# Antenatal anaesthetic assessment of high risk obstetric patients

Nosakhare A Uwubamwen

Dipali Verma

## Abstract

Early identification and anaesthetic assessment of high-risk patients in pregnancy is important and best delivered through a formal assessment clinic. It provides the opportunity to provide information, agree management plans, and carry out necessary investigations and referrals to other specialists prior to labour and delivery. Clear referral criteria and lines of communication are necessary for an effective service.

**Keywords** Anaesthesia; antenatal; assessment; clinic; obstetrics

**Royal College of Anaesthetists CPD Matrix:** 2B06

## Introduction

Obstetric anaesthetists are often involved in the peripartum assessment and care of pregnant women. However, it is not cost effective or necessary for all pregnant women to be seen by an obstetric anaesthetist in the antenatal period. The maternal mortality rate in the UK is low (9.8 per 100,000 maternities)[1] and even lower in other developed countries like Sweden (4 per 100,000). African, Asian and older women continue to have a higher risk of dying in pregnancy.[1]

Reasons for improvements are multifactorial and include advances in medical, surgical, obstetric and maternal critical care. This improved healthcare has resulted in the survival of an increasing number of women with significant co-morbidities into childbearing age. Factors such as advancing age of pregnancy, infertility treatments, morbid obesity, congenital heart disease and sickle cell disease patients living to adulthood has led to an increasing number of high-risk pregnant women. The surveillance of maternal deaths in the UK 2014—2016[1] showed most of the women who died had pre-existing multiple medical and mental health problems or vulnerabilities before they became pregnant.[1]

**Nosakhare A. Uwubamwen** MBBS FCARCSI FRCOG is a Consultant in General and Obstetric Anaesthesia and Honorary Senior Lecturer, Directorate of Anaesthesia, Central Manchester University Teaching Hospitals NHS Foundation Trust, Manchester, UK. Conflicts of interest: none declared.

**Dipali Verma** MBBS DA FRCA Consultant in Obstetric Anaesthesia, Tom Bryson Department of Anaesthesia, Liverpool Women's Hospital NHS Trust, Liverpool, UK. Conflicts of interest: none declared.

These groups of patients require careful antenatal assessments and planning of peripartum care by the multidisciplinary team. Obstetric anaesthetists, with their training and experience of the management of critically ill patients in other hospital settings are in an important position to contribute significantly to the assessment, management and planning for this group of patients. The primary objectives of such antenatal assessment of high-risk obstetric patients are summarized in Box 1. Such assessments offer several benefits (Box 2) for the patient, anaesthetist and obstetrician.

An international questionnaire-based survey[2] of 36 obstetric units showed that in 37% of the units anaesthetists were involved in prenatal examinations and give advice in cases of complicated pregnancy, but only 23% of units had obstetric anaesthesia out-patient clinics.

A 2005 survey in the UK[3] showed 70% of responding units did not have a formal antenatal anaesthetic service but there has been a significant increase in the availability of antenatal anaesthetic assessment clinics (AAACs) in the UK in the past decade[4] and the process by which women are referred has become more formal.

## Key factors in setting up and running an effective clinic or AAAC service

This can be challenging both clinically and organizationally. It requires careful planning, cooperation and communication between the obstetric, midwifery and anaesthetic teams. The communication lines must be clear so that high-risk patients are identified, assessed and investigated promptly. The management plan should be documented and easily accessible to the attending clinician at the time of delivery. Ideally this should be in the patient's hospital case notes, summarized in the patients' hand-held notes and in an electronic format easily accessible on the delivery suite. The question of who refers patients to the clinic and the referral guidelines or criteria should be clarified to the obstetric and midwifery team and displayed in the antenatal clinic area. Midwives and obstetricians should be able to refer directly to the clinic following the agreed criteria for referral. Box 3 shows a typical list of criteria for referral to an obstetric anaesthesia clinic. The referral letter or form should contain the patient's demographic details as well as her obstetric and medical history. The reason for referral as well as any results of investigations should be specified. Referrals need to be planned to allow time for any necessary investigations and planning around delivery, if there is significant chance of preterm delivery this must be taken into consideration when arranging appointments.

---

### Aims of antenatal anaesthetic assessment clinic

- Discuss and provide appropriate information to parturient about her anaesthetic peripartum management
- Identify and manage in the antenatal period risk factors that may adversely affect pregnancy outcome
- Recommend a strategy for anaesthetic management during labour and delivery e the individualized management plan (IMP)
- Identify mother with anaesthetic risk, e.g. contraindications to regional analgesia, difficult airway
- Manage and optimize existing medical conditions
- Identify risks for emergency caesarean section

**Box 1**

---

Some units have a semi-formal arrangement to assess their high-risk patients on the labour ward but this is not an ideal setting for the clinic. A dedicated antenatal clinic located in the antenatal clinic area and run by an experienced obstetric anaesthetist offer a more formalized and effective assessment regime. This can run concurrently with a high-risk obstetric clinic where a special interest obstetrician and/or physician are also present. This facilitates communication between the anaesthetic and obstetric teams. Adequate medical, midwifery and secretarial support should be funded and provided. Careful clinical decision-making and management may reduce the likelihood of these high-risk patients developing life-threatening conditions and severe maternal morbidity or mortality.[5]

**The individualized management plan (IMP):** It is key that care plans are communicated. It should be brief, clear, specific and located where it can easily be accessed. It should be discussed with the patient who is then invited to be part of a holistic approach to her care. She is encouraged to take part ownership of her care by understanding the plans and co-operating with the planned care.

### Does AAAC make a difference to outcome?

There is currently no prospective data available to substantiate improved maternal outcomes following early anaesthetic assessment. However, it seems logical that an early intervention

---

### Benefits of a formal obstetric anaesthesia clinic

- Advantages for the patient, anaesthetist and obstetrician as care is planned specific to the patient's condition and requirements
- Reduce incidence of unexpected difficult problems in the peripartum period
- Ability to optimize care
- A formal out-patient clinic further improves our ability to assess these patients with complex issues
- Antenatal education for mothers. This can lead to increased ability to make informed choices, reduces anxiety and may increase satisfaction

**Box 2**

---

### Criteria for referral to antenatal anaesthetic assessment clinic

- **Musculoskeletal diseases**, e.g. spina bifida, low back pain, lumbar disc disease/surgery, fractured lumbar vertebrae, scoliosis
- **Morbid obesity** with BMI >40 at booking or in the 1st trimester
- **Neurological diseases**, e.g. stroke, neuromuscular disease, previous neurosurgery. Multiple sclerosis, myopathies, spina bifida
- **Cardiac disease**, e.g. valvular disease, arrhythmias, coronary heart disease, congenital heart disease, cardiac surgery
- **Respiratory disease**, e.g. severe asthma, cystic fibrosis
- **Haematological disease**, e.g. coagulation disorders, thrombocytopenia, haemoglobinopathy
- **Endocrine disease**, e.g. diabetes
- **Hepatic disease**
- **History of adverse drug reactions**, e.g. reactions to local anaesthetic, neuromuscular blocking agents (NMBA) and history of susceptibility to malignant hyperthermia
- **Previous problems with regional or general anaesthesia**, e.g. difficult intubations
- **Severe hypertensive disease** (other than pre-eclamptic patients who will be seen as acute emergency cases)
- **Connective tissue disorders**, e.g. rheumatoid arthritis, scleroderma, systemic lupus erythematosus
- **Transplant recipients**

**Box 3**

---

approach can potentially minimize substandard anaesthetic care of high-risk patients. As described by Geller et al.[6] there is a continuum of temporal events: normal or healthy pregnancy → morbidity → severe morbidity → near miss → death. Identifying patients who are at risk of progressing along this continuum will assist clinicians in reducing severe maternal morbidity and mortality rates.

The importance of such early identification and management of these cases is emphasized in various reports of the Confidential Enquiries into Maternal death in the UK. It recommends that women with cardiac and other medical disease should be seen in the antenatal anaesthetic clinic and women with significant pregnancy-induced hypertension (PIH) and high BMI should also receive joint care from an early stage.[7]

In a review of 136 patients seen at their obstetric anaesthesia assessment clinic over a 6-year period Rosaeg et al.[8] concluded that mothers benefited from antenatal education regarding options for pain relief and delivery, which was associated with a decrease in anxiety and an increased ability to make informed choices.

**Case mix of referrals:** The spectrum of cases seen varies with each catchment area of individual maternity units and reflects the complexities of cases seen in that hospital. Tertiary referral centers are increasingly dealing with pregnant women with complex medical disorders. In a review of 1000 referrals in a tertiary centre,[9] case mix was reported as follows: musculoskeletal (37%), cardiac (19.3%), haematological (10.3%), anaesthetic (9.5%), neurological (7.8%) and respiratory (3%). These findings compare closely with other reviews.[8,10,11]

## The clinic

Zuokomor[12] has summarized history, examination and common investigations undertaken in an obstetric anaesthesia clinic. It should be entirely consultant led and discussion with the patient, with or without her partner, regarding her risks and medical management on the labour ward. The patient should be offered advice on labour analgesia and anaesthesia in case of operative delivery. This information should be documented on the notes and patients' handheld antenatal notes, sent to the referring midwife or doctor through a formal letter. A multidisciplinary care plan based on the best current evidence will be prepared promptly for management in labour or in case of emergency. A copy of the care plan should be sent to the patient for attachment to the handheld notes.[13]

### Airway assessment

Assessment of the airway is important. The Mallampati test assesses the size of the tongue in relation to the oropharynx. The score seems to increase with gestational age and weight gain during pregnancy as well as in the course of a prolonged labour. The test has a low predictive value on its own and should be used in combination with other airway assessment tests in order to improve its sensitivity and specificity. In combination with 'thyromental distance' evaluation, the specificity is 98% and sensitivity 80%.[14]

### Musculoskeletal conditions and morbid obesity

Musculoskeletal conditions and morbid obesity (either as sole reason for referral or as part of multi-system pathology) are the most common reason for referral to many obstetric anaesthesia clinics.[8–11] Morbidly obese women (BMI>40) should be referred for anaesthetic assessment as part of antenatal care. Presenting disorders include non-specific back pain, disc prolapse, scoliosis and previous surgery. Apart from previous back surgery regional anaesthesia placement is often not a problem. Patients with severe kyphoscoliosis should be offered a formal cardiac and respiratory assessment. Most common anaesthetic reasons for referral were failure of previous regional block.

Ultrasound-assisted techniques are increasingly being used in obstetric anaesthesia clinics to help with assessment for regional anaesthesia procedures. It can be especially helpful in cases of morbid obesity and spinal abnormalities.[15] It helps to identify key anatomical landmarks, visualization of relevant anatomy, identification of optimum insertion points, and the angle of insertion of the needle and to determine depth of the epidural space. Its limitation however, is the inability to perform the epidural procedure under live direct needle visualization.

### Cardiovascular disease

There is a need to appreciate the profound impact of physiological changes in pregnancy on pre-existing cardiac disease. Deterioration of maternal condition can be confused with the 'normal' symptoms of pregnancy, so careful assessment is required. Cardiac conditions like aortic or mitral stenosis, cardiomyopathy and coarctation of aorta are associated with significant maternal and fetal risks. Assessment and management of these groups of pregnant women need early involvement of cardiologists with interest in obstetrics to ensure clear management plans are in place for delivery.

### Respiratory disease

All women with respiratory disease should have an early thorough antenatal assessment including pulmonary function tests done in order to determine their respiratory reserve, to construct a relevant management plan and to optimize their care. The most commonly encountered respiratory disease amongst the pregnant population is asthma. It often improves with pregnancy due to the effects of progesterone and cortisol.

### Neurological disease

The neurological conditions that are most commonly encountered in the pre-assessment clinic include epilepsy, multiple sclerosis and spina bifida. Involvement of a neurologist and an early referral to an anaesthetist is advised. Plan with regard to medication, birth plan and discuss analgesic/anaesthetic options. Accurate documentation of any pre-existing neurological deficit is essential.

### Haematological disorders

Venous thrombo-embolism occurs in 0.1% of pregnancies but is the most common direct cause of maternal death. Point of care haematological assessment using thromboelastography (TEG) is a useful assessment and management tool. TEG can guide therapy by documenting changes in coagulation in vitro before a therapy is instituted and also by helping the clinician make critical decisions. Women who have inherited bleeding disorders may be at significant risk of bleeding following miscarriage, abortion, antenatal procedures and delivery. These patients require multidisciplinary specialized care tailored to the individual, with cross-specialty communication, including anaesthetists and neonatologists as necessary.[16]

### Audit and research

Effectiveness of the AAAC should be audited regularly. Compliance with the referral criteria and individualized management plans, percentage of missed referrals that arrive for delivery as well as disease-specific reviews of referred cases (e.g. cardiac disease, morbid obesity, haematological conditions, etc.) should form part of ongoing audits. Having a prospective record keeping of data in a computerized database will improve quality of the audit data. These databases can be utilized for quality improvement projects and further research. ◆

## REFERENCES

1 Knight M, et al. MBRRACE-UK. Saving lives, improving mothers' care lessons learned to inform maternity care from the UK and Ireland confidential enquiries into maternal deaths and morbidity, 2014–16.

2 Hamar O, Garamvogyi G. Obstetric anesthetic outpatient clinics: an international Survey. *Int J Gynecol Obstet* 1990; **33:** 235–8.

3 Rai MR, Lua SH, Popat M, Russell R. Antenatal anaesthetic assessment of high-risk pregnancy: a survey of UK practice. *Int J Obstet Anesth* 2005; **14:** 219.

4 Roe MD, Nabeih W. Antenatal anaesthetic assessment clinics: a survey of United Kingdom practice. *Int J Obstet Anesth* 2018; **37:** 139–41.

5 ButwickB AJ. Carvalho Can we improve maternal outcome for high-risk obstetric patients? *Int J Obstet Anesth* 2007; **16:** 311–3.

6  Why mothers die. Report on confidential enquiries into maternal deaths in the United Kingdom 2000—2002. London: RCOG Press, 2004.

7  Geller SE, Rosenberg D, Cox SM, et al. The continuum of maternal morbidity and mortality: factors associated with severity. *Am J Obstet Gynecol* 2004; **191:** 939—44.

8  Lewis G. The confidential enquiry into maternal and child health (CEMACH). Saving mothers' lives: reviewing maternal deaths to make motherhood safer-2003—2005. In: The seventh report on confidential Enquiries into maternal deaths in the United Kingdom. London: HMSO, 2007 [London: CEMACH].

9  Rosaeg OP, Yarnell RW, Lindsay MP. The obstetrical anaesthesia assessment clinic: a review of six years' experience. *Can J Anaesth* 1993; **40:** 346.

10  Cormack C, Francis S, Yentis S. Antenatal anaesthetic assessment of the pregnant woman. *Anaesth Intensive Care Med* 2007; **8:** 269.

11  Uwubamwen N, Patel S, Vaddhireddy R, Eltoft E. A 2 Year review of obstetric anesthesia outpatient clinic for high risk obstetric anesthesiology. In: 109 A1118 presented at the at American society of anesthesiologist's annual scientific meeting October 20, 2008. Orlando, Florida, 2008.

12  Zuokumor Preye. Antenatal anaesthetic assessment of the obstetric patient. *Anaesth Intensive care med* 2013; **14:** 269—71.

13  OAA/AAGBI guidelines for obstetric anaesthetic services, 2013 [Published by].

14  Frerk CM. Predicting difficult intubation. *Anaesthesia* 1991; **46:** 1005—8.

15  Carvalho JCA. Ultrasound facilitated epidurals and spinals in obstetrics. *Anesthesiol Clin* 2008; **26:** 145—58.

16  Management of inherited bleeding disorders in pregnancy (Green-top guideline No. 71) RCOG. Accessed 20 March 2019.