

## CHAPTER 4

# Haemorrhage

MARION H HALL on behalf of the Editorial Board

### Obstetric haemorrhage: key recommendations

#### Service provision

##### *Guidelines and protocols*

A multidisciplinary massive haemorrhage protocol must be available in all units and should be updated and rehearsed regularly in conjunction with the blood bank. All grades of staff should participate in these 'fire drills' on site.

Women known to be at high risk of bleeding should be delivered in centres with facilities for blood transfusion, intensive care and other interventions, and plans should be made in advance for their management.

#### Individual practitioners

Consultant haematologists should be involved in the care of women with coagulopathy.

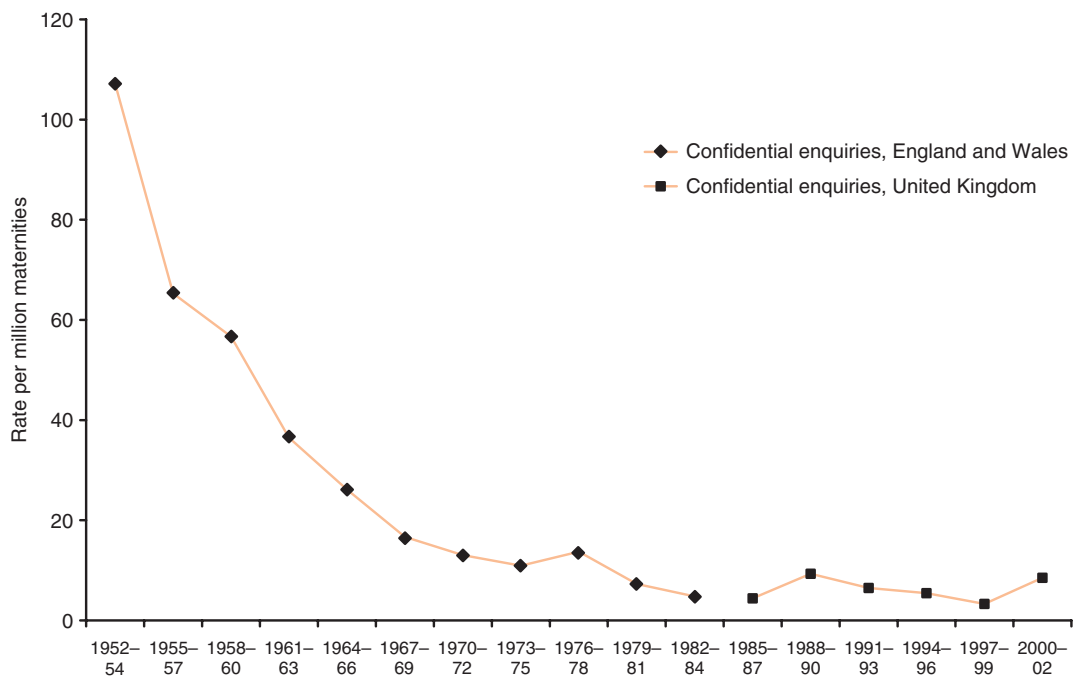
Placenta praevia, particularly in women with a previous uterine scar, may be associated with uncontrollable uterine haemorrhage at delivery and caesarean hysterectomy may be necessary. A consultant must be in attendance.

On-call consultant obstetricians must consider all available interventions to stop haemorrhage such as B-Lynch suture, embolisation of uterine arteries or radical surgery and they should not hesitate to involve surgical or radiological colleagues as required.

### Fifty years ago . . .

Figure 4.1 shows the change in death rates from haemorrhage over the last 50 years. Looking at the absolute numbers, it is shocking to recall that at least 40 women per annum died from haemorrhage in the early 1950s compared with about three per annum in recent years. The major fall in death rates had occurred by 1975 and this improvement in outcome was thought to have been due to:

- hospitalisation for delivery of women at higher risk (older women, grand multiparae, and those with pre-eclampsia)
- better surveillance of ill women and, for some, major surgery such as hysterectomy



**Figure 4.1** Maternal mortality for deaths due to haemorrhage; England and Wales 1952–84; United Kingdom 1984–2002

- using the flying squad to resuscitate women at home or in small hospitals prior to transfer to a large hospital
- the active management of coagulopathy and of women at risk of renal failure.

All of these had been recommendations in earlier Reports of the Confidential Enquiries into Maternal Deaths.

In recent years some possible risk factors for haemorrhage appear to be becoming more common, for example:

- the increasing mean age of childbirth
- an increasing number of women with complex medical disorders choosing to become pregnant
- increased numbers of multiple pregnancies following assisted reproduction
- increased caesarean section rates leading to subsequent placenta praevia or accreta.

These risk factors, together with changes in obstetric training, may be relevant to the increase in deaths in this triennium, which are discussed below.

### Summary of findings for 2000–02

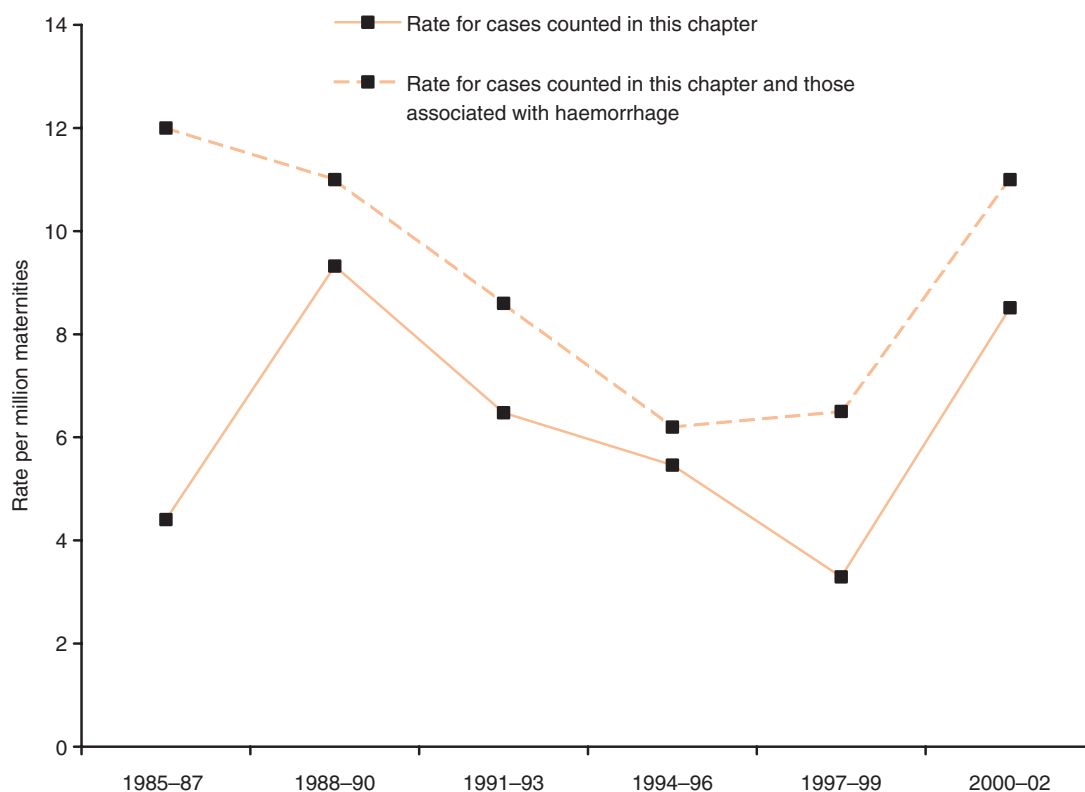
Of the 17 deaths directly due to haemorrhage counted in this chapter, four were due to placenta praevia, three to placental abruption and ten to postpartum haemorrhage (PPH). The numbers of deaths from abruption and placenta praevia are unchanged from the previous triennium but there has been a striking increase in the numbers of deaths from postpartum haemorrhage, from one case in the last Report to ten in the present triennium.

**Table 4.1** Numbers of deaths from haemorrhage by underlying cause and mortality rate per million maternities; United Kingdom 1985–2002

Triennium	Placental abruption	Placenta praevia	Postpartum haemorrhage	Total (n)	Rate per million maternities	
					Rate	95% CI
1985–87	4	0	6	10	4.4	2.1–8.1
1988–90	6	5	11	22	9.3	5.8–14.1
1991–93	3	4	8	15	6.5	3.6–10.7
1994–96	4	3	5	12	5.5	2.8–9.5
1997–99	3	3	1	7	3.3	1.3–6.8
2000–02	3	4	10	17	8.5	5.0–13.6
Total	23	19	41	83	6.3	5.0–7.8

Five other women, whose deaths are counted in other chapters, also had complications in which significant haemorrhage occurred. The underlying causes of these were eclampsia, placenta increta at termination of pregnancy, amniotic fluid embolism and ruptured uterus.

As shown in Table 4.1, haemorrhage is a continuing problem and the mortality rate per million maternities has more than doubled since the last triennium. However, two of the women who died in this triennium had no contact at all with health services and another two declined blood transfusions that would probably have saved their lives. Without these four cases, the death rate would be 6.5 per million, which is similar to the rate over the last decade, although higher than in any triennium since 1998–90, as shown in Figure 4.2.

**Figure 4.2** Maternal mortality rates from haemorrhage by cases counted in the haemorrhage chapter and by total number of cases associated with haemorrhage; United Kingdom 1985–2002

### Substandard care

Fifteen (80%) of the 17 women who died from haemorrhage did seek medical care. Two did not. Two of the 15 women who sought care refused blood products. In 12 of the 15 cases where the woman sought care, this was assessed to have been poor. In seven cases, organisational problems (including inappropriate booking) were identified. In five cases the anaesthetic care was assessed as substandard, and lessons from these cases are discussed in Chapter 9 Anaesthesia.

The quality of resuscitation provided for these women was variable and sometimes poor. Of the 13 women who sought care and were prepared to accept blood products, most did have a transfusion, sometimes massive (range 7–82 units). Acknowledging the fact that death can occur very rapidly, it is nevertheless noteworthy that some women who died of haemorrhage seem to have received remarkably little blood.

Despite repeated recommendations given in successive Reports of this Enquiry, some high-risk women are still being booked for delivery in hospitals with neither blood transfusion nor intensive care facilities on site and with poor lines of communication to the nearest of appropriate facilities. In one case, urgently needed blood had been withdrawn from the refrigerator by the blood transfusion service because it was out of date 30 minutes before it was required. One hospital reported malfunctioning of specimen transport systems, which led to delay in crossmatched blood being available. Another reported a lack of a properly staffed recovery area.

In a few cases the care given was very poorly documented. Antenatal anaemia was not always corrected, although this is not counted as substandard care because anaemia can be refractory. In some cases, there was a failure to identify complex medical problems that would have been evident on careful scrutiny of family history, previous investigations and clinical symptoms as shown in the following vignette:

A woman had a pre-pregnancy chest X-ray (screening for tuberculosis) that showed atrial enlargement, which was not reported but was evidence of mitral stenosis. Some of her female relatives had had unexplained deaths, but this history was not elicited until after the woman herself had died. She also had recurring epistaxis which was not adequately investigated until it was too late. She actually had factor XI deficiency.

It is also important to check obvious antecedent factors, such as partial retained placenta, which was missed in one case.

In most cases, consultant obstetricians and anaesthetists were actively involved, although emergency surgery was sometimes started by non-consultant staff. In one case, however, there was no consultant attendance and no life-saving procedure was attempted. Twelve women had hysterectomies and some also had internal iliac ligation. No deaths were reported of women who had had a B-Lynch suture or radiological embolisation. There are no denominator data to allow interpretation but it may be that these procedures are more effective than heroic surgery.

It is very clear how helpful senior anaesthetic advice can be. In several cases where the woman was undergoing a caesarean section, the consultant anaesthetists had to persuade the obstetricians that physical signs such as oliguria, tachycardia or hypotension were in fact attributable to haemorrhage and that further surgery was required.

The quality of surgical treatment gave rise to concern. There were two cases in which re-suturing had to be undertaken in the operative field. Two women appeared to have had the abdomen closed prematurely after the first surgical procedure.

One woman was extubated prematurely when she had pulmonary oedema. In one woman, the administration of four doses of intramyometrial carboprost (Hemabate<sup>®</sup>, Pharmacia) was thought to have contributed to her collapse.

## Placental abruption

Placental abruption can occur at any gestational age.<sup>1</sup> It is usually treated actively by delivery, by caesarean section if the fetus is alive and viable but vaginally if the fetus is dead. Three deaths occurred in this triennium. All were in relatively young women and all were preterm, one in the second trimester of pregnancy. Care was considered good in one case but substandard in the other two. One was being managed conservatively, which is certainly unusual, although whether active management would have prevented her death is uncertain. One woman had an amniotic fluid embolism after the abruption occurred. The following vignette provides an example of other features that may be associated with abruption:

A woman had a rupture of the scar from previous caesarean sections. Intrauterine death had occurred from abruption and she was allowed to labour but then collapsed with upper abdominal pain. Dehiscence of the scar was diagnosed at examination under anaesthesia because of postpartum haemorrhage.

Labouring with a known intrauterine death is reasonable, even with previous caesarean section scars, but does present a problem for early diagnosis of scar dehiscence (which is usually diagnosed from fetal distress on cardiotocographic tracing). Special attention should be given to surveillance of women in such circumstances. Dehiscence may be diagnosed by eliciting scar tenderness or pain.

## Placenta praevia

When placenta praevia is diagnosed during pregnancy, delivery should be postponed until 14 days before term to improve perinatal outcome. However, death occurred before 38 weeks in three of the four cases in this triennium. In the other case the woman died just before her elective surgery.

All four women who died from placenta praevia presented with bleeding. Previous caesarean section predisposes to placenta praevia and placenta accreta. All four women had at least one previous caesarean and three had previous accreta.

It is increasingly argued that where there is a scan diagnosis of placenta praevia but no bleeding, hospital admission is not necessary. Hospitalisation is preferable where bleeding occurs, however, as illustrated in the following case:

A woman who had several previous caesarean sections was admitted with antepartum haemorrhage at around 28 weeks of gestation. A scan showed placenta praevia and two units of blood were transfused. She then went home but was readmitted two weeks later with further bleeding and again

was allowed to go home. She was readmitted with bleeding a few weeks later and had an emergency caesarean section. Unfortunately, this was in a unit with neither blood transfusion facilities nor an intensive care unit on site.

Admission is advisable when repeated bleeding occurs. Very close surveillance is even more necessary if placenta accreta has been diagnosed, because of the risk of dehiscence of the scar, as has been already discussed. Such high-risk women should be managed in a hospital which has facilities for embolisation, major surgery, blood transfusion and intensive care.

## Postpartum haemorrhage

There was a wide age range in the women who died from postpartum haemorrhage. Five of the ten deaths were in primigravidae, four in women of low parity and only one in a grand multipara, the group usually considered most at risk. One woman had a fundal placenta accreta and there was one death associated with multiple pregnancy.

Two deaths occurred in women who had no antenatal or intrapartum care. One may not have known she was pregnant. The other always avoided acknowledging pregnancy because she expected her children to be taken into care. There does not seem to have been any scope for midwifery or medical intervention.

## Women who decline blood transfusion

Two deaths occurred in women who declined blood transfusions. This is not considered as substandard care. Both were delivered by elective section, for reasons which were not clearly documented, and both subsequently required hysterectomy. Delay in carrying out the subsequent hysterectomy in one case may have been due to difficulty in obtaining consent.

There have only been six cases of death in women refusing blood transfusion in the last 21 years (1982–2002) so it is a very uncommon event, although it may well be that those women are over-represented among deaths. Staff find it very difficult to manage such situations. The recommendations for the management of women who decline blood products, made in the 1991–93 Report,<sup>2</sup> have been updated and are annexed to this Chapter. Since these have been published there have been some new developments which will prove helpful for managing these women in future:

- a. Interventional radiology for embolisation of the uterine or other vessels<sup>3</sup> may be difficult to deliver where haemorrhage has occurred without warning, where the woman's condition is unstable and she cannot be moved and especially where the delivery hospital is not on a general hospital site. But consideration could be given to arranging for the woman to deliver where there are appropriate facilities and it may sometimes be possible to stabilise the situation using angioplasty balloons prior to embolisation.
- b. Cell savers to harvest and wash the blood cells that the woman has lost and return them to her are acceptable to some women who decline blood transfusion and may be useful if the blood loss is intra-abdominal and is not contaminated with amniotic fluid. These conditions may not be met, however, if there is torrential vaginal loss or

bleeding in the early stages of caesarean section. There is a risk of iso-immunisation if fetal cells are given to the mother and administration of Anti-D immunoglobulin can reduce this. The risk of causing coagulopathy by returning amniotic fluid into the circulation is thought to be small.<sup>4</sup>

The above procedures may, of course, be used in any case of obstetric haemorrhage, including women who will accept blood transfusion.

### Substandard care

Among the eight women who sought care, there were elements of substandard care in seven. Most aspects of substandard care have been discussed earlier in this chapter, but one further point deserves discussion.

Recent changes in medical training may be relevant to the increased numbers of deaths from haemorrhage. Reduction in the overall length of obstetric training and in working hours during training may have reduced the amount of experience gained. There is also a trend towards subspecialisation among consultants and those with a special interest in obstetrics do not necessarily have highly developed surgical skills. The information available to the Enquiry does not permit any firm conclusion as to whether these factors contributed to the recent change in death rates. If they did contribute, this would strengthen the recommendation for regular 'fire drills' or 'skills drills' for the management of obstetric emergencies, including major haemorrhage, for all grades of staff in every unit.

#### Obstetric haemorrhage: learning points

- Catastrophic haemorrhage is a persisting problem.
- All of the women who died with placenta praevia had previous caesarean sections.
- Women at high risk of haemorrhage are still delivering in isolated or units ill equipped to sudden, life-threatening emergencies. These units may be without immediate access to specialist consultant care, blood products or intensive care.
- Women who decline blood products should be treated with respect and a management plan in case of haemorrhage agreed with them before delivery is anticipated.
- During this triennium, two women who concealed their pregnancies for fear that their babies might be taken into care died of postpartum haemorrhage at home.
- Obstetric care was considered to be substandard in 12 out of 15 (80%) of cases where the woman had sought treatment; anaesthetic care was considered to be substandard for five (see Chapter 9).
- No deaths were reported in women who had had interventional radiology or B-Lynch suture.

## References

1. Hall MH, Wagaarachchi P. Antepartum haemorrhage. In: MacLean AB, Neilson JP, editors. *Maternal Morbidity and Mortality*. London: RCOG Press; 2002. p. 227–40.
2. Department of Health. *Report on Confidential Enquiries into Maternal Deaths in the United Kingdom 1991–93*. London: HMSO; 1996.
3. Hong T-M, Tseng H-S, Lee R-C, Wang J-H, Chang C-Y. Uterine artery embolisation: an effective treatment for intractable obstetric haemorrhage. *Clin Radiol* 2004;59: 96–101.
4. Catling SJ, Freitas O, Krishnan S, Gibbs R. Clinical experience with cell salvage in obstetrics: 4 cases from one UK centre. *Int J Obstet Anesth* 2002;11:128–34.

## CHAPTER 4: ANNEX A

### Guidelines for the management and treatment of obstetric haemorrhage in women who decline blood transfusion

The vast majority of women accept blood transfusion if the clinical reasons for its use are fully explained. However, a few may continue to refuse transfusion because of personal or religious beliefs. Massive obstetric haemorrhage is often unpredictable and can become life threatening in a short time. In most cases, blood transfusion can save the woman's life and very few women refuse transfusion in these circumstances. If it is known in advance that a woman may decline blood products, plans for the management of massive haemorrhage, should it occur, should be made and discussed during her pregnancy.

#### Management

##### *At booking*

1. When women are asked about religious beliefs they should also be asked if they have any objections to receiving a blood transfusion. This discussion should be documented. All relevant information should be given to her in a non-confrontational manner, including the possibility that hysterectomy may be required if massive haemorrhage occurs.
2. If she decides against accepting blood transfusion in any circumstances, she should be booked for delivery in a unit with facilities for prompt management of haemorrhage, such as interventional radiology, cell salvage and surgical expertise.

##### *Antenatal care*

3. Her blood group, antibody status and haemoglobin should be checked in the usual way and haematinics given throughout pregnancy to maximise iron stores.
4. The placental site should be identified by ultrasound scan in late pregnancy.
5. Even if it is acceptable to the woman, autologous transfusion should not be suggested to pregnant women, as the amounts of blood required to treat massive obstetric haemorrhage are far in excess of the amount that could be donated during pregnancy. If cell salvage is available, it should be ascertained whether she would agree to this.

##### *Labour*

6. The consultant obstetrician and anaesthetist should be informed when a woman who will decline transfusion is admitted in labour or for delivery. Vaginal delivery is usually associated with lower blood loss than caesarean section and caesarean section should be performed only if there is a clear medical indication. In that case it should be performed by a consultant obstetrician.

7. The third stage of labour should be actively managed with oxytocics. The woman should not be left alone for at least an hour after delivery.

### *Haemorrhage*

8. Blood loss must be carefully quantified and clotting status investigated promptly. Delay should be avoided in intervention such as embolisation of uterine arteries, B-Lynch suture, internal iliac ligation or hysterectomy.
9. Pharmacological interventions which may be useful include intravenous vitamin K, and antifibrinolytics such as tranexamic acid.
10. The woman and her partner should be kept fully informed throughout. If the situation is critical, she should be asked again whether she would accept transfusion, in case she has changed her mind. Medical and midwifery staff should try to see her on her own to comfort themselves that she is making her decision of her own free will.
11. If she continues to refuse blood or blood products, her wishes must be respected. Any adult patient who has the necessary mental capacity is entitled to refuse treatment, even if that will result in death. No other person can consent to or refuse treatment on her behalf.
12. If, in spite of all care, the woman dies, her relatives require support like any other bereaved family.
13. It is very distressing for staff to have to watch a woman bleed to death while refusing effective treatment. Support must be promptly available for staff in these circumstances.