Anaemia in Pregnancy Implications for Mother and Fetus

Catriona Monaghan

Abstract

Anaemia is defined as haemoglobin less than two standard deviations below the mean for a healthy matched population. The WHO defines this as < 110.0g/L in pregnant women. The prevalence of anaemia in pregnancy is widely distributed on a global scale ranging from 56% in Central and West Africa, to 24% in Europe. In the UK, the main aetiology for anaemia in pregnancy is nutritional deficiencies, particularly iron.

Anaemia in pregnancy can have implications for the mother, including reduced work capacity and susceptibility to infections, as well as the fetus and subsequently the neonate. These can include low birth weight and there have been associations made with impaired psychomotor and mental development in infants suffering from iron deficiency.

The management for iron deficiency anaemia in pregnancy includes a trial of oral iron. The haemoglobin level should respond within two weeks. Gastrointestinal discomfort tends to be the most commonly reported side effect and when this occurs preparations with a lower iron content should be tried. Indications for parenteral iron therapy include absolute non-compliance, intolerance to oral iron and proven malabsorption.

Indications for blood transfusion include massive obstetric haemorrhage and local protocols should guide management. In the case of a woman with a low haemoglobin not actively bleeding, but is symptomatic of anaemia, a discussion regarding the risks and benefits of blood transfusion should be undertaken and recorded in the notes.

RJMH Transfusion Audit 2014

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Royal Jubilee Maternity Service (RJMS), Belfast Health and Social Care Trust

Introduction

The rate of red cell transfusion in obstetric units in the western world varies from 0.6% to 2.9%, depending on the case mix and variation in clinical practice[1]. Obstetric haemorrhage is a major cause of maternal morbidity and high red cell transfusion rates have been shown to correlate with maternal morbidity. Previous retrospective audits of red cell transfusion in pregnant women in RJMS highlighted a requirement to reduce inappropriate transfusion (37%), avoid over-transfusion (28%) and improve documentation of transfusion episodes.

Aims

We aimed to undertake a retrospective audit of all women who were transfused red cells in RJMS in 2014 (January-December) and assess appropriateness against nationally accepted guidelines [2,3].

Methods

Women who were transfused were identified using the Northern Ireland Maternity System (NIMATS). Corresponding clinical notes were examined for haemoglobin (Hb) level at booking, pre-transfusion and post-transfusion, the number of red cell units and other blood products transfused and the clinical indication for transfusion. Additional details such as grade of the clinician authorising the transfusion, documentation of the indication for transfusion and prescription of iron were also ascertained.

Results

A total of 88 transfused women were identified, for which the indication for transfusion was documented in all cases. The decision to transfuse was predominantly made by SHO-grade doctors (45%). Transfusion was deemed to be inappropriate in 22 (27.5%) patients and over-transfusion was an issue in 12 (28%) women in the absence of active bleeding. Oral iron supplementation was not prescribed for 29 women when indicated following the Hb check at 28 weeks gestation.

Conclusion

This audit demonstrated some improvement in use of red cell transfusions in obstetric patients in RJMS, compared with previous audits. However there is still scope to reduce exposure to donated blood by avoiding inappropriate and excessive transfusion and by oral iron supplementation in the antenatal period.

1. Patterson JA et al Vox Sanguinis 2015, 108: 37-45
2. Better Use of Blood Guidelines And Implementation Network, March 2009
3. Guidelines for the Blood Transfusion Services in the UK, 8th Edition 2013

Thromboembolism in Pregnancy

Dr Gary Benson

The importance of VTE in pregnancy continues to be highlighted through the confidential maternal enquiries which consistently place VTE as a recurrent major cause of maternal death.

VTE in pregnancy, both its risk assessment as well as treatment, continues to be an area of challenge for all health care professionals. Guidelines have recently been updated and published through the RCOG but given the majority of these patients attend through an ED, it remains important that such guidelines should not remain the property of the specialty who has developed them. Widespread education and guidance to all medical, surgical, haematology and obstetric areas is key to the safe management of women who are pregnant and who may have VTE.

Haemolytic Disease of the Foetus and Newborn – past, present and future
Educational Day Transfusion Practice in Obstetrics and Paediatrics, 20 November 2015, Ulster Hospital, Dundonald

Haemolytic disease of the foetus and newborn (HDFN) was a major cause of perinatal mortality in the 1950s and 1960s. Rh D negative mothers carrying Rh D positive babies were at risk of forming anti-D antibodies. Anti-D antibodies cross the placenta and for Rh D incompatibility have the potential to cause severe foetal anaemia antenatally or neonatal jaundice postnatally because of the relative immaturity of the newborn's liver enzyme system.

There is a significant cohort of birth mothers who only had one live born infant and a succession of pregnancy losses because of anti-D alloimmunisation and severe rhesus disease.

The only treatment options were early delivery with the attendant complications of prematurity. Exchange transfusions and intrauterine foetal transfusions were applied with limited success. The situation improved with developments in neonatal intensive care and it is now expected that babies born at 28 weeks gestation will survive.

The develop of anti-D immunoglobulin blood product for prophylaxis of Rh D negative antenatal patients so that they will not become alloimmunised to anti-D antibody is a major transfusion medicine success story. Advancements include postpartum prophylaxis, antenatal prophylaxis for potentially sensitising events and routine antenatal anti-D prophylaxis.

This paper presents data on residual cases of alloimmunisation to anti-D in Northern Ireland for the five year period 2010-2014. These results compare favourably with the best results achieved in other programmes.

Future developments include the potential application of an assay predicting foetal molecular Rh D genotype from a maternal plasma sample. Anti-D immunoglobulin may be safely withheld for Rh D negative mother and baby pairs. The minimum dose of anti-D immunoglobulin prophylaxis may be exceeded and this could have the effect of reducing residual alloimmunisation rates further.

Appropriate Use of anti-D Immunoglobulin in Northern Ireland

A regional audit coordinated by the NI Transfusion Committee

Susan Atkinson

There has been a marked decrease in the occurrence of haemolytic disease of the newborn, which is associated with stillbirth and severe morbidity in surviving babies, since the introduction of routine antenatal anti-D immunoglobulin prophylaxis (RAADP) in the UK. National guidelines, which include those produced by the British Committee for Standards in Haematology and The Royal College of Obstetricians and Gynecologists, provide recommendations on the use of RAADP and anti-D Immunoglobulin (Ig) administration when potentially sensitizing events occur, such as early pregnancy loss, antepartum haemorrhage and delivery.

This audit of anti-D Ig use was performed by retrospective review of clinical notes to ascertain whether national recommendations are complied with in all NI Healthcare Trusts.

The vast majority of women who had either early pregnancy loss (159 women) or live or stillbirths (953 women) during a 6-month period in 2012 were administered anti-D Ig when indicated. However there was no evidence that this blood derived product had been administered to 4% of early pregnancy loss cases, to 4% of women who had potentially sensitizing events or to 5% of women who delivered Rh-positive babies. In 1.7% of Rh-negative women who subsequently delivered live births there was no evidence that RAADP had been administered, nor any reason given for omission.

The audit demonstrated scope for improvement in maternal sampling for Kleihauer test, since it was only possible to confirm that it was performed in 69% of RhD negative women with potentially sensitizing events at 20 weeks gestation or later and in 97% of RhD negative women following delivery.

Documented evidence of consent for RAADP was identified in 81% of cases but was poor for anti-D Ig administration following potentially sensitizing events.

The NITC has outlined an action plan to promote better use of anti-D Ig and to improve associated documentation in NI Healthcare Trusts.

Transfusion in the paediatric population

Helen V. New

Neonatal transfusions are mostly given to preterm very low birthweight babies. The majority of preterm low birthweight neonates receive at least one red cell transfusion, primarily to replace iatrogenic blood losses. Best transfusion practice involves a balance between the risks vs benefits, and the UK blood services contribute by striving for the optimum safety and efficacy of neonatal blood components and their timely provision. Much of neonatal transfusion practice is based on consensus guidance and there is variation amongst neonatologists and ongoing uncertainty as to appropriate indications for transfusion.

When assessing risks of transfusion, preterm neonates should be considered as a distinct group. They are vulnerable and may react to transfusion with more subtle signs, or reactions may be difficult to recognise in babies who are already acutely unwell for other reasons. From analysis of reports to the UK national haemovigilance scheme, SHOT (www.shotuk.org), it has been estimated that the there are a disproportionate number of errors associated with neonatal and infant transfusions compared to older age groups. Haemovigilance reporting systems only capture a proportion of adverse outcomes of transfusion. Others are reported in the literature, for example cases of hyperkalaemia and cardiac arrest following large volume transfusions, and adverse outcomes of neonatal exchange transfusions (currently the subject of a clinical survey in association with the British Paediatric Surveillance Unit, www.rcpch.ac.uk/bpsu/ebt). There is concern that some neonatal adverse reactions could be being missed, in particular adverse cardiorespiratory outcomes, and modified definitions may be required. Recent studies including a UK prospective observational study have demonstrated sustained cardiorespiratory changes following neonatal transfusion.

Red cell transfusion indications are generally based around the haemoglobin (Hb) concentration. There have been three recent randomised controlled trials (RCTs) comparing restrictive vs liberal Hb transfusion thresholds in preterm neonates stratified by combinations of respiratory status and postnatal age. These studies have had limited and somewhat conflicting information on long term outcomes, but a Cochrane review concluded that overall there is no evidence that the restrictive Hb thresholds used in the trials have a significant impact on morbidity or mortality and that Hb levels below the lower limits tested should not be used. For platelet transfusions, the evidence base is less advanced. The majority of platelet transfusions given on neonatal units are prophylactic in the absence of bleeding. There is a current international multicentre RCT of prophylactic transfusion thresholds of 25 vs 50 x 10^9/L (www.PlaNeT_2.com) with participating centres from both the UK and Netherlands.

In summary, preterm neonates are an intensively transfused vulnerable group of recipients. Evidence is accruing regarding both the risks of transfusion and the indications. Multiprofessional collaboration is successfully working in order to optimise transfusion provision and practice for these patients.

Anaesthetic Management of Peripartum Haemorrhage

Conor Lamb – ST7 Anaesthetic Trainee

Haemorrhage continues to account for 10% of maternal deaths in the UK. The most common form of peripartum haemorrhage is post-partum haemorrhage (PPH), accounting for around 80% of cases. PPHs appear to be increasing in incidence, not only in the UK, but also in many developed countries. A knee jerk assumption may to be to suspect this to be due to the raised prevalence of morbidly adherent placentas but the data suggests it is largely attributable to atonic uteruses.

The anaesthetic management of peripartum haemorrhage varies according to the anticipation, degree and rate of haemorrhage. The management is challenging and often reliant on achieving many small tasks quickly. Ideally an unexpected massive haemorrhage could be prevented or ameliorated by screening, antenatal correction of anaemia, appreciation of the presence of multiple risk factors and prompt response to early warning signs. Management is at its best when it is within a recognised cohesive multidisciplinary team. Specific intra-operative anaesthetic management should focus on keeping up / catching up with volume resuscitation, prevention of coagulopathy and maintaining a helicopter view of the overall proceedings.

Special mention should be given to the importance of training in these scenarios and the importance of acknowledging and reflecting on human factors.

Obstetric management of postpartum haemorrhage

Postpartum haemorrhage (PPH) is a significant cause of maternal mortality and morbidity. Active management of the third stage reduces the incidence of PPH but rapid management when it occurs is paramount. The three domains of PPH management are assessment, fluid replacement and arrest of the bleeding. All three should happen simultaneously and multidisciplinary simulation training is very important in improving teamwork and outcomes.

The most common cause of PPH is uterine atony and therefore the first line of pharmacological agents aims to improve uterine contractility. Oxytocin, ergometrine, misoprostol and haemabate can be used to improve uterine contraction and arrest the bleeding. If these fail, mechanical measures to stop the bleeding should be promptly applied. These include bimanual compression and uterine balloon tamponade which can be effective in a relatively simple way.

Surgical measures include compression sutures, uterine artery ligation and internal iliac artery ligation. If hysterectomy is needed, it should not be delayed, as the ongoing bleeding will affect coagulation and the procedure will be more difficult.

Cell salvage– Should every obstetric unit have one?

Dr Shubha Mallaiah, Consultant Anaesthetist,

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Major obstetric haemorrhage (MOH) is a huge problem globally being the leading cause of death amongst young women, mainly in resource poor countries. In the developed world, although mortality is not a major issue, severe morbidity from MOH is on a relentless rise. Access to transfusion of allogeneic blood clearly helps save lives in these women, but carries with it certain risks. Allogeneic blood is a valuable but finite resource and future supplies may be at risk.

Intraoperative cell salvage (IOCS) helps to reduce the need for allogeneic blood transfusion. It was slow to gain popularity in obstetrics due concerns regarding amniotic fluid embolism and Rhesus Immunisation in Rh-ve mothers. But these barriers have been surmounted and IOCS is currently recommended in obstetrics by NICE, AAGBI and MBRRACE. Women who decline blood products will often accept cell salvage.

It can also be cost effective as our use at Liverpool Women's Hospital has demonstrated but local factors such as case mix, skill mix, background blood transfusion rates etc at individual units may affect this differently.

The recently completed SALVO study, which is a multicenter RCT of IOCS during caesarean section in women at risk of haemorrhage, involving 20 hospitals around the UK, may provide some answers.

Then there is the question of whether we should be salvaging vaginal losses??

Optimising Management of Coagulopathy to reduce Transfusion requirement in Postpartum Haemorrhage

Peter Collins

Summary
The haemostatic management of major obstetric haemorrhage remains challenging and current published guidance relies heavily on experience from the non-pregnant population, data derived from major trauma and expert opinion. In recent years, an interest in the implications of relative hypofibrinogenaemia, point of care monitoring of coagulation abnormalities and the potential to give goal-directed therapy to correct coagulopathies have created the possibility to significantly challenge and change guidance. There is evidence that the haemostatic impairment in the pregnant population is different from trauma-induced bleeding and the type and rate of onset of coagulopathies differ depending on the underlying cause. Most obstetric bleeds are not associated with significant haemostatic impairment and hence do not need early haemostatic support. Early haemostatic impairment is seen most commonly with placental abruption and amniotic fluid embolus. This talk reviews recent data on the role of point of care testing, discusses implications of the use of shock packs in obstetric bleeding and challenges conventional thinking on formulaic management. The talk suggests that hospitals have major obstetric haemorrhage protocols that are distinct form those used in major trauma.