

Section

6



Epidemiology

CHAPTER 19

'Near misses' and severe maternal morbidity; the Scottish experience

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For the first time, a chapter on 'near misses' and severe maternal morbidity was included in the 1997–99 edition of this Report. That chapter outlined the rationale behind extending our traditional review of maternal deaths to include cases of severe morbidity; summarised the international literature on the topic; and described early pilot work in Scotland. In this present chapter, we describe our more recent experience with a national confidential audit of severe maternal morbidity in Scotland.

There is debate surrounding what constitutes the optimum definition of severe obstetric morbidity. The aim is to identify a group of women who were very ill and whose lives were threatened. In the international literature, the terms 'near miss' and severe morbidity are used interchangeably. We favour the latter term, as it carries no implication that the woman's life-threatening condition was due to negligence or poor care. There is also debate around the working definitions for inclusion criteria for a study of 'near miss' events. We chose to use a combination of pathophysiological (or clinically based) and management-based definitions.

Methods

The Scottish Confidential Audit of Severe Maternal Morbidity is funded by NHS Quality Improvement Scotland: the body which now has responsibility for the Scottish Maternal Deaths Enquiry. Although initiated with ring-fenced funding, the hope is to continue the Enquiry within the core funding allocated by NHS Quality Improvement Scotland to the Scottish Programme for Clinical Effectiveness in Reproductive Health.

Since October 2001, all consultant-led maternity units in Scotland have participated in data collection for this audit. We began with 22 units but, due to amalgamations or closures, the number of units has now decreased to 19. Definitions for categories of life-threatening maternal morbidity were developed from the published literature,^{1–4} taking into account the views of participants. Each month, each unit reports the number of women meeting one or more of the agreed definitions to the central office of the Scottish Programme for Clinical Effectiveness in Reproductive Health. A minimal dataset on each case is collected, comprising: a unique identifier, age, date of event and limited clinical information to verify that the case definitions are being met. In the first year of national data collection these monthly returns were collated centrally and used to calculate national and unit-level rates of 'near miss' events.⁵

For the second year, and following consultation with participants, both the case definitions were refined and the number of categories was increased from 13 to 14. In addition, a case assessment pro forma relating to the most common category of 'near miss' event, severe obstetric haemorrhage, was developed. This pro forma comprised both

condition-specific (that is, assessing adherence to national guidance on the management of haemorrhage) and general (that is, root-cause analysis) sections. This national pro forma was used by local clinical risk management teams during assessment of cases of severe obstetric haemorrhage. It served to guide local teams through a systematic and structured assessment of each case. The risk management teams were required to make an overall assessment of quality of care using the definitions of substandard care similar to those used by the Confidential Enquiries into Maternal Deaths and they were also required to formulate an action plan. The completed pro formas were collated centrally in order to identify recurrent themes and draw generalisable lessons for Scotland as a whole. Thus, during the second year, both case ascertainment (permitting the calculation of rates of events) and case assessment (permitting the learning of clinical lessons) took place.

Results

The case definitions in use at the time of publication of this Report for the 14 categories of 'near miss' event are summarised in Table 19.1.

Table 19.1 Definitions for the 14 categories of severe maternal morbidity currently in use by the Scottish Confidential Audit 2003–04

Code	Category	Definition
1	Major obstetric haemorrhage	Estimated blood loss \geq 2500 ml, or transfused 5 or more units of blood or received treatment for coagulopathy (fresh frozen plasma, cryoprecipitate, platelets; includes ectopic pregnancy meeting these criteria)
2	Eclampsia	Seizure in presence of pre-eclampsia
3	Renal or liver dysfunction	Acute onset of biochemical disturbance, urea $>$ 15 mmol/l, creatinine $>$ 400 mmol/l, aspartate aminotransferase/alanine aminotransferase $>$ 200 u/l
4	Cardiac arrest	No detectable major pulse
5	Pulmonary oedema	Clinically diagnosed pulmonary oedema associated with acute breathlessness and O ₂ saturation $<$ 95%, requiring O ₂ , diuretics or ventilation
6	Acute respiratory dysfunction	Requiring intubation or ventilation for $>$ 60 minutes (not including duration of general anaesthesia)
7	Coma	Including diabetic coma. Unconscious for $>$ 12 hours
8	Cerebrovascular event	Stroke, cerebral/cerebellar haemorrhage or infarction, subarachnoid haemorrhage, dural venous sinus thrombosis
9	Status epilepticus	Unremitting seizures in patient with known epilepsy
10	Anaphylactic shock	An allergic reaction resulting in collapse with severe hypotension, difficulty breathing and swelling/rash
11	Septicaemic shock	Shock (systolic blood pressure $<$ 80 mm/Hg) in association with infection. No other cause for decreased blood pressure. Pulse of 120 bpm or more
12	Anaesthetic problem	Aspiration, failed intubation, high spinal or epidural anaesthesia
13	Massive pulmonary embolism	Increased respiratory rate ($>$ 20/minute), tachycardia, hypotension. Diagnosed as "high" probability on V/Q scan or positive spiral chest CT scan. Treated by heparin, thrombolysis or embolectomy
14	Intensive care admission Coronary care admission	Unit equipped to ventilate adults. Admission for one of the above problems or for any other reason. Includes coronary care unit admissions

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Table 19.2 Overall assessments of quality of care assigned by local risk management teams after assessing cases of severe obstetric haemorrhage using a standard proforma

Quality of care category	No.
1. Appropriate care; well managed	91
2. Substandard care, incidental. Lessons can be learnt, but may not have changed outcome.	21
3. Substandard care, minor. Different care may have altered outcome.	17
4. Substandard care, major. Management contributed significantly to morbidity. Different management might well have resulted in a more favourable outcome.	4
Total	133

During the first year of national data collection, 'near miss' events (identified using definitions which differed in minor respects from those shown in Table 19.1)⁵ occurred in 196 women (of 51,165 deliveries in Scotland) (rate 3.8/1000 deliveries, 95% CI 3.3/1,000–4.4/1,000). Of these, 30% fell into more than one of our defined categories. Sixty-four women (33%) were admitted to an intensive care unit during their care. Severe haemorrhage was the most common category of event, occurring in 98 women (50%). During the year, there were four maternal deaths in Scotland due to causes related to one of our severe morbidity categories. Thus, the ratio of severe morbidity (as defined in our study) to maternal mortality was 49:1. The findings of our first year of national data collection are presented in full elsewhere.⁵ Because of the frequency of 'haemorrhage' events, this topic was chosen for development of our first case assessment proforma.

During the second year, 167 cases of severe obstetric haemorrhage were reported (meeting the refined and expanded definition shown in Table 19.1). At the time of writing, 133 (80%) of these had been assessed by local clinical risk management teams using the national case assessment proforma. Overall assessments of quality of care are summarised in Table 19.2.

National collation of the case assessment pro formas allowed the identification of learning points applicable to all maternity units in Scotland. National learning points comprised examples of both suboptimal care and good practice and comprised both recurrent themes and solitary, but important, instances. Examples of learning points distilled from the case pro formas are summarised in Table 19.3.

Discussion

The Scottish experience has confirmed that ascertainment and assessment of defined categories of severe maternal morbidity, on a national basis, is feasible. We have found that the 'system-based' definitions originally proposed by Mantel *et al.*¹ have proved eminently usable, with minimal adaptation. Our strategy for case ascertainment involves consultant-led maternity units only. A small proportion of women in Scotland deliver in midwife- or general practitioner-led units, or at home. We are aware that some cases of severe morbidity might be missed, as we have no case ascertainment mechanisms in place in these settings. However, any woman being managed in such a setting who develops severe morbidity would usually be transferred to a consultant-led unit; so we assume that missed cases, if any, would be few in number. Continuing collection of 'case ascertainment' data will allow examination of time trends in rates of 'near miss' events at local and national levels. Continuing collection of 'case assessment' data will

Table 19.3 Generally applicable learning points distilled from local risk management assessments of 133 cases of severe obstetric haemorrhage

Suboptimal care		Good practice	
Recurrent themes	Important instances	Recurrent themes	Important instances
Documentation	Check 'group and save' sample at laboratory before elective operation	Use a postpartum haemorrhage 'checklist'	Use of prophylactic Syntocinon infusion for high-risk case
Call senior staff early	Do not ignore post-operative tachycardia	Have interventional radiologist present at high risk elective operations	Elective insertion of pelvic drain at caesarean section in anticoagulated patient
Use protocols		Hold regular 'fire drills' on emergency procedures	Allocate a designated 'scribe' during emergency management
Check under theatre drapes for bleeding		Give positive feedback when job well done	Post a notice by the telephone reminding staff of availability of 'O negative' and 'group-specific' blood
Use 'O negative' blood if cross match delayed			
There is no such thing as a woman with 'no risk'			
Consider hysterectomy early			
Ensure staff can operate equipment			
Investigate medical conditions antenatally			

allow examination of time trends in rates of suboptimal care and collation of further learning points.

A formal, qualitative focus group exercise has shown that this approach to learning from adverse events is acceptable to, and indeed welcomed by, local risk management teams. However, a small-scale study of interobserver variability has indicated that, even using a structured pro forma, assessment of 'substandard' or 'suboptimal' care may be somewhat subjective and of limited reproducibility. We plan further development and evaluation of this approach to adverse event audit in order to improve the validity and rigour of our methods.

For further information on the Scottish Confidential Audit of Severe Maternal Morbidity, contact Gillian Penney (g.c.penney@abdn.ac.uk).

References

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