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How to run an obstetric anaesthesia training programme

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'The position of woman in any civilization is an index of the advancement of that civilization; the position of woman is gauged best by the care given her at the birth of her child.'

Haggard HW, New York, 1929 [1].

The 'birth' of obstetric anaesthesia: historical narrative

The safety of obstetric anaesthesia has been debated since its 'birth' in 1847, when James Young Simpson (the Scottish obstetrician) first administered 'modern' obstetric anaesthesia for vaginal delivery. Important milestones in the development of obstetric anaesthesia include the introduction of inhaled agents (ether) in 1847, the expanded use of narcotics (morphine) combined with scopolamine to make labouring women amnestic and 'somewhat' comfortable ('twilight sleep') during labour in the early decades of the twentieth century, and the refinement of neuraxial blocks, which occurred in the mid-twentieth century. Other outstanding conceptual developments include Zweifel's idea that drugs given to the mother cross the placenta and impact the fetus and Apgar's idea that the condition of the newborn is the best and most sensitive assay of the quality of obstetric and obstetric anesthesia care of the mother [2].

Obstetric anaesthesia as a subspecialty

Today obstetric anaesthesia has become a recognised subspecialty of anaesthesiology and an integral part of practice of most anaesthesiologists. Perhaps no other subspecialty of anaesthesiology provides more personal gratification than the practice of obstetric anaesthesia [3]). An obstetric anaesthesiologist has become an essential member of the obstetric care team, who closely works with the obstetrician, midwife, neonatologist and the Labour and Delivery Ward nurse to ensure the highest quality care for the parturient and her baby.

Communication skills and exchange of information is essential for a perfect outcome, which is always expected when providing safe passage for both the mother and her fetus from the antepartum to postpartum period. The anaesthesiologist's unique skills in resuscitation combined with experience in critical care make members of this subspecialty particularly valuable in peripartum care of the high-risk patients, extending our role well beyond the routine provision of intrapartum anaesthesia or analgesia [3].

New medico-legal issues in obstetric anaesthesia

In addition to clinical challenges [3-5] obstetric anaesthesia is laden with medico-legal liability [6, 7]. Obstetric anaesthesiologists are frequently named (besides obstetricians) in claims involving poor neonatal outcomes. Obstetric anaesthesia is also the most common subspecialty of practice to be ceased due to medico-legal concerns.

Beckmann studied the influence of the current medico-legal climate in Australia and New Zealand on anaesthetic practice [8]. Information collected included demographics, opinions regarding the current medico-legal climate, medical defense organisations and the implications for anaesthetic practice. Nearly all (95.3%) members of the Australian and New Zealand College of Anaesthetists were concerned about the current medical indemnity crisis and 80.5% felt concerned about the financial security of medical insurers. Of all respondents 23.6% had personal experience of litigation and 73.6% expected to have a claim made against them during their career. Responding anaesthesiologists spent an average of 8.3% of their gross annual income on medical insurance premiums and 47.2% were concerned about the viability of their practice given the rising costs of medical insurance. Obstetric anaesthesia was the most common area (subspecialty) of practice to be ceased due to medico-legal concerns. 20.2% of obstetric anaesthesiologists who responded intended to cease practice in the two years after the survey and in the two years prior to the survey 3.1% of respondents

had retired due to their litigation concerns, while 12.8% (average age of 56.7 yr) were intending to retire in the next two years for the same reason [8]. Changes to the conduct of the pre-operative consultation were common. Other changes to the practice of anaesthesia included more thorough documentation of complications (50.8%) and a strong reluctance to perform neuraxial blocks (54%). This study strongly suggests that anaesthesiologists are increasingly concerned about the current medico-legal climate and as a result, some might be retiring earlier and giving up high-risk areas of practice (such as obstetric anaesthesia).

Lee et al used the American Society of Anesthesiologists (ASA) Closed Claims Project database to identify specific patterns of injury and legal liability associated with regional anaesthesia in the USA [9]. Because obstetrics represents a unique subset of patients, claims with neuraxial blockade were divided into obstetric and non-obstetric groups for comparison. An in-depth analysis of 1980-1999 regional anaesthesia claims was performed. Of a total of 1,005 regional anaesthesia claims, neuraxial blockade was used in all 368 obstetric claims and 453 of 637 non-obstetric claims (71%). Damaging events in 51% of obstetric and 41% of non-obstetric neuraxial anaesthesia claims were block related. Obstetrics had a higher proportion of neuraxial anaesthesia claims with temporary and low-severity injuries (71%) compared with the non-obstetric group (38%) and a lower proportion of claims with death or brain damage and permanent nerve injury compared with the non-obstetric group. Cardiac arrest associated with neuraxial block was the primary damaging event in 32% of obstetric and 38% of non-obstetric neuraxial anaesthesia claims involving death or brain damage. The authors concluded that obstetric claims were predominately associated with minor injuries [9].

Ross pointed out that detailed analysis of statements made in the ASA files revealed that a substantial number of obstetric patients were unhappy with the peripartum care provided and felt themselves mistreated and/or ignored [10]. It is possible that malpractice litigation might serve the purpose not only of reparation of injury for substandard care but also one of emotional vindication. Obstetric anaesthesiologists are frequently named in claims involving bad fetal/neonatal outcomes. Most of these claims, for whatever reason, do not result in payments to the litigant. Problems involving airway management (such as difficult intubation or pulmonary aspiration of gastric contents) continue to be well represented in the obstetric files. Another cause of adverse outcomes with regional anesthesia is local anaesthetic toxicity [10].

Crawforth evaluated the anaesthesia care provided during obstetric adverse events [11]. Malpractice claims filed against nurse anaesthetists for care involving obstetric anaesthesia (n = 41) were extracted from the American Association of Nurse Anesthetists (AANA) Foundation Closed Claim database. The events represented in the claims occurred between 1990 and 1996 from anaesthetics provided by both nurse anaesthetists and anaesthesiologists. Risk factors for adverse outcomes identified in this study included advanced maternal age, obesity and ethnicity. Patients requiring emergency Caesarean deliveries under general anaesthesia were found to be at considerable risk for a poor outcome leading to a claim. The most common adverse outcome in the obstetric closed claim database was neonatal death (27%), followed by maternal death (22%) and complications resulting from neuraxial blocks (20%). The leading cause of maternal death and brain damage was failure to secure a patient airway. The mode of delivery in 19 of the 20 claims in which death was the outcome was surgical (Caesarean section). In the claims representing maternal death, eight of the nine claims represented surgical deliveries under general anaesthesia. The anesthetic care was deemed appropriate in 56% of the claims. The median payment for appropriate care ($2,866) was less than for care determined to be inappropriate ($45,000) [11].

Good peri-operative evaluation of all patients, detailed review of patient's medical records, and constant vigilance can decrease the incidence of complications and subsequently medico-legal issues. Given the clinical challenges and medico-legal liability associated with practice of obstetric anaesthesia subspecialty training (fellowship) in this field might further decrease the complications and medico-legal implication in practice of this high-risk subspecialty of anaesthesiology.

How to run an obstetric anaesthesia training programme

Obstetric anaesthesia, by definition, is a subspecialty of anaesthesia dedicated to peripartum, peri-operatvie, pain and anaesthetic management of women during pregnancy and the puerperium [12].

The recommended duration of subspecialty training in obstetric anaesthesia in the USA is a minimum of twelve months. The objectives include anaesthesia care for women at various degrees of risk during labour and vaginal delivery, women undergoing instrumental (such as vacuum or forceps) delivery, operative (Caesarean section) delivery, women scheduled for removal of retained segments of placenta, postpartum tubal ligation and other peripartum obstetric procedures. Fellowship (subspecialty) training should offer experience in anaesthesia for non-obstetric surgery during pregnancy, anaesthesia for assisted reproductive technologies, and anaesthetic management of operations on placental support (OOPS), also known as ex-utero intrapartum treatment (EXIT) procedures. In

addition fellows should develop skills in antenatal evaluation of both low and high-risk parturients. Specifically, the peripartum anaesthetic management of pregnant women with co-existing medical disease including haematological, cardiac, neurological, endocrine, renal, and pulmonary disorders should be emphasised. There must also be training in the anaesthetic management of parturients with infectious disorders including HIV and herpes simplex. Obstetric anaesthesia fellows should acquire skills in the management of patients with pregnancy-induced hypertension (PIH), multiple gestations, abnormal fetal presentation, obstetric haemorrhage, trauma in pregnancy and pre-term labour. They should have an opportunity to participate in multidisciplinary case conferences of high risk patients (for example, patients with abnormal placentation scheduled for Caesarean hysterectomies and parturients carrying fetuses with abnormal airway scheduled for EXIT procedures). Exposure to a wide variety of neuraxial techniques (such as lumbar epidural, combined spinal-epidural, single dose spinal) for normal spontaneous vaginal delivery, and elective and emergency Caesarean delivery should be offered. Anaesthetic management of Caesarean delivery should include experience with general anaesthesia [12].

Although the number of faculty members involved in the education of obstetric anaesthesia fellows has not been specified, it is recommended that at least three faculty members with substantial experience in obstetric anaesthesia be involved [12]. It is also encouraged that the fellowship is offered at institutions which have active maternal-fetal fellowship training and/or active perinatology and neonatology services. Multidisciplinary instructions to obstetric anaesthesia fellows should be provided by obstetric anaesthesia, obstetric, maternal-fetal medicine and neonatology faculty. There must be a single Programme Director responsible for the Fellowship Program.

In the USA the Society for Obstetric Anesthesia and Perinatology (SOAP) was founded in 1968 to provide a forum for discussion of problems unique to the peripartum period. SOAP is comprised of anaesthesiologists, obstetricians, paediatricians, and basic scientists who share an interest in the care of the pregnant patient and the newborn [12]. The mission of the Society is to promote excellence in research and practice of obstetric anaesthesiology and perinatology. The Society has recently prepared a draft *Program Requirements for Fellowship (CA-4) Education in Obstetric Anesthesiology.* The Specialty Curriculum of this document is divided into three components: Clinical Curriculum, Didactic Curriculum, and Curriculum for Scholarly Activity [12].

Clinical Curriculum

The SOAP document states that fellows in obstetric anaesthesia must gain clinical experience in a variety of clinical scenarios affecting the care of pregnant and peripartum women. In addition to 'hands on' clinical experience, which should account for the majority of their experience, fellows should also care for some patients while simultaneously supervising core residents in anaesthesiology (on their obstetric anaesthesia rotation), both being ultimately supervised by the faculty anaesthesiologist with experience in obstetric anaesthesia. The goal of having subspecialty fellows teach and supervise core anaesthesia residents while also caring for patients is to prepare the fellows to become the faculty supervisors and teachers of the future. The following represents a guideline for the minimum acceptable clinical experience for each obstetric anaesthesia fellow [12]:

- A minimum of 8 months operating room and labour and delivery ward clinical activity is required. The fellow in obstetric anaesthesia must have exposure to the management of pregnant women with a (suspected) difficult airway. The fellow should also provide anaesthetic management for high-risk pregnant patients. High-risk parturient include, but are not limited to, women with cardiac, renal, pulmonary, neurological and endocrine disorders, morbid obesity, PIH, multiple pregnancy or abnormal fetal presentation, obstetric haemorrhage, molar pregnancy, pre-term labour and delivery, illicit substance abuse, coagulopathies and thrombophilias.
- The fellow in obstetric anaesthesia must personally provide anaesthesia for a minimum of 199 procedures involving pregnant women to include the following:
  - *Anaesthesia for vaginal delivery with a maternal co-morbidity – 60 cases/procedures*
  - *Anaesthesia for vaginal delivery with a high risk obstetrical/fetal condition – 40 cases/procedures*
  - *Anaesthesia for Caesarean delivery with a maternal co-morbidity – 40 cases/procedures*
  - *Anaesthesia for Caesarean delivery with a high risk obstetric/fetal condition – 40 cases/procedures*
  - *Anaesthesia during the 1st, 2nd, 3rd trimester – other than Caesarean delivery – 15 cases/procedures*
  - *General anaesthesia for Caesarean delivery – 4 cases*

The fellow in obstetric anaesthesia is also required to have experience in management of spontaneous and operative vaginal delivery, postpartum tubal ligation, cervical cerclage, and assisted reproductive technology interventions, retained placenta, uterine curettage and cervical dilation. The anaesthetic management of vaginal delivery should include experience with all types of neuraxial analgesia

(including epidural analgesia, combined spinal-epidural analgesia and single dose spinal analgesia for labour). Experience with the anaesthetic management of EXIT procedures is desirable.

- Additional clinical experience within the full one-year fellowship in obstetric anaesthesia should include consultation and management for pregnant patients requiring non-obstetric surgery
- It is important for the obstetric anaesthesia fellow to gain knowledge in interpretation of antepartum and intrapartum fetal surveillance tests. It is desirable to for the programme offering fellowship in obstetric anaesthesia to establish a rotation in antepartum testing unit during the fellowship training.
- The programmes offering fellowship in obstetric anaesthesia must develop methods for fellows to acquire the knowledge and skills necessary for routine and advanced neonatal resuscitation and Neonatal Advanced Life Support certification. It is desirable that there is at least 2 week rotation in neonatal intensive care unit (NICU).
- The fellow must conduct or be substantially involved in a scholarly project during the fellowship training. Presentation at national and international meetings and publications in peer-reviewed journals is desirable.

Didactic Curriculum

The didactic curriculum can be provided through conferences, lectures, workshops and facilitated self learning. The didactic curriculum should focus on the following areas:

- Maternal physiology
- Fetal and placental physiology and pathophysiology
- Embryology and teratogenicity
- Neonatal physiology and neonatal resuscitation
- Obstetric management of labour (normal and abnormal)
- Pain of labour and pain pathways
- Tocolytic therapy
- Local anaesthetic use in obstetrics
- Neuraxial use of opioids in obstetrics
- Regional anaesthetic techniques in obstetrics
- General anaesthesia in obstetrics
- Anaesthetic and obstetric management of complications
- Medical disease and pregnancy
- Cardio-pulmonary resuscitation and advanced cardiac life support of the parturient
- Postpartum tubal ligation
- Post-operative pain management in obstetrics
- Maternal medications and breastfeeding
- Non-obstetric surgery during pregnancy
- Ethics of research in pregnant women
- Ethical issues during pregnancy
- Organisation of obstetric anesthesia service
- Maternal mortality
- Medical economics
- Monitoring and transport of critically ill parturients

Curriculum of scholarly activity

Each programme offering a fellowship in obstetric anaesthesia must provide an opportunity for fellows to participate in research or other scholarly activities. Fellows should obtain competence in the six areas listed below [12]:

- Patient care that is compassionate, appropriate and effective for the treatment of health problems and the promotion of health
- Medical knowledge about established and evolving biomedical, clinical and cognate sciences, as well as the application of this knowledge to the patient care
- Interpersonal and communication skills that result in the effective exchange of information and collaboration with patients, their families, and other health professionals
- Practice-based learning and improvement that involves the investigation and evaluation of care for their patients, the appraisal and assimilation of scientific evidence, and improvements in patient care
- System-based practice, as manifested by actions that demonstrate an awareness of and responsiveness to the larger context and system of health care, as well as the ability to call effectively on other resources in the system to provide optimal health care
- Professionalism, as manifested through a commitment to carrying our professional responsibilities, adherence to ethical principles, and sensitivity to patients of diverse backgrounds

All patient care by the fellows must be supervised by qualified faculty. Duty hours for obstetric anaesthesia fellows in the United States are limited to 80 hours per week. The Programme Director must provide a final evaluation for each fellow who completes the program [12].

The American Society of Anesthesiologists Task Force on Obstetric Anesthesia have published an updated version of the *Practice guidelines for obstetric anesthesia: an updated report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia* [13]. In July 2002, the American College of Obstetrics and Gynecology (ACOG) published an ACOG Practice Bulletin entitled *Obstetric analgesia and anesthesia* [14]. The purpose of both documents is to help anaesthesiologists and obstetrician-gynaecologists understand the available methods of pain relief in labor to facilitate communication with each other and other colleagues (such as neonatologists) in the labour and delivery suite, thereby, optimising patient comfort while minimising the potential for maternal and neonatal morbidity and mortality.

Key Learning Points

- Obstetric anaesthesia has become a recognised subspecialty of anaesthesiology and an integral part of practice of most anaesthesiologists.
- An obstetric anaesthesiologist has become an essential member of the obstetric care team, who closely works with the obstetrician, midwife, neonatologist and Labour and Delivery Ward nurse to ensure the highest quality care for the parturient and her baby.
- The anaesthesiologist's unique skills in acute resuscitation combined with experience in critical care make members of this subspecialty of anaesthesiology particularly valuable in peripartum care of the high-risk patients, extending our role well beyond the routine provision of intrapartum anaesthesia or analgesia.
- In addition to clinical challenges obstetric anaesthesia is laden with medico-legal liability. Obstetric anaesthesiologists are frequently named (besides obstetricians) in claims involving poor neonatal outcome.
- The recommended duration of subspecialty training in obstetric anesthesia in the United States is a minimum of twelve months. The Society for Obstetric Anesthesia and Perinatology in the United State has recently prepared a draft of a *Program Requirements for Fellowship (CA-4) Education in Obstetric Anesthesiology.*

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