Maternal Critical Care in Obstetrics

Thomas F. Baskett, MB, Colleen M. O'Connell, PhD

Department of Obstetrics and Gynaecology and Perinatal Epidemiology Research Unit

Dalhousie University, Halifax NS

Abstract

Objective: To determine the factors leading to maternal critical care in a tertiary obstetric hospital and the associated trends.

Methods: We conducted a review of the medical records of all women who required transfer for critical care from a free-standing obstetric unit to a general hospital over a 24-year period (1982–2005).

Results: During the 24-year period there were five maternal deaths directly associated with 122 001 deliveries (4.1/100 000) and, in addition, 117 women were transferred to the general hospital for critical care (1.0/1000). The death-to-transfer ratio was 1 in 23. Of the women transferred, 93/117 (79.5%) required intensive care and 24/117 (20.5%) needed specialized medical or surgical services not available in the obstetric unit. Of the women transferred, 16/117 (13.7%) were antepartum, and 101/117 (86.3%) were postpartum. Hemorrhage and hypertensive disorders combined to make up 56.4% of all maternal transfers. Women with a multiple pregnancy were more likely to require transfer than those with a singleton pregnancy (RR 3.34; 95% CI 1.4–7.59, *P* = 0.01).

Conclusion: The majority of maternal transfers for critical care occur postpartum, and in more than half of the cases the reason for transfer is hemorrhage or hypertensive disease. Women with a multiple pregnancy had a significantly greater rate of transfer than those with a singleton, and women with a triplet pregnancy had a greater rate than those with twins. There was a non-significant increase in the number of maternal transfers over the study period.

Résumé

Objectif : Déterminer les facteurs menant à l'offre de soins aux mères en phase critique au sein d'un hôpital obstétrical tertiaire et les tendances connexes.

Méthodes : Nous avons mené une analyse des dossiers médicaux de toutes les femmes en phase critique se trouvant dans une unité obstétricale autonome qui ont nécessité un transfert dans un hôpital général, et ce, sur une période de 24 ans (1982–2005).

Résultats : Au cours de cette période de 24 ans, nous avons recensé cinq décès maternels directement associés à 122 001 accouchements (4,1/100 000); de plus, 117 femmes ont été transférées dans un hôpital général pour y recevoir des soins destinés aux malades en phase critique (1,0/1 000). Le rapport décès/transfert était de 1 sur 23. Chez les femmes transférées, 93/117 (79,5 %) ont nécessité des soins intensifs et 24/117 (20,5 %) ont nécessité des services médicaux ou chirurgicaux spécialisés n'étant pas offerts au sein de l'unité obstétricale. Chez les femmes transférées, 16/117 (13,7 %) se trouvaient en période antepartum et 101/117 (86,3 %), en période postpartum. L'hémorragie et les troubles hypertensifs sont, pris ensemble, à l'origine de 56,4 % de tous les transferts maternels. Les femmes présentant une grossesse multiple étaient plus susceptibles de nécessiter un transfert que celles qui présentaient une grossesse monofœtale (RR, 3,34; IC à 95 %, 1,4–7,59, P = 0,01).

Conclusion : La plupart des transferts maternels visant l'obtention de soins pour malades en phase critique surviennent au cours de la période postpartum; dans plus de la moitié des cas, l'hémorragie ou les troubles hypertensifs sont à l'origine du transfert. Les femmes présentant une grossesse multiple ont connu un taux considérablement accru de transfert, par comparaison avec les femmes qui présentaient une grossesse monofœtale; de plus, les femmes enceintes de triplés ont connu un taux de transfert supérieur à celui des femmes présentant une grossesse gémellaire. On a constaté une hausse non significative du nombre de transferts maternels au cours de la période d'étude.

J Obstet Gynaecol Can 2009;31(3):218–221

Key Words: Maternal mortality, severe maternal morbidity, maternal intensive care, postpartum hemorrhage, severe preeclampsia, multiple pregnancy

Competing Interests: None declared.

Received on July 29, 2008

Accepted on August 20, 2008

INTRODUCTION

In developed countries, maternal mortality rates have fallen to such low levels that it is difficult to gather sufficient cases for audit to draw clinical lessons. In the latest national survey in Canada (from 1997 to 2000), there were only 64 maternal deaths—44 direct and 20 indirect—in 1 054 828 live births.[1] While it is essential to continue to audit cases of maternal mortality, it has been suggested that a review of cases of severe maternal morbidity, which occur more frequently, should provide a more clinically relevant appraisal of the threats to maternal health in pregnancy.[2,3] Over the past 15 years, different approaches to the classification of severe maternal morbidity have been used, including clinically defined morbidities,[4–6] organ system dysfunction,[7–10] and management-based criteria such as the need for intensive care.[11–14] The need for maternal transfer for critical care from a free-standing obstetric unit such as ours is an easily identified criterion of severe maternal morbidity. We have expanded upon a previous preliminary study[15] to determine the indications for and type of

maternal critical care required, and to establish trends over a 24-year period.

METHODS

The Women's Hospital of the IWK Health Centre is a free-standing obstetrical unit with about 5000 deliveries per annum. The majority of deliveries (85%) are from the Halifax City and Halifax County population of approximately 370 000, for which the Women's Hospital is the only obstetric unit. Approximately 15% of deliveries follow transfer of high-risk pregnancies from the rest of the province of Nova Scotia. If maternal critical care is required, transfer by ambulance is necessary to one of two general hospitals, each less than 1 kilometre from the Women's Hospital. Over the 24 years, 1982–2005, the records of all women with a pregnancy of > 20 weeks' gestation who required transfer for critical care were reviewed. The following information was abstracted from the hospital charts: primary reason for transfer, transfer of women with multiple pregnancy, primary transfer service, and the number of days of critical care. The chi-square test for trend was used to assess the rates of maternal transfer over three eight-year periods: 1982–1989, 1990–1997, and 1998–2005, for both the Halifax residents and those transferred from the rest of the province. Proportions of cases requiring transfer were compared between singleton and multiple pregnancies (chi-square analysis). All maternal deaths during the same 24-year period were reviewed.

Ethics approval for this study was obtained from the Research Ethics Board at the IWK Health Centre in Halifax, Nova Scotia.

Table 1. Primary reason for maternal transfer

Hemorrhage	34
antepartum hemorrhage	10
postpartum hemorrhage	24
disseminated intravascular coagulation	24
Hypertensive disease	32
including HELLP syndrome	15
Cardiac	12
Sepsis	9
Medical/surgical disorders	30
gastro-intestinal	12
pulmonary embolism	4
respiratory	4
neurological	4
other	6
Total	117

Table 2. Primary transfer service

	Number	Days of care
Surgical ICU	43	155
Medical ICU	35	176
Cardiac ICU	10	58
Neurosurgical ICU	5	27
Surgical specialty	12	98
Medical specialty	12	149
Total	117	663

ICU: intensive care unit.

RESULTS

During the 24 years, there were five maternal deaths directly associated with 122 001 deliveries (4.1/100 000). The causes of maternal death were postpartum hemorrhage (2), venous thromboembolism (2), and severe preeclampsia (1). Three of these patients, one with postpartum hemorrhage, one with venous thromboembolism, and one with severe preeclampsia, were transferred to intensive care but died within 24 hours. There were 117 women transferred to the general hospital for critical care (1.0/1000), and of these 16/117 (13.7%) were antepartum and 101/117 (86.3%) were postpartum. The death-to-transfer ratio was one to 23.

The primary indications for transfer are shown in Table 1. Hemorrhage and hypertensive disorders were the commonest reasons for referral, and together made up 56.4% of all transfers. The primary transfer service required is shown in Table 2. Of the women transferred, 93/117 (79.5%) required intensive care and 24/117 (20.5%) needed specialized medical or surgical services not available in the obstetric unit. The days of care required are also shown in Table 2; on average, each woman required 5.7 days of critical care. The 93 women needing intensive care stayed for an average of 4.5 days, while the 24 women transferred to medical or surgical units averaged 10.3 days of care. The transfers of women with multiple pregnancy, shown in Table 3, highlight the increased maternal risk of multiple pregnancy compared with singleton pregnancy (RR 3.34; 95% CI 1.47–7.59, $P = 0.01$).

The trends in maternal transfers over time are shown in Table 4. There was a non-significant increase in maternal transfers over the three epochs (0.8/1000 to 1.1/1000). Halifax residents were significantly less likely to require transfer than those from the rest of the province (RR 0.25; 95% CI 0.17–0.37, $P < 0.01$).

DISCUSSION

Our study shows that hemorrhage and hypertensive disorders were the reasons necessitating maternal critical