

High-Risk Obstetric Anaesthetic Clinic

Department of Anaesthesia / Maternal Medicine

Annual Report 2014

January – December 2014

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1. Staff Members

Consultant Anaesthetists

Dr R Wendler, Consultant Obstetric and Cardiac Anaesthetist
Dr F Schroeder, Consultant Cardiac and Obstetric Anaesthetist
Dr S Hammond, Consultant Obstetric Anaesthetist

Consultant Obstetricians

Ms I Watt-Cote, Consultant Obstetrician, Maternal Medicine

Fetal Medicine Unit

Mr A Bhide, Consultant Obstetrician
Dr J S Carvalho, Consultant Fetal Cardiologist
Dr T Homfray, Consultant Geneticist
Ms S Linton, Midwifery Manager; Lead Midwife FMU
Mr A Papageorghiou, Consultant Obstetrician
Ms C Romer, Lead Midwife Maternal Medicine
Mr B Thilaganathan, Consultant Obstetrician; Lead Clinician, Fetal Medicine Unit

Specialists

Dr L Anderson, Consultant Cardiologist
Dr S Austin, Consultant Haematologist
Dr E Behr, Consultant Cardiologist
Dr A M Belli, Consultant Radiologist
Dr S Brecker, Consultant Cardiologist
Dr N Bunce, Consultant Cardiologist
Dr A Child, Honorary Consultant, Cardiology and Cardiovascular Genetics
Miss S Carr, Transfusion Nurse Specialist
Miss K Feane, Transfusion Nurse Specialist
Prof M Jahangiri, Consultant Cardiac Surgeon
Prof B Madden, Consultant in Respiratory Medicine and Intensive Care
Dr R Morgan, Consultant Radiologist
Dr E Rhodes, Consultant Haematologist
Dr R Sharma, Consultant Cardiologist
Prof S Sharma, Consultant Cardiologist
Dr J Uprichard, Consultant Haematologist
Dr D E Ward, Consultant Cardiologist
Miss Anne Wareing, Clinical Nurse Specialist, Haematology

2. Background and Summary

The High-Risk Obstetric Anaesthetic Clinic forms part of the Maternal Medicine team since 2005/2006 and is held every Thursday morning in the Fetal Medicine Unit (FMU). It is a service for all women with medical disorders and/or anticipated anaesthesia-related problems in pregnancy, providing advice on various methods of pain relief in labour and the peri-operative management of high-risk patients during delivery.

Since 2006 we have produced an annual report detailing the activities of the clinic. The report for 2012 also reviewed and compared the patients from the previous 5 years with patients who attended the clinic in 2012.

From January to December 2014, a total of 328 appointments were allocated and 284 patients attended the clinic.

The case mix remains stable and, as in previous years, anaesthesia-related referrals accounted for almost a third of all appointments. The second largest group in 2014 were women referred with morbid obesity (body mass indices of more than 40 kg/m²) followed by women who suffered from haematological disorders and/or who were therapeutically anti-coagulated. Every tenth clinic slot is allocated to a woman with cardiac disease in pregnancy.

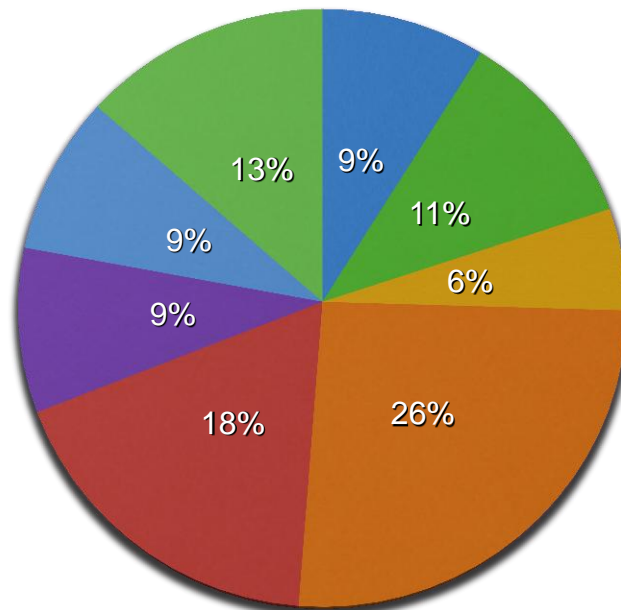
3. Activity Analysis

From January to December 2014 a total of 284 patients were seen in the clinic, 328 appointments were offered. 44 patients postponed/cancelled and some patients delivered prior to their appointment. On average, six women were seen on each clinic day (284 patients on 45 Thursdays).

In 2014 about a third of all patients (30%) attended with anaesthesia-related problems. Haematological disorders in pregnancy were the most frequent maternal medical condition referred to the clinic (13%) and just over 10% were referred for cardiac disease in pregnancy. 2014 saw an increase in the number of patients with neurological disease doubling to 10% in addition to an increase in women with other pre-existing medical disorders, from 8% to 10%. The number of morbidly obese women attending the clinic has been static since 2013 at about 20% of all appointments. The number of women who categorically refused the transfusion of blood/blood products, mainly Jehovah's Witnesses, (JW) dropped slightly to 6% of all attendances. 15% of all clinic appointments were not utilised due to the patient not attending or the appointment being cancelled/postponed by the patient at short notice, this figure is similar every year, in some cases patients delivered before their clinic appointment. A patient with previous severe pre-eclampsia was also seen this year, the only patient referred with a primary obstetric condition.

Figure 1: Clinic activity

■ neurology ■ haematology ■ JW ■ Anaesthetic ■ BMI ■ Cardiac ■ Misc ■ DNA



Management plans were issued for patients who presented with a complex disorder, severe enough to require a detailed plan for further management in pregnancy and the peripartum period. Overall, 176 plans were issued (61%) which is consistent with previous years. All other patients had detailed entry in their handheld notes.

Some women were seen in clinic but subsequently delivered in another hospital, some data sets are therefore incomplete.

Anaesthesia-related Problems in Pregnancy

A total of 84 women with previous or anticipated anaesthesia-related problems attended the clinic. The most frequent reasons for referral were serious back problems (e.g. operations on the lumbar spine and/or discectomies, scoliosis, or problems with regional anaesthesia during previous deliveries). An appointment was also offered to every woman who suffered from postdural-puncture-headache and/or underwent a blood patch for this condition.

Cardiac Disease in Pregnancy

Twenty nine patients with various cardiac diseases attended the clinic in 2014. The majority of patients presented with acquired cardiac pathologies such as valvular abnormalities or cardio-myopathies. Two patients were seen with Postural Tachycardia syndrome. A smaller number suffered from congenital heart disease, various arrhythmias or conduction disorders. In close co-operation with cardiologists, all women who delivered in the reporting period were successfully managed at St. George's Hospital.

Haematological Disease in Pregnancy

Thirty six women with different haematological disorders attended the clinic, all of whom were managed jointly with the Department of Haematology at St George's Hospital. A large group of women presented with a history of DVT/PE and received complex anti-coagulation. Other patients suffered from disorders such as thrombocytopenia, sickle cell disease, haemophilia and/or other clotting factor disorders and one patient had thrombotic thrombocytopenia TTP.

Neurological Disease in Pregnancy

There was a significant increase in neurological patients seen in 2014, 29 patients with various pre-existing disorders (e.g. epilepsy, cerebral AV-malformations, intra-cranial tumors) were successfully managed in conjunction with neurological and neurosurgical teams at St. George's Hospital.

Other Medical Disorders in Pregnancy

Twenty eight patients presented with various other medical disorders, including a woman with a renal transplant, SLE and connective tissue disorders; all of these women required a management plan.

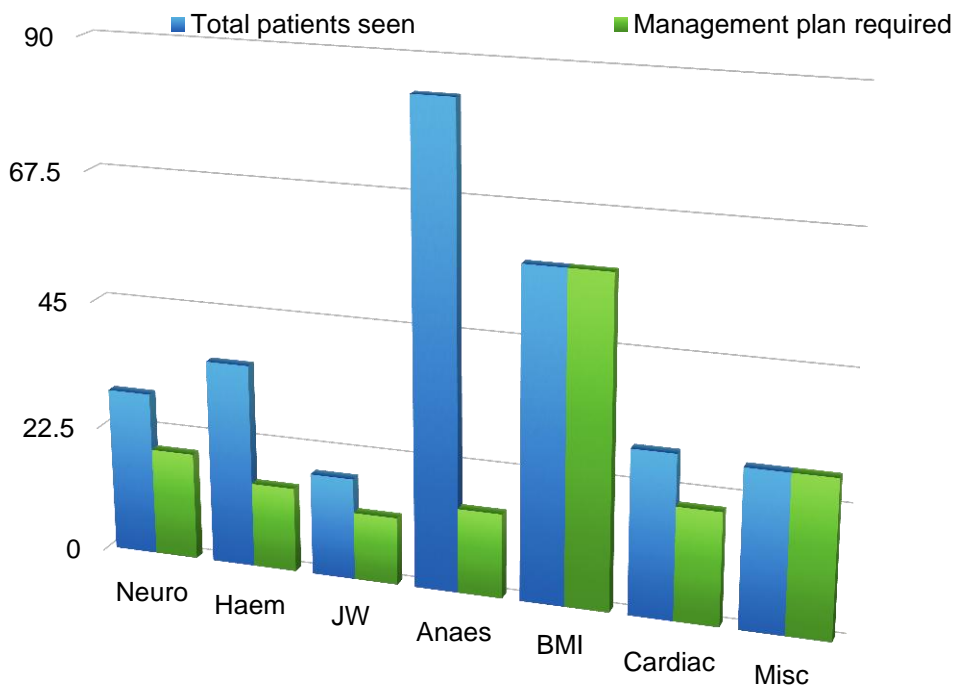
Morbidly Obese Women

Compared with previous years there was a slight decrease in the number of patients referred to the clinic for morbid obesity (58; 20 % of patients). In line with NICE and CNST Guidelines, all these women were formally assessed for anaesthetic risks and the results were documented in a “*Pregnant women with increased BMI*” assessment form.

Women who categorically refuse the transfusion of blood products (Jehovah’s Witnesses)

Eighteen women who categorically refused the transfusion of blood or blood products during or after delivery were referred to the clinic. They were counseled according to Trust Guidelines in a multidisciplinary meeting with obstetricians, transfusion practitioners and anaesthetists.

Figure 2: Number of management plans issued in 2014 (all other patients had detailed notes entry)



4. Management

As in previous years, the management plan included details of the patient's obstetric history (parity, gestation, expected date of delivery [EDD], problems with previous deliveries), the anticipated mode of delivery and, if necessary, the recommended anaesthetic technique. In addition, the level of post-partum care and monitoring, the anaesthetic/obstetric management in possible early labour, and/or in an emergency situation, were 'pre-planned'.

A hard copy of the management plan was available in the hospital and 'hand-held' maternity notes, as well as in the 'High-Risk-Folder' in the anaesthetic office on Labour Ward. The plans were also saved electronically in the electronic patient record system (EPR).

In more complex cases, or whenever referrals to other specialties or investigations are still outstanding, only a preliminary management plan is produced. Correspondence, letters and notes concerning the patients are kept in the anaesthetic office and are accessible for medical staff out of hours in case of emergencies or unexpected admissions. In the most challenging cases a multidisciplinary meeting is held. We also offer advice to anaesthetic colleagues, obstetricians and to labour ward staff, including out of hours if required.

Most high-risk cases are admitted to and cared for on the Obstetric High Dependency Unit ('Labour Ward HDU'). This means that the baby, the mother and her partner are able stay together after the delivery, only a very small number of women will be transferred to the General Intensive Care or Cardio-Thoracic Intensive Care Unit.

(Not all patients seen in the clinic in 2014 delivered in the reporting timeframe, also few patients that were seen in the clinic in 2013 appear in this report as they delivered in 2014.)

Management of Cardiac Disease in Pregnancy

Risk assessment

Thorough risk assessment and careful planning during pregnancy and delivery are key elements in the management of patients with maternal cardiac disease. Results from the CARPREG study provide valuable guidance for the management of these patients. Depending on the underlying disease and the Toronto Risk Index patients can be allocated to different levels of care. Patients who score high-risk markers should be treated in specialised units and by a multidisciplinary team.

- Toronto Risk Markers:
 - Earlier cardiovascular events or arrhythmias
 - NYHA >II or cyanosis
 - Left heart obstruction (Mitral valve stenosis < 2cm², Aortic valve stenosis < 1.5cm² or outflow tract gradient > 30 mmHg by echocardiography)
 - Ejection fraction <40%

Predicted complications during pregnancy for patients with maternal cardiac disease range from 5% to 75%, depending on the number of risk markers.

Delivery details, cardiac disease in pregnancy in 2014 (delivered n=21)

- o SVD +/- epidural analgesia n = 9 (43%)
- o Instrumental delivery (forceps/ventouse): n= 3 (14%)
- o LSCS for non-obstetric/obstetric reasons: n= 9 (43%)

Only a minority from this group required a LSCS because of the cardiac condition itself. For one woman a general anaesthetic was required for LSCS due to therapeutic anticoagulation. In 2014 there were no unexpected admissions to the general or cardiac intensive care unit in this group of patients.

Management of Haematological Disease in Pregnancy

Whenever women required anticoagulation during pregnancy, management in respect to anaesthesia was discussed. If appropriate, anticoagulation was stopped 12-24 hours prior to delivery to allow for safe regional analgesia and anaesthesia. Anticoagulation was recommenced as soon as possible after childbirth or operative delivery (usually four hours postpartum). Other women required the transfusion of various clotting factors or platelets.

If epidural analgesia was contraindicated, a Remifentanil-PCA (Patient Controlled Analgesia) was offered. Suitable patients received an approved information leaflet about analgesia with Remifentanil (two women in this group received a Remifentanil-PCA).

Bleeding complications in this group were as frequent as in the 'general population'; one 1700ml PPH occurred due to uterine atony and not because of the patient being anticoagulated. The outcome for mother and baby was very favorable.

The uptake of neuraxial analgesia and/or anaesthesia was slightly lower in this group (19%) compared to non-clinic patients (25%) and only one patient required a general anaesthetic for haematological reasons.

Management of Neurological Disease in Pregnancy

Twenty-nine women presented with various neurological conditions and were managed during pregnancy and delivery after they had a consultation with a neurologist or neurosurgeon. If required, antiepileptic therapy was modified during pregnancy. In this group 37% of patients delivered by LSCS and 10% by assisted delivery; a further three women required general anaesthesia for a LSCS and 2 were offered a Remifentanil PCA for labour analgesia as they were

unable to have a regional technique. In most cases, an operative delivery was necessary to avoid an increase of intra-cranial pressure during labour and delivery.

Management of Other Medical Disorders in Pregnancy

Twenty-eight women who presented with various medical disorders were seen and delivered in 2014. In addition 5 patients delivered in 2014 that had been assessed in late 2013.

In this group, 18 (54%) had a vaginal delivery which represents a significant increase compared with the previous year; 6 women (18%) required an instrumental delivery and 9 (27%) a LSCS. Three women utilised a Remifentanil PCA for labour analgesia; two patients required general anaesthesia for LSCS (spinal TB requiring spinal surgery and intensive care therapy post-operatively in one case).

Management of Anaesthesia-related Problems

As in previous years, the majority of women in this group could be reassured that regional analgesia/anaesthesia would still be a safe option during childbirth. The assessment was usually followed by a detailed discussion about possible complications and side effects of regional anaesthesia.

If epidural analgesia was thought impossible to perform safely, other methods of pain relief in labour were discussed. In these cases, as for a number of patients with haematological disorders, a Remifentanil PCA was offered. Compared with previous reports, vaginal delivery accounted for the vast majority of deliveries compared with LSCS and instrumental.

Management of Women who categorically refuse the Transfusion of Blood Products (Jehovah's Witnesses)

According to Trust Guidelines, 'case conferences' were arranged for these patients at 24 to 34 weeks' gestation and a transfusion practitioner or haematologist, obstetrician and anaesthetist were present. After detailed explanations about transfusion alternatives and the possible implications of the decision not to receive blood and/or blood products, a written and signed document as well as a valid 'Advanced Directive' was prepared for all patients in this group. Haematological results were also reviewed and, if indicated, medication to stimulate red blood cell production were prescribed.

Since Jehovah's Witnesses are usually not referred for medical reasons, their probability for a LSCS was expected to be the same (or lower) compared to the 'general population', and in 2014 only 10% of the JW patients delivered by LSCS. However, 16% in this group lost more than 500mls of blood but there were no serious maternal complications and/or admissions to the intensive care unit.

Management of Morbidly Obese Women

Fifty-eight women with morbid obesity (BMI >40 kg/m²) were scheduled to see an anaesthetist in 2014 (and a further 4 delivered who were seen in late 2013). During these consultations, and as recommended in the latest *Confidential Enquiry into Maternal Death*, the medical history, the patient's airway and the anatomy of her (lumbar) spine and venous access were thoroughly investigated. Pain relief during labour and for delivery was discussed in detail and early epidural analgesia was usually recommended.

According to recently published guidelines on DVT prophylaxis, most obese patients are anti-coagulated (prophylactic dosage) which potentially can interfere with regional anaesthesia. In agreement with the responsible consultant, we adopted the following dosing regimen for thrombo-prophylaxis for obese patients:

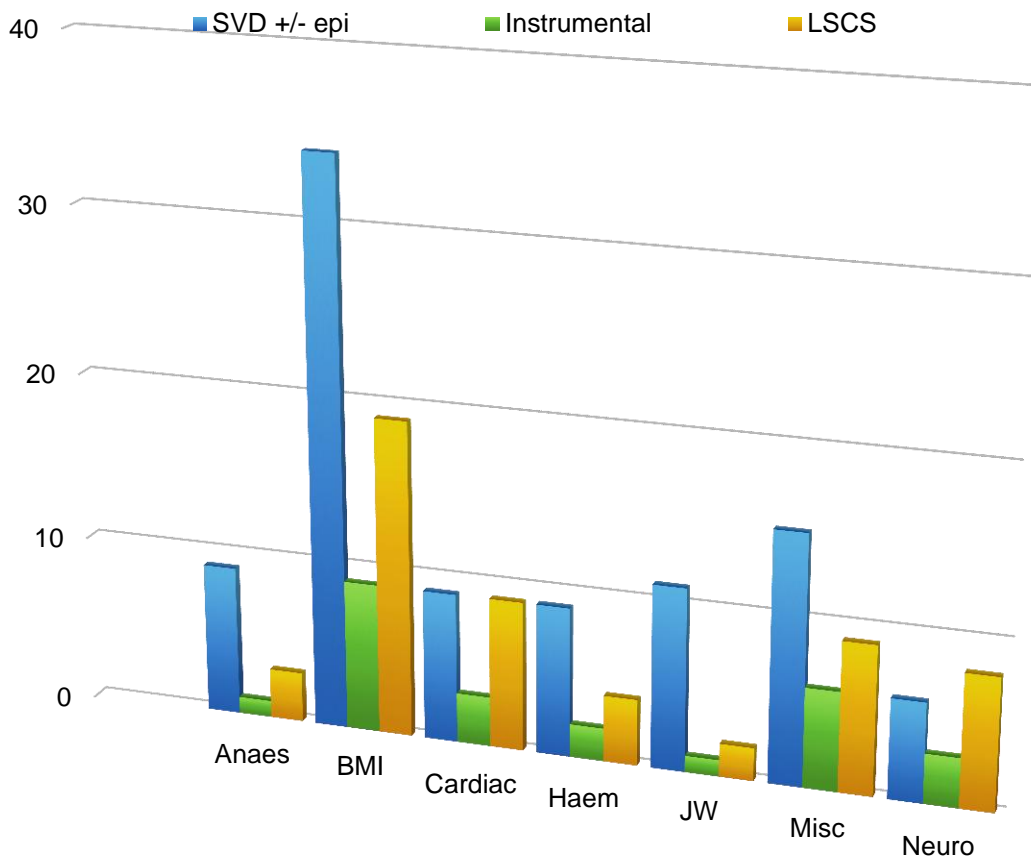
| | |
|----------------------|--|
| > 50kg and < 100Kg: | Dalteparin 5000 IU OD |
| > 100 kg and <150kg: | Dalteparin 5000 IU BD |
| > 150 kg: | Dalteparin 5000 IU BD/ + 6 weeks 7500 IU BD post-partum |

74% of morbidly obese women seen in clinic received low-molecular heparin. Some women are reluctant to take anticoagulation antenatally even when informed of their thromboembolic risks.

For the first time since 2012, the rate for LSCS (elective/emergency) and instrumental deliveries amongst these patients has fallen. Thirty-four (55%) women had a SVD, 9 (15%) had an instrumental and 19 (30%) a LSCS, which is higher than the Trust's overall average LSCS rate at 24%. One patient required general anaesthesia for a LSCS due to a ruptured uterus.

The uptake of epidural analgesia increased to 21 (34%) women. Therefore, in almost three quarters of patients from this group some form of anaesthetic 'input' was required. These figures confirm the same trends noted in previous CEMACH reports and also in our annual report from 2012.

Figure 3: Mode of delivery in different patient groups, (total numbers) in 2014



5. Outcome

Fortunately, in 2014 none of our clinic patients suffered severe morbidity or mortality during labour, delivery or in the post-partum period (up to 6 weeks after delivery). 3 babies required admission to the neonatal unit and tragically there was 1 still-birth amongst the patients seen that was unrelated to the medical condition. There was only one (planned) admission to GITU and no anaesthetic complications amongst the clinic patients.

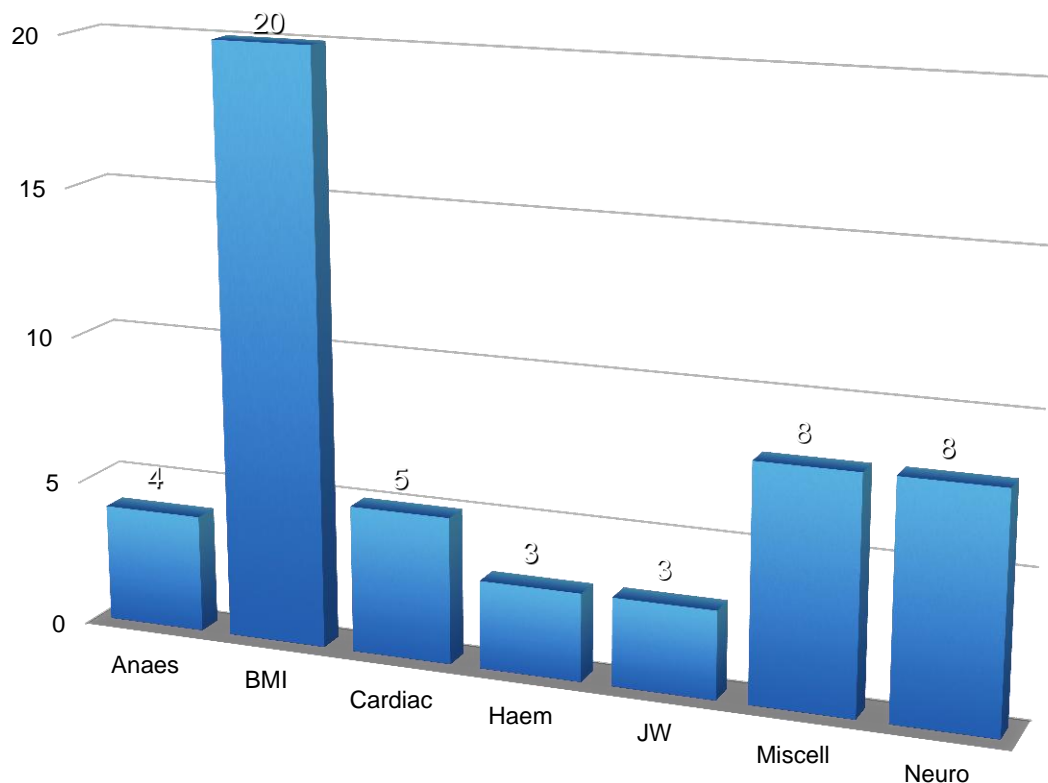
In total 7 women received Remifentanyl PCAs; 3 with severe back problems preventing successful siting of regional anaesthesia, 1 was anticoagulated and the other 3 had complex medical conditions preventing the safe delivery of neuraxial analgesia/anaesthesia. Eight women received general anaesthesia for an operative delivery; the breakdown of these was 1 woman with a high BMI, 2 haematological patients unable to have a regional technique, 3 other medical conditions and 2 neurological conditions.

Maternal Morbidity

A significant number of patients suffered a blood loss of more than 500ml during the delivery period and this occurred twice as often whenever a Caesarean section was performed. All women could be managed on the obstetric HDU.

Morbid obesity is a predictor for a higher risk of LSCS and peri-partum blood loss (see Fig.3).

Figure 3: Number of women with peri-partum blood loss > 500ml in patient groups in 2014



6. Discussion and Perspectives

For almost 10 years now, the High-Risk Obstetric Anaesthetic Clinic continues to provide a service to women with medical disorders and/or anticipated anaesthesia-related problems in pregnancy. The Clinic has established close links with several other specialties at St. George's Hospital.

Between 2007 and 2013 there was a steady rise of referrals but for the last two years patient numbers have slightly decreased to a manageable level. More consultants in maternal medicine and a more efficient referral process reduced the number of unnecessary referrals to our clinic. With typically all required investigations performed before the patient will attend, the anaesthetic assessment and management plan can usually be completed in one visit. In addition, women on uncomplicated prophylactic dalteparin are no longer seen, but receive an approved leaflet on *anticoagulation and epidural analgesia in labour* instead.

However, in more severe cases we still continue to be involved at an earlier stage of the pregnancy, often in multidisciplinary case conferences.

The clinic continues to use a text message reminder system to try and avoid last minute cancellations or non- attendances.

Since January 2013 all women with cardiac disease, who consent, will be entered into the European Registry for Pregnant Women with Cardiac Disease. The data set for this registry is very comprehensive and forms part of a European data collection that is expected to show invaluable information regarding the management of this patient group in the future.

7. Limitations

Due to lack of secretarial and IT support, data collection for this annual report and further analysis is limited and partially incomplete. Only patients for whom a management plan was issued, could be followed up. Various trends have not changed over the years. For example, women with cardiac disease deliver by caesarean section almost as frequently as the general population and the Caesarean section rate at St George's remained relatively low over the past 7 years (20-25%). On the other hand, morbidly obese patients have a very high probability for an operative delivery and for peri-partum haemorrhage. There are some data sets missing due to women seen in the clinic but then not actually delivering at St George's.

8. Acknowledgements

We would like to thank

- All referring clinicians and associate consultants from other medical specialties for sharing their valuable knowledge and expertise with us. The clinic is only viable in a multidisciplinary setting and we hope that this will continue in the future.
- All midwives, secretaries and healthcare assistants in the Fetal Medicine and Day Assessment Units. They are always very helpful and give us great support on each clinic day. A special “Thanks” to Sandra Linton, Lead Midwife, Fetal Medicine Unit, for managing our clinic appointments.
- The entire staff on the labour ward - obstetricians, midwives and anaesthetists- who are involved in the care of pregnant women with medical disorders. Without the support of all colleagues a successful outcome for women who are at higher risk during pregnancy, labour and delivery would not be possible.
- Dr I Watt-Coote and the maternal medicine team for their continued support and expertise in coordinating the care of this complex group of patients.
- Chris Saddington for sending text messages to all clinic patients every Wednesday and for uploading management plans to the EPR system.

9. Appendix

9.1. Objectives

The main aims of the *High-Risk Obstetric Anaesthetic Clinic* at St George's are:

1. To give advice and assess patients with previous or anticipated anaesthesia-related problems regarding analgesia and anaesthesia during labour and childbirth.
2. To provide anaesthetic and general medical advice for women with medical disorders, always in close co-operation with obstetricians and other medical specialists in a multidisciplinary setting at St George's Hospital. This may also include pre-conception counselling.
3. To prevent complications and maternal deaths by regular medical, obstetric and anaesthetic assessments, risk stratification and the provision of robust management plans for the antenatal and delivery period.
4. To further establish St George's Hospital's maternity services as a regional referral centre for women with complicated and high-risk pregnancies.
5. To develop and improve guidelines for referral and management for women who suffer from medical disorders in pregnancy, as well as for morbidly obese patients and women who categorically refuse the transfusion of blood products.
6. To provide training opportunities for senior anaesthetic and obstetric trainees with a special interest in maternal medicine and high-risk pregnancy.

9.2. Guidelines for Referral

Red conditions require longer appointment time

Anticipated anaesthesia-related problems

- History of difficult/ failed intubation or an anticipated difficult airway
- Suxamethonium apnoea
- Complications during/after neuraxial blockade / previous traumatic experience
- Spine problems, e.g. congenital abnormalities, back surgery, trauma ect. (a minor/mild scoliosis of the lumbar spine does not require referral)
- Severe needle phobia
- Malignant hyperthermia and porphyria
- Anaphylaxis / anaphylactic shock, complex allergies
- Women who categorically refuse blood transfusion (usually Jehovah's Witness)

Cardiovascular Disease

- Congenital heart disease, corrected or uncorrected
- Acquired heart disease: valvular lesions, ischaemic heart disease, cardiomyopathy
- Arrhythmias: congenital or acquired
- Diseases of the aorta (e.g. Marfan's syndrome)

Haematological Disease

- Complex history of thromboembolism before or during pregnancy
(Women on prophylactic Dalteparin with no other co-morbidities do not need require referral)
- Congenital coagulopathy (e.g. von Willebrand's disease)
- Thrombocytopenia / thrombocytopenic coagulopathy
- Haemoglobinopathy (e.g. thalassaemia, sickle-cell disease)

Neurological Disorders

- Conditions that may interfere with neuraxial anaesthesia and analgesia
- Neuromuscular disease which may affect respiration (myasthenia gravis, muscular dystrophy or any other neuro-muscular disease)
- Other intracranial pathologies (e.g. AV-malformations, neoplasm)
- Previous history of stroke or intracranial bleeding or head trauma

Respiratory Disease

- Severe obstructive / restrictive lung disease (e.g. asthma, pulmonary fibrosis)
- Respiratory conditions requiring special care during pregnancy and childbirth

Renal Disease

- All women with impaired renal function / regular dialysis and / or after renal transplant

Endocrinological Disorders

- Poorly controlled or uncontrolled diabetes mellitus
- Acromegaly, Addison's disease, pheochromocytoma
- Similar significant endocrinological disorders

Autoimmune Disorders

- Systemic Lupus erythematosus
- Systemic sclerosis (scleroderma)
- Antiphospholipid syndrome

Obesity

- BMI >40 kg/m² prior to pregnancy

Other

- Any other condition associated with significant pathophysiology

Inappropriate referrals(no appointment with an anaesthetist required)

- **Women on ante-natal thrombo-prophylaxis only (i.e. Dalteparin 5000 IU s/c OD, 5000 IU s/c BD for obese patients) and who don't suffer from any of the above conditions do not require review in the clinic a patient information leaflet is provided.**
- Back pain which is not caused by any of the above-mentioned conditions (back pain without any neurological symptoms)Mild scoliosis of the lumbar spine (especially when previous epidural uneventful and 'landmarks' of lumbar spine easy to identify)
- Minor problems such as mild hay fever, mild asthma, 'common allergies'

Thank you very much for your co-operation

Sarah Hammond
Frank Schroeder
Renate Wendler

St George's Hospital 11/04/2015