemorrhagic shock.

Reply:

Secondary evaluation standard of 4 focuses on obstetrics with known risks that OBAs may still have time to make effective preoperative preparation. While category 5 stresses the immediate action of OBA in emergent cases.

2. It is recommended to combine the primary evaluation standard of “Ability of clinical thinking and decision-making” and “Professionalism of obstetric anesthesia specialists”. And followed by secondary evaluation standard of “teaching capacity”, “research ability”, and “comprehensive ability”. The “comprehensive ability” includes “management skills, ability to handle medical dispute, and non-technical skills”.

Reply:

“Ability of clinical thinking and decision-making” and “professionalism of obstetric anesthesia” lay emphasis on different aspects. “ability of clinical thinking and decision-making” focus on basic knowledge and skills, while “professionalism of obstetric anesthesia” weights more on professional skills of obstetric anesthesia specialists, especially the ability of dealing with critical pregnancy.

Research ability receives more and more attention. Teaching ability is an indispensable skill for doctors in tertiary hospitals. These two distinct abilities have their own independent systems, which need further elaboration. Therefore, we classified these two as primary evaluation standard. Non-technique skills is different from clinical practice skills, which require the mastering of comprehensive skills. Non-technical skills stress more on teamwork, communication, and the ability to review and handle problems from a professional perspective.

3. It might be too demanding to accomplish all these training items and become a specialized obstetric anesthesiologist in just 3 years.

Reply:

Actrually, this is not demanding. We drafted the evaluation standard according to obstetric subspecialty training objective of Peking University Health Science Center. In the course of the second year of the anesthesia specialist training, trainees who passed the mid-term evaluation would become attending anesthesiologists and possess the competency of the handling basic obstetric anesthesia related issues. The subspecialty of OBA training was intended for more comprehensive clinical experience training of paturients at high-risk, and to finish educational and research works required. We also consulted the Program Requirements for Fellowship (CA-4) Education in Obstetric Anesthesiology in the U.S., which is more demanding and more specified.

4. Is it over demanding to possess the “ability to coordinate and utilize public health resources, providing necessary medical-related guidance and services”?

Reply:

Doctors could provide medical service and consultation in out-patient service. Now it is more convenient to provide pregnant women with anesthesia-related medical guidance and professional medical consultation through diversified we-medium and online platforms. The advantage of internet can also be adopted to optimize the allocation of medical resources. In addition, crisis management and emergency treatment of pregnant women involve multidisciplinary cooperations. It is necessary for medical staff to know the specific implementation process, so as to apply for and coordinate relevant public resources in time.