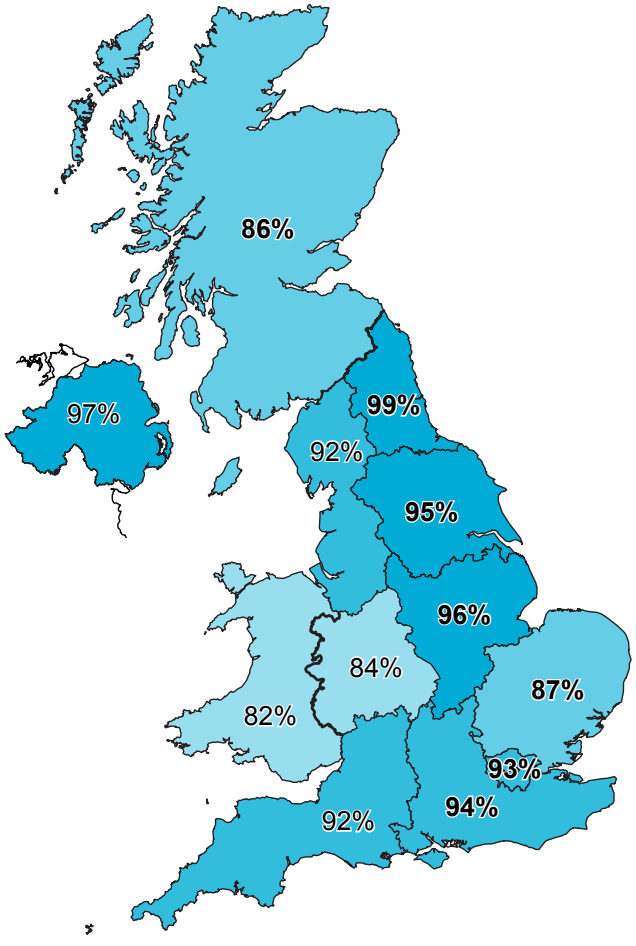
UKOSS

UK Obstetric Surveillance System

Annual Report 2007

We would like to thank all the reporting anaesthetists, midwives, obstetricians and risk managers throughout the UK who have contributed to UKOSS, without whom this work would not have been possible.



Royal College of Obstetricians and Gynaecologists

npeu National Perinatal Epidemiology Unit

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1. Introduction

The UK Obstetric Surveillance System (UKOSS), a joint initiative between the National Perinatal Epidemiology Unit and the Royal College of Obstetricians and Gynaecologists, was launched in February 2005. The system is designed to be used to survey a range of rare conditions in pregnancy and is based on the model developed by the British Paediatric Surveillance Unit[1]. The scheme is also supported by the Royal College of Midwives, the Obstetric Anaesthetists Association, the National Childbirth Trust, the Faculty of Public Health, the Confidential Enquiry into Maternal and Child Health, the Health Protection Agency, the National Patient Safety Research Programme, and the National Patient Safety Agency.

Rare conditions are difficult to study because the identification of even a small number of affected women requires collaboration between large numbers of investigators. Such collaborations are difficult to establish and may be costly, hence uncommon disorders are rarely studied comprehensively on a population basis. The information available about the natural history, prognosis, risk factors and evidence-based practice is therefore very limited. UKOSS draws together clinicians from all hospitals with consultant-led maternity units in the UK in a routine reporting system, thus allowing the straightforward conduct of a changing programme of studies of rare disorders of pregnancy. The information gained from these studies may be used to inform counselling of women, development of guidelines for prevention or treatment and for service planning.

Studies using UKOSS may be undertaken by any investigator who identifies a suitable topic[2]. Suitable disorders to study are those which are uncommon (usually no more than one case per 2000 births annually in the UK), are an important cause of maternal or perinatal morbidity or mortality, and which have research questions which can be suitably addressed using the UKOSS methodology (prospective descriptive, cohort or case-control studies). This report outlines the studies undertaken during the first two years of surveillance using UKOSS.

2. Methods

Up to four nominated clinicians (anaesthetists, midwives, obstetricians and risk managers) in each hospital with a consultant-led maternity unit report to UKOSS. Every month, the nominated individuals are sent a report card with a list of conditions currently under surveillance (figure 1). They are asked to complete a simple tick box indicating if any cases have occurred in the previous month, or if none, to return the card indicating a nil return. Only conditions with an estimated incidence of fewer than one in 2000 births are surveyed, and thus the most common response is a nil return.

On receiving a case report (return of the monthly card mailing), the UKOSS central team dispatches a data collection form to collect more detailed information about each case. The data collection forms have been developed individually for each condition and are designed to be short and easily completed from a woman's case notes without requiring reference to any other sources of information. The data collection forms seek confirmation of the appropriate case definition and additional information on risk factors, management and outcomes according to the protocol relating to each condition. UKOSS does not collect any personally identifiable information, including women's names, addresses, dates of birth or hospital numbers. Reporting clinicians are asked to keep their own record of the names of women they have reported, in order that they can retrieve the woman's case notes to complete the data collection form. The Patient Information Advisory Group (PIAG) and the Confidentiality and Security Advisory Group for Scotland (CSAGS) have judged that collection of information only, for the purpose of studying incidence and identifying means to improve patient care, which is not individually identifiable and does not lead to any change in management for the individual patient is acceptable without requiring individual patient consent[3 4]. The UKOSS methodology and that of each individual study have been approved by the London Multi-centre Research Ethics Committee.

In order to perform case-control studies, information on control women is also collected on control or comparison women for some surveys. For these studies only, clinicians who report a case are asked to identify appropriate control women and complete a similar data collection form from their case notes. The process of selecting control women is individual to each study.

Figure 1: UKOSS Report Card

UKOSS Report Card
United Kingdom Obstetric Surveillance System June 2007

Nothing to report ☐

Please specify the number of cases seen this month:

☐ Amniotic Fluid Embolism
☐ Extreme Obesity
☐ FMAIT (NAIT)
☐ Gastroschisis
☐ Myocardial Infarction
☐ Pulmonary Vascular Disease
☐ Non-renal Solid Organ Transplant
☐ Renal Transplant

Contact details have changed ☐

The new details are: _____

UKOSS Clinician's Section
Hospital name
Month Year

Please complete and keep this section for reference if you have reported cases this month.

Condition	Patient's name	Patient's Hospital number

Detach and keep this section.

3. Participation

All 228 units with consultant-led maternity units in the UK contribute to UKOSS. This represents 100% participation of eligible units and effectively means that the denominator for all UKOSS studies is the entire birth cohort in the UK. The mean monthly card return rate over the first two years of reporting was 91% (Figure 2), with regional return rates varying between 82% and 99% (Figure 3).

Figure 2: UKOSS national card return rates February 2005 to January 2007

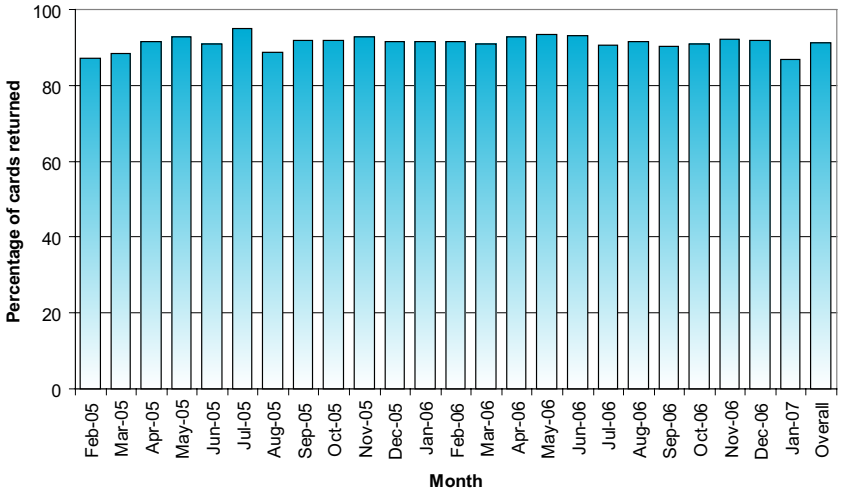
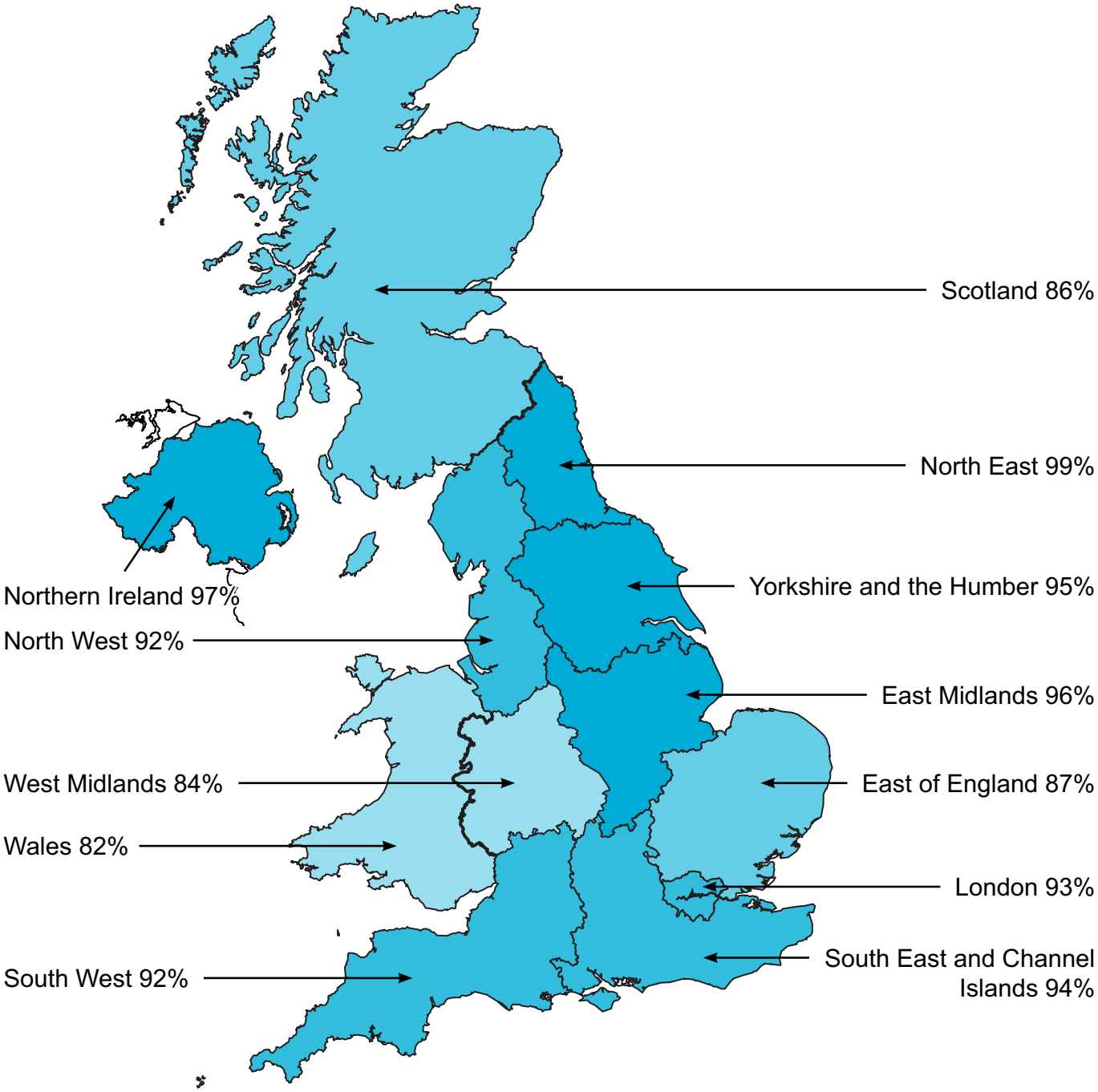


Figure 3: Map showing regional card return rates over the first two years of surveillance



4. Studies

Unless otherwise specified, the results presented represent analysis of cases reported and data available up to January 2007. All studies have been funded by departmental sources except where indicated. Please note the data presented are provisional, not peer reviewed and definitive conclusions should not be drawn from them.

4.1. Completed studies

4.1.1. Acute Fatty Liver of Pregnancy

Key points

- Acute fatty liver of pregnancy is a leading cause of maternal mortality in the UK today.
- Estimates of incidence in UK-based regional or hospital studies vary widely.
- The results of this study suggest that nationally the disease is rare, with an estimated incidence of 1 in 21,900 births.

Background

Acute fatty liver of pregnancy is a rare and potentially lethal condition of late pregnancy which may be part of a spectrum of disorders related to pre-eclampsia[5]. It has been identified by the UK Confidential Enquiry into Maternal Deaths as a leading cause of maternal mortality[6]. A prospective case series (n=5) from Wales reported an incidence of approximately 1 in 1000[7]. This incidence rate contrasts dramatically with an incidence rate of 1 in 16,288 identified in a recent study of severe maternal morbidity in the South East Thames region of England[8]. Some risk factors for the disorder, such as nulliparity and multiple pregnancy have been identified[9], [10], but there has been no comprehensive study of the epidemiology of this condition. There has also been no wide-ranging study of the management of the condition worldwide, and several questions remain controversial, such as the role of liver transplantation and the natural history of the associated liver failure[10] [11]. The objective of this descriptive study was to provide a national picture of the incidence of the disease, its epidemiology and management.

Case definition

EITHER Acute fatty liver of pregnancy confirmed by biopsy or postmortem examination

OR A diagnosis of acute fatty liver of pregnancy with signs and symptoms consistent with acute fatty liver present.

Surveillance Period

February 2005 – August 2006

Interim Results

Eighty cases were reported during the study and further information received about 74 (93%). Twelve cases were subsequently reported by clinicians as not cases and there were five duplicate reports. Using the previously developed diagnostic criteria[7], there were 52 confirmed cases, representing an estimated incidence of 4.6 per 100,000 total births (95% confidence interval (CI) 3.4 to 6.0 per 100,000). Five further reported cases did not meet these diagnostic criteria. Thirty-nine women (75%) were diagnosed antenatally (the majority on the day of delivery, range 0-4 days before delivery), and 13 postnatally (median 2 days following delivery, range 1-4). Sixty percent of women were admitted to intensive care for a median of three days (range 1-8), and eight women (15%) were admitted to a liver unit (median stay 8.5 days, range 4-16). No women required a liver transplant. No women died (case fatality rate 0%, 95% CI 0-6.8%). There were six stillbirths and one neonatal death in a total of 61 infants (perinatal mortality rate 115 per 1000 births, 95% CI 47 to 222).

Interim Conclusions

Acute fatty liver of pregnancy is rare in the UK, but the prognosis appears to be better than previously reported[6] [7]. The outcome is poorer for infants.

4.1.2. Antenatal Pulmonary Embolism

Key points

- Thromboembolic disease is the leading cause of maternal mortality in the UK.
- In this study for each woman who died there were more than 40 women who suffered a non-fatal pulmonary embolism (PE).
- Three quarters of women with an antenatal PE have recognisable classical risk factors.
- Thomboprophylaxis and treatment were not always undertaken according to national guidelines.

Background

Pulmonary embolism has been identified as the most important cause of direct maternal mortality in the UK today and has been extensively studied as part of the ongoing Confidential Enquiry into Maternal Deaths (now the Confidential Enquiry into Maternal and Child Health (CEMACH))[6]. In contrast, non-fatal PE in pregnancy has not been extensively studied. Data do not exist in the UK on the incidence of this disorder, sequelae or management. There are known risk factors for fatal PE[6 12-16] and guidelines exist for the use of preventive therapies[14]. However, it is not known to what extent these risk factors are present in women with non-fatal PE nor how appropriately preventive strategies are used in antenatal PE. This knowledge is important to improve management of this serious life-threatening condition. Guidelines also exist for the acute management of PE in pregnancy[13]. These guidelines are largely based on extrapolated evidence from studies in non-pregnant patients. The objective of this study was to describe the epidemiology of antenatal PE in the UK, and determine to what extent evidence-based management protocols are used.

Case definition

EITHER PE is confirmed antenatally using suitable imaging (angiography, computed tomography, echocardiography, magnetic resonance imaging or ventilation-perfusion scan showing a high probability of PE)

OR PE is confirmed antenatally at surgery or postmortem

OR a clinician has made a diagnosis of PE antenatally with signs and symptoms consistent with PE present, and the patient has received a course of anticoagulation therapy of more than one week duration.

Surveillance Period

February 2005 – September 2006

Interim Results

One hundred and eighty-seven cases were reported during the study and further information received about 173 (93%). Twenty-seven cases were subsequently reported by clinicians as not cases and there were five duplicate reports. Ninety-four antenatal PEs were reported over the first year, representing an estimated incidence of 1.3 per 10,000 total births (95% confidence interval (CI) 1.0-1.6). Classical risk factors for thromboembolic disease were identified in 73% of women. The main risk factors for PE were multiparity (adjusted odds ratio (aOR) 2.90, 95%CI 1.37-6.13) and BMI >30 (aOR 2.80, 95%CI 1.12-7.02). Six women who had a PE should have received antenatal thromboprophylaxis with low molecular weight heparin (LMWH) according to national guidelines[14]; only two (33%) of them did. Five women (4%) had a PE following antenatal prophylaxis with LMWH; three of these women (60%) were receiving lower than recommended doses. 98% of women were treated for PE with LMWH (62% enoxaparin, 18% dalteparin, 21% tinzaparin); 51% using a once daily dosage schedule. The remainder were managed with unfractionated heparin. There were no recurrent PEs reported. Three women died (case fatality 2.5%, 95% CI 0-5.3%).

Interim Conclusions

Significant severe morbidity from thromboembolic disease underlies the maternal deaths reported in the UK. This study has revealed some cases where thromboprophylaxis was not undertaken according to national guidelines and there may thus be scope for further work on guideline implementation.

4.1.3. Eclampsia

Key points

- Hypertensive disorders of pregnancy remain a leading cause of direct maternal mortality.
- The incidence of eclampsia has declined significantly in the UK since 1992.
- Women with eclampsia are also less likely to have recurrent fits or experience associated severe morbidity than in 1992.
- The majority of women are managed with magnesium sulphate according to regional and national guidelines.

Background

Eclampsia has been identified by the UK Confidential Enquiry into Maternal and Child Health as an important cause of maternal mortality[6]. In 2000-2 eclampsia accounted for 6% of direct maternal deaths in the UK[6]. A national surveillance study in 1992[17] recorded a UK incidence of 4.9/10,000 maternities with a case fatality rate of 1.8%. Since this study took place there have been major advances in the management of eclampsia. Magnesium sulphate has been shown to be effective in preventing recurrent eclampsia and reduces the risk of eclampsia in women with severe pre-eclampsia[18,19]. A number of evidence-based management protocols have subsequently been developed[20-22]. However, there are no current data on the epidemiology and management of non-fatal eclampsia in the UK to identify the extent to which these protocols have been adopted and the impact on disease incidence. The objective of this study was to describe the epidemiology of eclampsia in the UK and assess the impact of the introduction of magnesium sulphate therapy.

Case definition

The occurrence of convulsions during pregnancy or in the first ten days postpartum, together with at least two of the following features within 24 hours after the convulsions: hypertension (a booking diastolic pressure of <90 mmHg, a maximum diastolic of ≥90 mmHg, and a diastolic increment of ≥25mmHg); proteinuria (at least + protein in a random urine sample or ≥0.3g in a 24hr collection); thrombocytopenia (platelet count of less than 100x109/l); an increased plasma alanine aminotransferase (ALT) concentration (≥42 IU/l) or an increased plasma aspartate aminotransferase (AST) concentration (≥42 IU/l).

Surveillance Period

February 2005 – February 2006

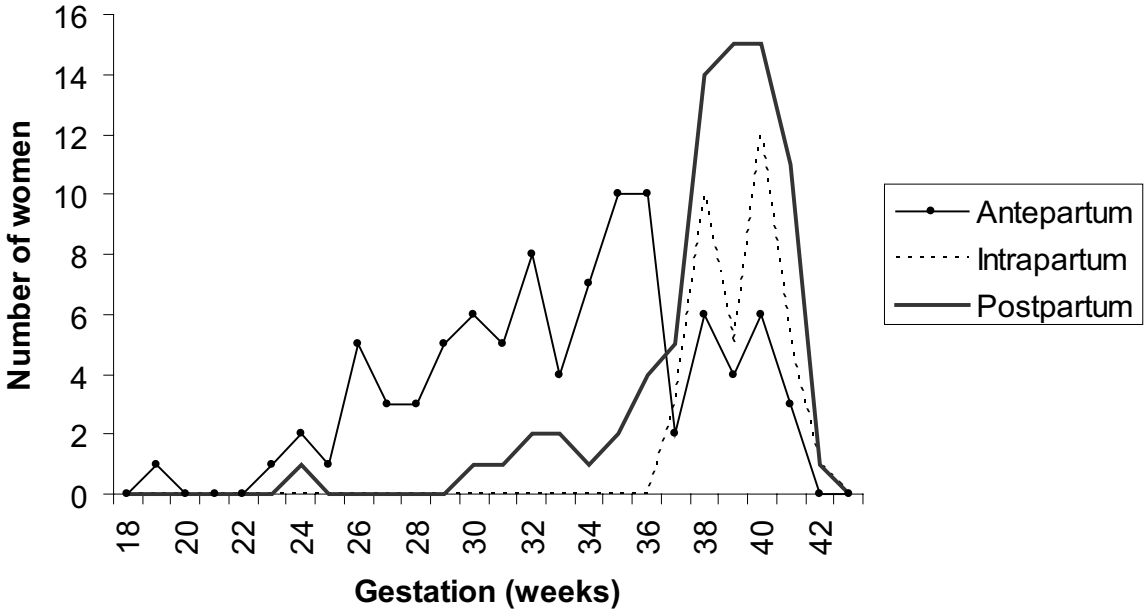
Interim Results

Three hundred and fourteen cases were reported during the study and further information received about 292 (93%). Forty-two cases were reported by clinicians as not cases after notification; the majority of these cases were women who had received magnesium sulphate but had not had a fit. There were eight duplicate reports. Completed data collection forms were received for 33 women who had a fit but did not meet the case definition for eclampsia; 18 of these women did not have hypertension and 17 had hypertension but in the absence of any other signs. Two hundred and nine cases met the criteria for eclampsia, representing an estimated incidence of 2.7 cases per 10,000 births (95% confidence interval 2.3-3.0 per 10,000). This is significantly lower than the incidence reported in 1992; in addition, significantly fewer women had recurrent fits or associated severe morbidity than in 1992. Forty-five percent of first fits were antepartum, 18% intrapartum and 36% postpartum (Figure 4). Ninety-none percent of women were treated with magnesium sulphate after their fit. No women died.

Interim Conclusions

The incidence of eclampsia and its complications have decreased significantly in the UK since 1992, following the introduction of management guidelines for eclampsia and pre-eclampsia. These results are consistent with the findings of the randomised controlled trials of magnesium sulphate. This study shows the practical benefits of the incorporation of research evidence into practice.

Figure 4: Gestational age at the time of eclampsia (antepartum and intrapartum fits) or delivery (postpartum fits)



4.1.4. Peripartum Hysterectomy

Key points

- The incidence of peripartum hysterectomy in the UK is 4.1 cases per 10,000 births.
- There is a strong association with previous delivery by caesarean section.
- The risk increases with an increasing number of deliveries by caesarean section.
- The majority of cases occur in association with either uterine atony or a morbidly adherent placenta (placenta accreta).

Background

Emergency hysterectomy in the peripartum period is often performed for life-threatening obstetric complications. The operation is considered to be one of the most major complications in obstetrics and is related to significant maternal mortality[6] and morbidity[23.] Haemorrhage has been identified by the UK Confidential Enquiry into Maternal Deaths as a leading cause of maternal mortality[6]. Recent hospital-based retrospective case-reviews in the UK[24-26] have reported incidence rates varying from 2.7[26] to 5.3[24] per 10,000 births. The Scottish Confidential Audit of Severe Maternal Morbidity[27] also collects information about women with severe haemorrhage undergoing hysterectomy (women with an estimated blood loss of 2.5 litres or more, or transfused five or more units of blood or given treatment for coagulopathy);19 women (9% of those with haemorrhage) were reported to have had a hysterectomy in 2005.

Several small studies have suggested an association of peripartum hysterectomy with previous caesarean section delivery[28-30]. The objective of this study was to estimate the incidence of peripartum hysterectomy in the UK, and to investigate and quantify the risk associated with previous caesarean section and other factors.

Case definition

Any woman pregnant or delivering a fetus or infant and having a hysterectomy during the same clinical episode.

Surveillance Period

February 2005 – February 2006

Interim Results

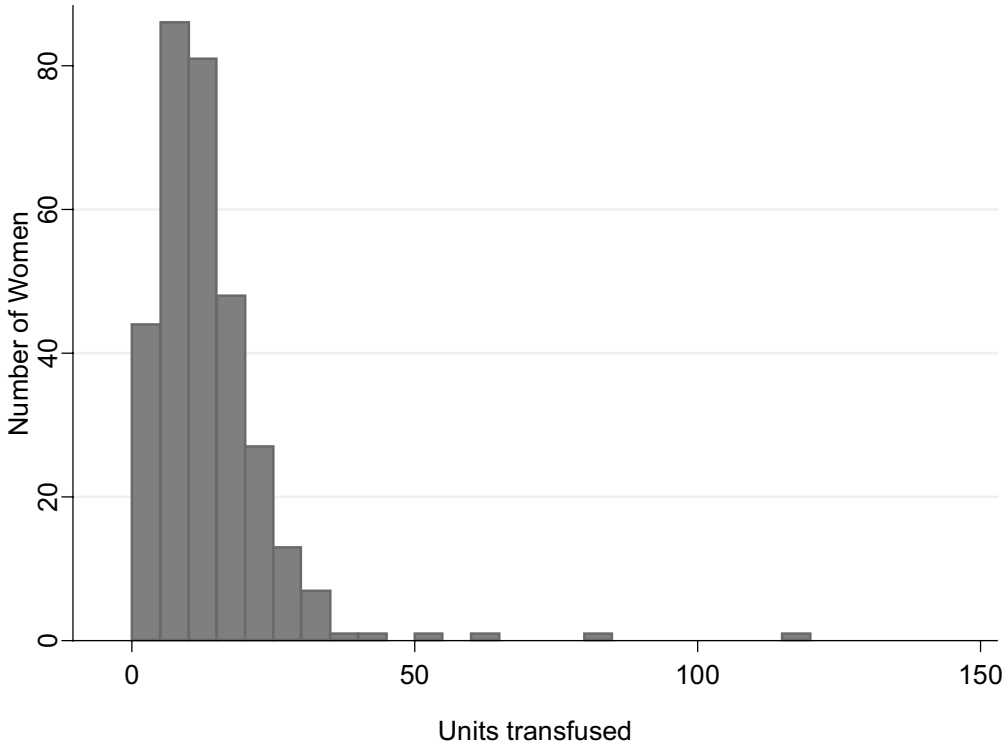
There were 318 confirmed cases of peripartum hysterectomy in an estimated 779,955 total births[31-33], giving an incidence of 4.1 per 10,000 total births (95% CI 3.6-4.5). Three hysterectomies were undertaken electively for management of malignancy (one ovarian, two cervical cancers) with the

remaining 315 undertaken for management of haemorrhage. The most commonly reported causes of haemorrhage were uterine atony (53%), morbidly adherent placenta (39%), uterine rupture (8%) and extension of uterine incision at delivery (6%). Compared with controls, women who had had a peripartum hysterectomy were over three times (odds ratio 3.52, 95% CI 2.35-5.26) more likely to have had a previous caesarean section. This risk increased with the number of previous sections such that women with a peripartum hysterectomy were over eighteen times more likely to have had two or more previous sections than control women. Women received a median of ten units of blood (Figure 5). Two women died, a case fatality of 0.6% (95% CI 0-1.5%).

Interim Conclusions

Peripartum hysterectomy is strongly associated with previous delivery by caesarean section and the risk rises with increasing number of previous caesarean section deliveries. The incidence of peripartum hysterectomy is likely to rise with increasing rates of caesarean section delivery.

Figure 5: Blood transfusion requirements in women undergoing hysterectomy



4.1.5. Tuberculosis in Pregnancy

Key points

- Tuberculosis (TB) is a priority infectious disease in the UK.
- TB in pregnancy is rare in the UK but may be life threatening.
- The disease appears to be limited to ethnic minority women.
- Extrapulmonary disease is more common than pulmonary disease.

Background

Tuberculosis (TB) has been identified as a priority infectious disease in the UK[34]. Incidence is rising, with an increase of 6% in the number of cases reported nationally between 2000 and 2001[35]. Upward trends have also been noted in the number of people co-infected with TB and HIV[36], and antimicrobial resistance[37]. Small recent case series[38] [39] have identified significant differences in the epidemiology of TB occurring in pregnancy as opposed to in the non-pregnant population, which impact significantly on diagnosis and management. All the patients identified were of Asian or Black African origin. There have been no national studies, and information about pregnancy outcomes is lacking. The objective of this study was to determine the national incidence, prognostic factors, management and sequelae of TB in pregnancy in the UK.

Case definition

EITHER A diagnosis of TB confirmed by culture of Mycobacterium tuberculosis complex (M. tuberculosis, M. bovis and M. africanum) during pregnancy

OR In the absence of culture confirmation, signs and/or symptoms compatible with TB and treatment with two or more anti-tuberculous drugs.

Surveillance Period

February 2005 – August 2006

Interim Results

A total of 121 cases were reported and information returned about 110 (91%). There were 52 confirmed cases, representing an estimated incidence of 4.6 per 100,000 total births (95% CI 3.4 to 6.0 per 100,000). The majority of the remaining cases did not meet the case definition because TB was diagnosed before pregnancy. Detailed data were collected on 31 women. All the women were non-white. Fifty-seven percent of women presented with extrapulmonary disease. The median gestational age at onset of symptoms was 22.5 weeks (range 4-39). The median gestational age at delivery was 37 weeks (range 24-42). One women died from her disease (case fatality 3.2%, 95% CI 0-10.6%). Three women were reported to have additional severe morbidities, including adult respiratory distress syndrome, a cerebrovascular accident and septicaemia. There was one neonatal death amongst the 29 infants for whom outcomes are known (perinatal mortality rate 34 per 1000 births, 95% CI 1 to 178).

Interim Conclusions

Tuberculosis in pregnancy in the UK is uncommon but may be life threatening. The disease appears to be limited to women from specific ethnic minority groups. Extrapulmonary disease is more common than pulmonary disease and may therefore present a diagnostic challenge.

4.2. Studies in progress

4.2.1. Amniotic Fluid Embolism

Key points

- Amniotic fluid embolism is a leading cause of maternal mortality in the UK today.
- Estimates of incidence and mortality vary widely.
- This study incorporates the previous UK voluntary amniotic fluid embolism register.
- Preliminary analysis shows the estimated incidence using active surveillance through UKOSS is more than twice that obtained through passive registration.

Background

Amniotic fluid embolism (AFE) has been identified by the UK Confidential Enquiry into Maternal Deaths as a leading cause of maternal mortality[6] with some evidence that fatality is decreasing in the UK. Estimates of incidence vary tenfold between 1.3 and 12.5 per 100,000 pregnancies[40]. Estimates of the mortality rate from this condition also vary widely[41], from as much as 86% to more recent estimates of 16-30%. No clear risk factors are identifiable from previous cases, but some preliminary evidence suggests that earlier diagnosis may lead to better outcomes. A wide range of treatments have been described in case reports[41], but there has been no comprehensive study of the epidemiology and management of this condition in the UK. A database of voluntary notifications was established in the UK to collect information on epidemiology and management[42]; this register was incorporated into UKOSS to improve ascertainment and allow a comprehensive study of the epidemiology and current management.

Case definition

EITHER A clinical diagnosis of AFE (acute hypotension or cardiac arrest, acute hypoxia or coagulopathy in the absence of any other potential explanation for the symptoms and signs observed)

OR A pathological diagnosis (presence of fetal squames or hair in the lungs).

Surveillance Period

February 2005 – ongoing

Interim Results

In the first two years of the study 48 cases of amniotic fluid embolism were reported. Information has been received for 41 of these cases (85%). There were ten cases which were subsequently reported by clinicians as not cases and one duplicate report. Six further cases did not meet the case definition. There were thus 24 confirmed cases in an estimated 1,440,000 total births. This gives an estimated incidence in the UK of 1.7 cases per 100,000 total births (95% CI 1.1 to 2.5 per 100,000). There were four deaths reported to UKOSS among the 24 cases, giving an estimated case fatality rate of 17% (95% CI 5-37%).

Interim Conclusions

The estimated incidence using active surveillance is more than twice that obtained by passive registration[42]. The study is ongoing and the results will be analysed further when sufficient cases have been collected to generate robust results.

4.2.2. Fetomaternal Alloimmune Thrombocytopenia (FMAIT/NAIT)

Key points

- FMAIT is associated with significant fetal and infant morbidity and mortality.
- First pregnancies are often severely affected and the diagnosis is usually made with the birth of a first affected infant.
- There is a debate about the utility of antenatal screening for the condition.
- This study will provide a national picture of the incidence of the disease, its epidemiology and management and provide information for the assessment of the case for a screening programme.

Background

FMAIT, also known as neonatal alloimmune thrombocytopenia or NAIT, is the most common cause of severe neonatal thrombocytopenia in otherwise well term infants[43], and is analogous to the fetal/neonatal anaemia caused by haemolytic disease of the newborn (HDN). The condition results from a fetomaternal incompatibility in platelet alloantigen, most commonly HPA-1a, and can lead to serious bleeding, intracranial haemorrhage and sometimes death of the fetus or infant[44]. In contrast to HDN, first pregnancies are often severely affected and the diagnosis is usually made with the birth of a first affected infant. There is therefore a current debate about the utility of screening for the condition. A recent evaluation against the National Screening Committee criteria for appraising a screening programme has identified a number of deficiencies in basic epidemiological information needed to assess the utility of antenatal screening[45]. This study aims to address three of these deficiencies: to determine the true incidence of severe haemorrhage associated with FMAIT, to describe the clinical outcome of affected cases and to identify prognostic factors.

Additionally, there are considerable controversies in the optimal management of FMAIT-affected pregnancies[45]. This descriptive, population-based study will allow the outcomes following different management strategies to be assessed.

Case definition

All pregnant women with a previous child affected by fetomaternal alloimmune thrombocytopenia or pregnant women otherwise known to be alloimmunised with a platelet-incompatible fetus.

Surveillance Period

August 2006 - ongoing

Interim Results

Over the period August 2006 to February 2007 there were 24 cases reported. We have received further information on 18 of these infants (75%). Six cases were subsequently reported not to be cases and one case did not meet the case definition. There were thus 11 confirmed cases. These cases have not been further analysed at this early stage of the study. At the end of the study case reports received through UKOSS will be compared with those received through a parallel study conducted through the British Paediatric Surveillance Unit and with infants referred to the National Blood Service or Welsh Blood Service. Capture-recapture analyses will be undertaken to determine case ascertainment through the different surveillance sources and to gain a complete picture of case numbers.

Interim Conclusions

This study is currently at an early stage. These interim results suggest that the incidence of clinically detected infants may be lower than that estimated from a screening study of 24,417 pregnancies in East Anglia[44]. However, the low number of cases reported at this stage may simply be a chance phenomenon and we will be able to present more robust results at the conclusion of the study.

Funding

This study is funded by Wellbeing of Women.

4.2.3. Gastroschisis

Key points

- The birth prevalence of gastroschisis is rising in the UK and worldwide.
- Regional variations in birth prevalence have been reported in the UK.
- Existing congenital anomaly registers cover only 50% of UK births and cannot be used to study the condition on a national basis.
- This study will combine the use of UKOSS, paediatric surgical and congenital anomaly reporting systems to assess the birth prevalence of gastroschisis in the UK.

Background

Gastroschisis is a congenital anomaly of the anterior abdominal wall, in which gut and other abdominal contents are herniated through a defect in the wall to one side of the umbilicus[46]. The condition has been noted to be increasing worldwide, although the reasons for this rise remain obscure[47]. A number of reports, predominantly from regional congenital anomaly registers, have provided evidence that this increase is also occurring in the UK[46 48-50], leading to a call for further research on the condition by the Chief Medical Officer for England[51]. This increase in birth prevalence of gastroschisis has been noted to occur particularly in infants of younger mothers[51]. Additionally a North-South gradient in birth prevalence has been noted in the UK, although incomplete geographical coverage by regional congenital anomaly registers makes this difficult to study[48]. Currently regional congenital anomaly registers cover only 50% of the UK population and ascertainment through the National Congenital Anomaly System (NCAS) is known to be poor[52]. The objective of this study is to combine the use of UKOSS, paediatric surgical and congenital anomaly reporting systems to assess the birth prevalence of gastroschisis in the UK.

Case definition

All pregnant women with a fetus affected by gastroschisis.

Excluded: Aplasia or hypoplasia of abdominal muscles, skin-covered umbilical hernia or omphalocele.

Surveillance Period

September 2006 - ongoing

Interim Results

Over the period September 2006 to February 2007 there were 129 cases reported. We have received further information on 101 of these infants (78%). One case was subsequently reported not to be gastroschisis. There were thus 100 confirmed cases. Delivery information is awaited for 37 of these cases.

A parallel study is being conducted through the British Association of Paediatric Surgeons Congenital Anomalies Surveillance System (www.npeu.ox.ac.uk/BAPS-CASS), and at the end of the study case reports will also be compared with notifications to regional congenital anomaly registers in order to obtain a comprehensive national picture of the condition.

Interim Conclusions

The number of cases notified to UKOSS to date is in line with the estimated birth prevalence from regional congenital anomaly registers[53]. Further information on regional variations, prognostic factors and outcomes will be available at the end of the study.

Funding

This study is part funded by BDF Lifeline.

4.2.4. Myocardial Infarction

Key points

- Myocardial infarction in pregnancy is known to be associated with significant maternal and fetal mortality.
- The current incidence estimate is based on a study from 1970.
- Current trends in lifestyle factors and increasing age at childbirth are likely to be leading to an increase in incidence.
- This study will provide a national picture of the incidence of the disease, its epidemiology and management

Background

Myocardial infarction (MI) in pregnancy is known to be associated with significant maternal and fetal mortality[54]. The widely quoted incidence estimate of 1 in 10,000 births is based on a study conducted in 1970[55]. However, with current trends in lifestyle factors associated with cardiovascular disease and increasing age at childbirth, the incidence of MI during pregnancy can be expected to have increased. A recent retrospective database analysis from the USA[56] provided evidence that this may be the case, identifying an increase in incidence of myocardial infarction in pregnancy from 1 in 73,400 pregnancies in 1991 to 1 in 24,600 in 2000. To date this is the only recent population study of this condition, although there are more than 150 individual case reports in the world literature[57]. A systematic review of the case reports in 1996 identified a number of features of MI during pregnancy which differed from MI outside of pregnancy, and reported a case fatality rate of 21% and a fetal mortality rate of 13%[54]. Normal coronary artery morphology was noted in 29% of women; MI in pregnancy may be caused by coronary artery dissection, embolus without atheroma in addition to atherosclerosis[54 58]. Classic coronary risk factors appear to be the exception rather than the rule: 19% of patients had hypertension, 26% were smokers and only 2% had hyperlipidaemia. The authors of this review acknowledge the possible biases in favour of reporting of cases which are in some way unusual; a systematic prospective study on a population basis is thus clearly needed. This study will provide a national picture of the incidence of the disease, its epidemiology and management.

Case definition

All women in the UK identified as having acute myocardial infarction during pregnancy using the joint European Society of Cardiology/American College of Cardiology criteria[59]:

EITHER A typical rise and gradual fall (troponin) or more rapid rise and fall (CK-MB) of biochemical markers of myocardial necrosis with at least one of the following: (a) ischaemic symptoms, (b) development of pathologic Q waves on the ECG, (c) ECG changes indicative of ischaemia (ST segment elevation or depression), or (d) coronary artery intervention (e.g. coronary angioplasty)

OR Pathological findings of an acute MI.

Surveillance Period

August 2005 – ongoing

Interim Results

Sixteen cases were reported up to January 2007 and data returned about 15 of them (94%). Two were subsequently returned as non-cases and six did not meet the case definition. This leaves seven confirmed cases.

Interim Conclusions

There have been substantially fewer then the expected number of cases reported. This may be due to under-reporting, to a genuinely lower incidence or due to previous incidence estimates including postnatal cases, which are not usually identified through UKOSS. We will be investigating other sources of case ascertainment and comparing fatal cases reported to UKOSS with those reported to CEMACH. We have also extended the study period from two to five years in order to allow us to generate a robust estimate of incidence at the end of the study.

4.2.5. Obesity

Key points

- Obesity is an important public health problem.
- Particular risks of pregnancy have been identified among obese women.
- The risks in the extremely obese group have not been quantified.
- This study will investigate the prevalence and outcomes of pregnancy in women with extreme obesity in the UK, and assess the risk of adverse outcomes attributable to obesity.

Background

Obesity is now recognised to be an important public health problem throughout the developed world[60]. The prevalence of obesity is rising rapidly in the UK in all age groups, including women of reproductive age[61]. Recent reports of the UK Confidential Enquiry into Maternal Deaths[6] have highlighted obesity as a factor in increasing numbers of maternal deaths in the UK. Retrospective database analyses in Canada, Australia and the UK have identified particular disease risks associated with pregnancy among obese women[62-64], including pre-eclampsia, venous thromboembolism and gestational diabetes, and higher rates of labour induction, delivery by caesarean section, general anaesthesia and anaesthetic complications[65]. Obese women are also at increased risk of poor perinatal outcomes, including stillbirth and neonatal death[66]. The majority of these studies focus on women with moderate obesity (BMI greater than 30). The studies therefore include only a very few women who are extremely obese and have not specifically addressed the risks in the extremely obese group. The risk of pregnancy complications in extremely obese women is potentially even higher than among moderately obese women. However, because of the relatively small numbers of women with this degree of obesity, a national study is needed to investigate this further. The objective of this study is to investigate the prevalence and outcomes of pregnancy in women with extreme obesity in the UK, and assess the risk of adverse outcomes attributable to obesity.

Case definition

EITHER Any woman weighing over 140Kg at any point during pregnancy

OR Any woman with a Body Mass Index (BMI) greater than 50 at any point during pregnancy

OR Any woman estimated to be in either of the previous categories but whose weight exceeds the capacity of hospital scales.

Surveillance Period

March 2007 - ongoing

Interim Results and Conclusions

Data collection for this study only commenced in March 2007 and we are thus not able to present any interim results. Because there is no national information on BMI in pregnant women, we are uncertain of the exact number of women who will meet the case definition. For the first six months of the study we will therefore only collect information on incidence, to ensure that we are not asking reporting clinicians to provide data on too many women. If the incidence reported after six months is less than one case in 2000 births, we will proceed with more detailed data collection on management and outcomes.

4.2.6. Pregnancy in Transplant Recipients

Key points

- There have been over 14,000 reports of pregnancy in transplant recipients worldwide.
- The UK National Transplantation Pregnancy Register identified high rates of preterm and caesarean section delivery in renal transplant recipients, but it no longer collects information.
- Immunosuppressive regimens are continually developing.
- This study will provide a national picture of the incidence of pregnancy in solid organ transplant recipients and assess the role of immunosuppressive regimens and other factors in the outcomes of women and their infants.

Background

Despite initial concerns about the advisability of pregnancy in solid-organ transplant recipients, there have now been reports of over 14,000 births to women with transplanted organs[67]. Most studies are centre-based and retrospective[68]. Three voluntary registers have collected data at various times: the US National Transplantation Pregnancy Register (1991-present)[69], the UK Transplant Pregnancy Register (1994-2001)[68] and the European Dialysis and Transplant Association Registry (1960-1992)[70]. Recent analysis of data from the UK Transplant Pregnancy Register[68] has identified high rates of preterm delivery (50%) and delivery by caesarean section (72%) in pregnant renal transplant recipients. Worse outcomes were associated with poorer pre-pregnancy graft function and drug-treated hypertension during pregnancy. This UK register, however, no longer collects information. Immunosuppressive regimens are continually developing, and more information is needed about the intrauterine effects and neonatal consequences of immunosuppressive drugs. The objective of this project is to collect information about pregnancy outcomes amongst current solid organ transplant recipients in the UK and assess the role of immunosuppressive regimens and other factors in the outcomes of women and their infants. This information is important to inform future management and counselling of these women. The project is divided into two distinct studies: the first to investigate women with renal transplants and the second women with other solid organ transplants.

Case definitions

Renal transplant study:

All pregnant women with a transplanted kidney, with or without other transplanted organs.

Non-renal solid organ transplant study:

All pregnant women with a transplanted solid organ, including heart, lung, liver, pancreas and small bowel. Isolated renal, corneal and bone marrow transplant recipients will be excluded.

Surveillance Period

January 2007 - ongoing

Interim Results and Conclusions

These studies are at a very early stage and there are as yet, no results to report. The study of renal transplant recipients is planned for completion in 2009 and the study of other solid organ transplant recipients will run until 2012.

4.2.7. Pulmonary Vascular Disease

Key points

- Pulmonary vascular disease in pregnancy is widely considered to pose an extreme risk of maternal death.
- There have been no recent prospective case series to assess this risk.
- Novel methods of management may impact on case outcomes.
- This study will provide a national picture of the incidence of the disease, its epidemiology and management.

Background

Pre-existence or gestational occurrence of pulmonary vascular disease, including Eisenmenger's syndrome, primary and secondary pulmonary hypertension, is one of the rare conditions widely considered to pose an extreme risk of maternal death[71]. Four of the nine maternal deaths in women with congenital heart disease reported in the UK in the last triennium were associated with pulmonary vascular disease[58]; since 1991 there have been 22 maternal deaths in the UK associated with this condition[58]. Eisenmenger's syndrome is estimated to carry a maternal mortality rate of 40% per pregnancy[58], with an infant mortality rate of 10-15%[71]. A systematic review of the literature in 1998 suggested that the maternal mortality rate had remained unchanged over the previous 20 years[71]. However, the authors of this review recognise that there may be inherent biases in published reports of pregnancy in women with pulmonary vascular disease in pregnancy and call for more information from detailed prospective case series in order to differentiate the risks of pregnancy and eventually provide an optimal plan of management. Cases in the UK were collected prospectively on a voluntary basis by the UK Registry of High Risk Obstetric Anaesthesia[72], however, problems with ascertainment caused the register to cease to collect data. The objective of this prospective study through UKOSS is to provide an appropriate national case series with good ascertainment to allow comprehensive study of the epidemiology and current management of Eisenmenger's syndrome and pulmonary hypertension.

Case definition

EITHER Pulmonary hypertension: defined as 1) a mean (not systolic) pulmonary artery pressure equal to or greater than 25mmHg at rest or 30 mmHg on exercise in the absence of a left-to-right shunt or 2) a pulmonary artery systolic pressure greater than 36mmHg[73]. Pulmonary hypertension may be primary (no cause identified) or secondary (known cause identified, for example, vasculitis, connective tissue disease, chronic pulmonary thromboembolism, sickle cell disease, drug use)

OR Eisenmenger's syndrome: defined as pulmonary hypertension secondary to an uncorrected left-to-right shunt from a ventricular septal defect, atrial septal defect or patent ductus arteriosus[74].

Surveillance Period

March 2006 – ongoing

Interim Results

To date 18 cases of pulmonary vascular disease have been reported, with further information available for 9 (50%). One duplicate case was reported and there was one reported case which did not meet the case definition, leaving seven confirmed cases. Six of these cases were known prior to pregnancy and only one diagnosed during pregnancy. There were no deaths among these women.

Interim Conclusions

Pulmonary vascular disease in pregnancy is extremely rare in the UK. This study will continue for a further four years in order to identify a larger series of cases.

4.3. Future studies

The following studies have been approved by the UKOSS Steering Committee and are due to commence in 2007/2008.

4.3.1. Therapies for Peripartum Haemorrhage

Key points

- Haemorrhage remains an important cause of maternal mortality in the UK.
- B-Lynch or brace sutures, recombinant factor VIIa and arterial embolisation or ligation are now being used more commonly to treat severe peripartum haemorrhage.
- There are no systematic data available at a population level to assess the clinical outcomes following use of these therapies.
- This study will describe the use of these specific therapies for treatment or prophylaxis for peripartum haemorrhage in the UK and assess the outcomes following their use.

Background

Haemorrhage is the second most common cause of direct maternal death in the UK as identified in the most recent report of the Confidential Enquiry into Maternal Deaths[6]. However, deaths from haemorrhage represent only the tip of the iceberg of disease; severe haemorrhage has been included in the definition of 'near-miss' maternal morbidity in several studies[9 75].

The basic treatment of major peripartum haemorrhage consists of surgery and/or medical management with transfusion and uterotonic drugs. However, there are now a number of reports of the use of other therapies, including recombinant factor VIIa[76], B-Lynch or brace sutures[77], ligation[78] and embolisation[79] of major pelvic vessels (internal iliac/uterine arteries) in cases with continued bleeding. None of these therapies have been investigated in large randomised controlled trials, but all are used widely throughout the UK. There are no systematic data available at a population level to assess the clinical outcomes following use of these therapies. For example, there are only nine reports in the literature of failed B-Lynch sutures[80]. However, in the UKOSS study of peripartum hysterectomy, 50 women who underwent a peripartum hysterectomy to control haemorrhage had had a B-Lynch or Brace suture prior to requiring a hysterectomy. In order to assess the clinical outcomes following these therapies, we need to identify all cases in which they are used. This descriptive study will collect information on the timing of use of these therapies, subsequent haemorrhage and requirement for additional management strategies such as hysterectomy. This will allow us to investigate the outcomes associated with these specific different management strategies depending on the timing of use in order to inform future guidelines for prevention and management.

Case definition

The cases will be all women in the UK treated for peripartum haemorrhage with:

EITHER Activated factor VIIa

OR B-Lynch or other brace suture

OR Arterial ligation or embolisation.

Surveillance Period

October 2007- October 2008

Main Research Questions

- How frequently is factor VIIa used to manage peripartum haemorrhage in the UK?
- How frequently are B-Lynch or brace sutures used to manage peripartum haemorrhage in the UK?
- How frequently is embolisation or ligation of major pelvic vessels used to manage peripartum haemorrhage in the UK?
- What are the maternal outcomes following use of these therapies?

Funding

This study is funded by Wellbeing of Women.

4.3.2. Uterine Rupture

Key points

- Uterine rupture is associated with significant maternal and fetal morbidity.
- A decrease in the number of women attempting vaginal birth after caesarean section may be due to concerns about the risk of uterine rupture.
- There are no systematic data available at a population level to quantify the incidence of uterine rupture and to assess the risks associated with induction and augmentation of labour in women who have had a previous caesarean delivery.
- This study will investigate the incidence, risk factors and outcomes of uterine rupture in the UK.

Background

True uterine rupture is a catastrophic event with significant associated maternal and fetal morbidity and mortality. In the developed world it most commonly occurs in women who have previously delivered by caesarean section[81]. This observation has led to debate about the optimal management of labour and delivery in women who have delivered by caesarean section in previous pregnancies. Women with a previous caesarean delivery have generally been encouraged to attempt a trial of labour in subsequent pregnancies[82], but recent reports of an increased risk of morbidity, particularly due to uterine rupture, are thought to have contributed to a marked decrease in the number of women attempting vaginal birth after caesarean section[83]. The rate of caesarean section delivery in the UK is increasing, with previous caesarean section being the most common primary obstetric indication for repeat caesarean[84]. Two recent systematic reviews have attempted to quantify the incidence of uterine rupture[81 85]. Both these reviews identified a number of deficiencies in the few existing studies in developed countries and suggested that a prospective national study of uterine rupture would offer the best opportunity to guide preventive strategies. They identified only one previous UK population-based study[9], which reported 12 ruptures in 48,865 deliveries, a rate of approximately 1 in 4000 deliveries.

In addition to difficulties in quantifying the incidence of uterine rupture, Guise et al[85] noted that existing observational studies were insufficient to answer additional questions about the risks of rupture associated with induction and augmentation of labour. This case-control study using the UK Obstetric Surveillance System will address these questions and quantify the national incidence of uterine rupture in the UK.

Case definition

The cases will be all women in the UK identified as having a uterine rupture using the following definition[85 86]: a complete separation of the wall of the pregnant uterus, with or without expulsion of the fetus, involving rupture of membranes at the site of the uterine rupture or extension into uterine muscle separate from any previous scar, and endangering the life of the mother or fetus. Any asymptomatic palpable or visualised defect (for example noted incidentally at caesarean delivery) will be excluded.

Surveillance Period

October 2008- October 2009

Main Research Questions

- What is the current incidence of uterine rupture in the UK?
- What are the characteristics of women who suffer from uterine rupture?
- What proportion of ruptures occur in women who have previously delivered by caesarean section?
- What is the risk associated with labour induction or augmentation of labour after prior delivery by caesarean section?
- What are the outcomes for mother and infant?

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