Quality of Care in the Management of Major Obstetric Haemorrhage

SN Johnson, S Khalid, S Varadkar, J Fleming, R Fanning, CM Flynn, B Byrne
Coombe Women and Infants University Hospital, Dublin 8

Abstract

Substandard care is reported to occur in a large number of cases of major obstetric haemorrhage (MOH). A prospective audit was carried out by a multidisciplinary team at our hospital over a one year period to assess the quality of care (QOC) delivered to women experiencing MOH. MOH was defined according to criteria outlined in the Scottish Audit of Maternal Morbidity (SAMM). 31 cases were identified yielding an incidence of 3.5/1000 deliveries. The predominant causes were uterine atony 11(35.4%), retained products of conception 6 (19.3%) and placenta praevia/accreta 6(19.3%). Excellent initial resuscitation and monitoring was noted with a high level of senior staff input. Indicators of QOC compared favourably with the SAMM. Areas for improvement were identified. This pilot study demonstrates the feasibility of detailed prospective data collection in MOH in a busy Dublin obstetric unit with a view to developing a national audit. Standardization of definitions allows for international comparisons.

Introduction

Traditionally, quality of maternal care has been assessed by the triennial confidential enquiry into maternal deaths (CEMACH) in the UK and Northern Ireland and recently the Republic of Ireland has become part of this audit reporting to the Centre for Maternal and Child Enquiries (CMACE). Care is substandard in one third of cases of severe maternal morbidity and in two thirds of maternal mortalities that are reported to occur as a result of massive obstetric haemorrhage (MOH). Successive maternal mortality enquiry reports have recommended consultant presence at caesarean section for placenta praevia and have also recommended local development of obstetric haemorrhage drills and MOH protocols. An even more potent measure of quality of care (QOC) lies in the audit of ‘near miss maternal morbidity’ with obstetric haemorrhage responsible for up to two thirds of severe maternal morbidity in our population. In our hospital a MOH protocol and obstetric emergency drills were introduced in March 2007 and January 2008 respectively. The purpose of this audit is not only to continue assessment of the incidence, causes, treatments and outcomes for MOH, but also to assess QOC and stimulate reflective practice. The purpose of this study was to assess the feasibility of collection of good quality prospective data of MOH in our institution with a view to informing the development of a national audit.

Methods

Following approval from the Research and Ethics committee at the hospital, a multidisciplinary group was formed and the proforma and method of data collection were agreed. In accordance with the Scottish Audit of Maternal Morbidity (SAMM) MOH was defined as an estimated blood loss (EBL) of 2.5 litres or more, transfusion of 5 units or more of red cell concentrate (RCC) or treatment of a coagulopathy. Cases were identified between January 1st and December 31st 2009 inclusive by a midwife, obstetric registrar and haemovigilance officer (all actively involved in clinical practice). The patient was usually identified and data accrued within 48 hours of the event and the team also discussed the case with care givers to obtain information that may not have been recorded in the patient notes. Patient demographics were recorded. Uterine atony was defined as failure of the uterus to contract after delivery or to involute appropriately in the postpartum period. Retained products of conception was defined by placental tissue remaining in the uterus after delivery necessitating either manual removal of the placenta or evacuation under anaesthetic. The placenta was deemed to be accreta or percreta if morbidity adherent to the uterine wall.

Indicators of quality of care were recorded and compared to similar data reported in the recent Scottish Audit and included: ultrasound localization of placental site in women with a previous caesarean section, early IV access with two large bore cannulae, request for appropriate blood investigations at the onset of bleeding (including cross-matching of 4 or more units of RCC), oxygen administration, use of a fluid warmer during the administration of blood products and fluids, appropriate BP and urinary output monitoring, and senior medical staff involvement. Adverse incident reporting was also recorded.

Data presented as mean and (range).

Results

31 cases of MOH were identified out of 8659 deliveries over the period of the study (3.5/1000 deliveries). The demographics of these women are shown in Table 1. Approximately 60% of the nullipas had a previous CS. The majority of the women were Irish caucasian (74%). The main causes of MOH were uterine atony 11 (35.4%), retained products of conception 6 (19.3%), and placenta praevia /accreta /percreta 6 (19.3%). Other causes for MOH included coagulopathy (2), placental abruption (2), uterine rupture (1), endometritis (1), bleeding from an extended uterine incision (1) and uterine artery malformation (1). Three of the cases had secondary postpartum haemorrhage. One presented one week...
Quality of Care in the Management of Major Obstetric Haemorrhage

post delivery by CS and one by vaginal birth. Both had EUA performed. One case had a subinvovluted uterus full of clots that were evacuated and another had retained products of conception. A third woman had unexplained bleeding three weeks post CS with a possible uterine artery malformation and had a hydrostatic balloon placed and uterine artery embolisation.

With regards to the management of MOH, the technique of rubbbing up a uterine contraction to stem bleeding was recorded in 62% of cases and bimanual uterine compression in 13%. Routine third stage oxytocin (10units bolus iv/IM) was administered in all but one woman. This pregnancy was complicated by antepartum rupture of one horn of a bicornuate uterus at 24 weeks gestation and uterine atony was not considered to be an issue. Oxytocin infusion was administered to 84% of patients. Misoprostol (71%) and carboprost (45%) were prescribed more frequently than ergometrine (32%). Surgical treatments included placement of an intrauterine Rusch balloon (13), insertion of a B-Lynch suture (2), internal iliac artery ligation (1) and hysterectomy (6). Uterine artery embolisation was used to treat the secondary PPH mentioned above. Table 1 shows the result of our audit of quality of care and similar data extracted from the Scottish Audit of Severe Maternal Morbidity (SAMMM) are shown for comparison. Our protocol to crossmatch 4 units of blood at initial presentation was adhered to in 61% of cases compared to the 53% adherence to the Scottish protocol of crossmatching 6 units of blood. All caesarean deliveries for suspected placenta praevia/accreta/accreta were performed either by or with the assistance of an obstetric consultant. There was a high level of consultant presence. 23% of cases were discussed with a consultant haematologist. None of this patient group required ICU transfer.

The mean EBL was 4 litres. The median numbers of different blood products used were: RCC 5.Sunits (range 2-18), solvent detergent treated pooled plasma (Octoplas) 5.Sunits (0-11), cryoprecipitate 4.25(0-5) and platelets 1(0-4). The mean volume of crystalloid and colloid infused before blood was administered was 2.1L and 1.4L respectively. RCC was the most common product requested (152 units), with 76 units of Octoplas, 31 units of pooled cryoprecipitate and 15 pools of platelets used in addition. There was evidence of coagulopathy in 26% of patients. Octoplas, cryoprecipitate, platelets and recombinant factor VIIIa (NovoSevenR) were used in 71%, 52%, 26% and 3% of patients respectively. The mean haemoglobin post transfusion was 8.8 g/dl (6-11.9). 25 of the 31 cases were reported to hospital risk management. Out of the 25, two cases were reported for reasons other than MOH (caesarean hysterectomy and transfusion form incident). The majority (21) of these cases were reported by midwifery staff.

Discussion

The incidence and aetiology of MOH in our study is comparable to that previously reported in Ireland and other developed countries. 

Adopting universal consensus definitions such as the adoption of the criteria used in the SAMM allows for meaningful data comparisons between units. The leading cause of MOH continues to be uterine atony and the importance of early resuscitation and aggressive use of oxytocic agents is important. It is reassuring to note that all of the women in this study had appropriate prophylactic oxytocin at delivery. Of concern however, is the continuing trend in the use of misoprostol as the second line uterotonic before ergometrine despite the lack of evidence to support this practice. Initial resusculation, with adherence to the protocol for MOH drills was good in most cases. Two cases of secondary PPH presenting to the emergency room were noted to have received substandard initial resuscitation. In one case optimal intravenous access was not established, oxygen was not administered and baseline coagulation studies were not performed while in the other case cross matched blood was not requested and documentation regarding treatment provided was poor. We had targeted labour, antenatal and postnatal ward staff with MOH drills but had not targeted the emergency room staff that deal primarily with early pregnancy and postpartum complications. This audit highlighted the need for MOH drills in the outpatient and emergency room setting.

The placental site was localized before delivery in 82% of the cases that had a previous caesarean section. This is suboptimal as placental localization is recommended in all pregnancies where there has been a previous caesarean delivery. There was a consultant obstetrician present at every caesarean section for placenta praevia/accreta. The diagnosis of a morbidity adherent placenta was suspected in five of these cases and the surgery was performed by a trained gynaecological-oncologist. There was a high level of consultant obstetric and anaeasthetic provided care despite the lack of staffing ratios to support a consultant delivered service. Consultant haematology advice was less likely to be sought in our unit compared to Scottish units and this is an area that needs to be explored further, particularly as there was significant heterogeneity in the pattern of blood products used. In interpreting comparisons we need to be cognizant of the differences in the source of data. The CWIUH is a large stand alone tertiary referral unit and our data is being compared with 18 consultant led maternity units geographically distributed over Scotland with different case loads and staffing.

Surgical alternatives to hysterectomy include the hydrostatic balloon (Rusch), uterine compression sutures and internal iliac artery ligation and success rates of 75%, 40% and 64% have been noted in the Dublin maternity hospitals previously. In our study, early resort to hysterectomy was noted in cases of placenta accreta (diagnosed or suspected antenatally) similar to the UK Obstetric Surveillance System (UKOSS) study which recommends early resort to hysterectomy for uterine or placental fragment associated with massive transfusion. In one case, the diagnosis was not suspected antenatally and uterotonics and the Rusch balloon failed to control rapid blood loss and ultimately, a hysterectomy was performed. In another case, the uterus at 24 weeks gestation and uterine atony was not considered to be an issue. Oxytocin infusion was administered to 84% of patients. Misoprostol (71%) and carboprost (45%) were prescribed more frequently than ergometrine (32%). Surgical treatments included placement of an intrauterine Rusch balloon (13), insertion of a B-Lynch suture (2), internal iliac artery ligation (1) and hysterectomy (6). Uterine artery embolisation was used to treat the secondary PPH mentioned above. Table 1 shows the result of our audit of quality of care and similar data extracted from the Scottish Audit of Severe Maternal Morbidity (SAMMM) are shown for comparison. Our protocol to crossmatch 4 units of blood at initial presentation was adhered to in 61% of cases compared to the 53% adherence to the Scottish protocol of crossmatching 6 units of blood. All caesarean deliveries for suspected placenta praevia/accreta/accreta were performed either by or with the assistance of an obstetric consultant. There was a high level of consultant presence. 23% of cases were discussed with a consultant haematologist. None of this patient group required ICU transfer.

The placental site was localized before delivery in 82% of the cases that had a previous caesarean section. This is suboptimal as placental localization is recommended in all pregnancies where there has been a previous caesarean delivery. There was a consultant obstetrician present at every caesarean section for placenta praevia/accreta. The diagnosis of a morbidity adherent placenta was suspected in five of these cases and the surgery was performed by a trained gynaecological-oncologist. There was a high level of consultant obstetric and anaeasthetic provided care despite the lack of staffing ratios to support a consultant delivered service. Consultant haematology advice was less likely to be sought in our unit compared to Scottish units and this is an area that needs to be explored further, particularly as there was significant heterogeneity in the pattern of blood products used. In interpreting comparisons we need to be cognizant of the differences in the source of data. The CWIUH is a large stand alone tertiary referral unit and our data is being compared with 18 consultant led maternity units geographically distributed over Scotland with different case loads and staffing.
In summary, this audit demonstrates excellent patient care in terms of initial resuscitation and monitoring, senior staff involvement and no women required ICU transfer. Areas for improvement were identified as follows: ultrasound localization of placenta should be performed in all women with a previous caesarean section; ergometrine should be used as the second line uterotonic agent when there is no contraindication; haemorrhage drills need to involve emergency room and OPD staff; there may be a need for more consultation with hematologists and incident reporting needs to be improved. This study demonstrates that detailed audit of MOH is possible with a dedicated multidisciplinary team, quality of care can be readily assessed and areas targeted for improvement. Adoption of a standard definition of MOH allows comparison between international obstetric units. This pilot study supports the feasibility of implementing a similar audit on a national level.

Correspondence: B Byrne
Coombe Women and Infants University Hospital, Dolphin’s Barn, Dublin 8
Email: bbyrne@coombe.ie

References
5. Green top guideline no 52: Postpartum Haemorrhage, Prevention and Management: May 2009
8. Knight M. Peripartum hysterectomy in the UK: management and outcomes of the associated haemorrhage. BJOG, 2007; 114:1380-1387

Quality of Care in the Management of Major Obstetric Haemorrhage