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The aberrant third stage of labour

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Chapter 5

Puerperal uterine inversion in the Netherlands: a nationwide cohort study

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Abstract

Puerperal uterine inversion is a severe but rare obstetric complication of yet unknown origin. In this two-year study we determine the incidence of this complication and we describe associated risk factors to expose its aetiology. All cases of uterine inversion were included from a nationwide cohort study, which contained all 98 hospitals with a maternity unit in the Netherlands. We reviewed the medical records of 15 patients, resulting an incidence of approximately 1 in 20000 vaginal births. Fourteen cases (93.3%) were classified as low-risk pregnancies at booking. Nulliparous women were not overrepresented and the main associated factors were signs of prolonged labour followed by third stage manipulation. This study is the first population-based study for uterine inversion. With the reported associated factors and occurrence in women with a low-risk profile, we show that every birth attendant should be able to detect this rare but severe complication.

Introduction

Puerperal inversion of the uterus is a relatively rare, but serious, obstetric complication in which the corpus of the uterus is forced completely or partially through the uterine cervix. Uterine inversion presents itself after the third stage of labour with postpartum haemorrhage and severe shock. If untreated or not managed properly it can lead to maternal death. In the 1940s, Das¹ reported incidences ranging from 1 in 8537 deliveries in India, 1 in 23127 in the USA to 1 in 27992 in Great Britain. Mortality rates ranged from 13 to 41%. No maternal mortality is reported in recent studies from high-resource countries, probably as a consequence of early recognition and adequate management^{2,3}. However, in low-income countries, maternal deaths due to uterine inversion are still reported⁴. In extremely rare cases it has also been described during caesarean section⁵. Non-puerperal inversion of the uterus is mainly caused by tumours of the uterus¹.

In the Netherlands only a few cases of uterine inversion during the puerperium have been reported^{6,7}. Up to now, population-based studies on uterine inversion are lacking. Our aim was to determine the incidence of puerperal uterine inversion in the Netherlands and describe associated factors.

Material and methods

This study is part of a two-year nationwide cohort study to assess severe acute maternal morbidity during pregnancy, delivery and puerperium in the Netherlands: the LEMMoN-study. Pregnant women were included from all 98 hospitals with a maternity unit, in the period August 1st 2004 until August 1st 2006. This involved eight tertiary care hospitals, 35 non-academic teaching hospitals and 55 general hospitals. Detailed information about the data collection was described previously⁸. Inclusion criteria for severe acute maternal morbidity (SAMM) were categorised in five groups: intensive-care unit admission, uterine rupture, eclampsia, major obstetric haemorrhage (defined as ≥ 4 units of packed cells, hysterectomy or embolisation) and miscellaneous. The last group included rare cases of SAMM according to the opinion of the treating obstetrician.

All cases of uterine inversion during the two-year LEMMoN period were included. Main outcome measures were incidence and associated factors for uterine inversion. Statistics Netherlands (CBS) data were used as the source for denominator data to calculate the incidence. Clinical characteristics, delivery information, the degree of inversion and management were described in the search for predisposing factors.

Clinical characteristics included age, parity, body mass index, gestational age, ethnicity, birth weight and Apgar-score. Delivery information included mode of delivery, duration of the second and third stage of labour, blood loss and duration of hospital admission.

Inversion of the uterus was classified according to the time of occurrence and degree of severity. The timing of inversion after delivery was divided in acute (within 24 hours), sub-acute (24 hours up to 30 days) or chronic (more than 30 days). The degree of inversion was classified as incomplete or complete (beyond the cervical ring).

Management information included hospital location, haemoglobin levels, presence of shock (as diagnosed by the attending physician), number of packed cells transfused, type of anaesthesia and the method of repositioning the inverted uterus. If possible, data were compared with the Netherlands Perinatal Registry data. If necessary, additional (follow-up) information for included cases was requested from the treating obstetricians by the first author.

The study was centrally approved by the medical ethics committee of Leiden University Medical Centre (P04-020; 8 March 2004).

Results

During the LEMMoN-study there were 371012 deliveries in the Netherlands⁹. In this two-year period, 97% of the 2352 monthly notification cards (98 hospitals, 24 months) were returned, representing 358874 deliveries. The percentage of vaginal births during our study period was 84.9%¹⁰. A total of 2552 SAMM cases were reported and 16 (0.6%) of these concerned uterine inversion. All inversions occurred within 24 hours (acute). One occurred during caesarean section and was excluded from our analysis. The incidence of acute uterine inversion after vaginal birth was 1 in 20312 deliveries.

In this study there were no maternal deaths due to uterine inversion. Fourteen women (93%) were classified as low-risk at the start of pregnancy. At the onset of birth, eight of these (57.1%) were still classified as low-risk. Two women were considered high risk because of post maturity, two because of intra-uterine growth restriction (IUGR) in history (one with suspicion of repeated IUGR), one because of pregnancy-induced hypertension and one because of an ovarian cyst. One woman was classified as high-risk because of the use of selective serotonin re-uptake inhibitor (SSRI) medication. The reasons for referral before birth were not associated with an increased risk of uterine inversion.

Maternal age in the study group ranged from 24 to 36 years (mean 30.1 years) and the body mass index ranged from 17.6 to 25.4 kg/m² (mean 21.5 kg/m²). The average maternal age of Dutch women at delivery in the Netherlands during the study period was 31.0 years¹⁰. Thirteen women (87%) were of Dutch origin and the two (13%) other women were from Surinam and Morocco. Twelve women (80%) delivered at term, one delivered preterm (36 weeks + 2 days) and there were two postterm (42 weeks and 42 weeks + 1 day) deliveries. Mean birth weight was 3585 grams (range 2575–5120 grams), two (13%) with macrosomia (>4500 grams). All newborns were healthy.

Clinical characteristics of the women with uterine inversion are presented in table 1. Thirteen (87%) women had a complete inversion and two (13%) had an incomplete inversion. In six (40%) women the uterine inversion was diagnosed before placental birth and in five (33%) of these cases the placenta was removed before repositioning as performed. Haemoglobin levels during the complication dropped below 5.0 mmol/l in nine (60%) cases, with a minimum of 2.5 mmol/l. Shock was registered in seven women (47%). All women were transported to the operation room for repositioning and/or further management, which included blood transfusion. In 14 cases (93%) manually repositioning was performed under general anaesthesia, in the other case the type of anaesthesia and repositioning method is unknown. One case needed a Rusch balloon to prevent recurrence. Two (13%) uterine inversions were reverted in primary healthcare by midwives before transfer to secondary healthcare. All uterine inversions were repositioned successfully.

Only partial follow-up data about consecutive pregnancies is available due to anonymous data collection of the LEMMoN study. At least two women delivered healthy babies after uterine inversion.

Table 1. Clinical characteristics of women with uterine inversion.

	Cases, <i>n</i> = 15	The Netherlands 2005 (%)
Age (year)	30.1	31.0
Parity		
0	8 (53.3)	45.5
1	6 (40.0)	36.4
2	1 (6.7)	12.8
Blood loss (ml)	2857 (1500-5000)	N/A
Shock registered	7 (46.7)	N/A
Number of packed cells	5 (2-10)	N/A
Hospital stay (d)	3.5 (1-7)	N/A
Possible risk factors		
Low-risk at booking	14 (93.3)	79.5
Low-risk at onset of birth	8 (57.1)	N/A
Mode of delivery		
Spontaneous	10 (66.7)	74.9
Vacuum extraction	5 (33.3)	9.9
Controlled cord traction	7 (46.7)	
Retained placenta	4 (26.8)	
Macrosomia (> 4500 g)	2 (13.4)	
Birth stage duration (h)		
2 nd	42 (5-108)	N/A
3 rd	40 (8-90)	
Fundal implantation	1 (6.7)	N/A

Data are presented as means (range) or number (%). N/A: not applicable. PRN: The Netherlands Perinatal Registry.

Discussion

All previous studies have been performed in single institutions. The present study provides the first population-based results on puerperal uterine inversion in the Netherlands. The incidence for acute uterine inversion was around 1 in 20000 vaginal deliveries, resulting in severe blood loss, drop of haemoglobin levels, the need for blood transfusion and shock. It is a rare obstetric complication and most cases occurred in low-risk women. In some cases prolonged duration of second and third stages of labour, macrosomia, vacuum extraction and retained placenta were found to be associated factors.

One limitation of this study was that there was no specific category for uterine inversion, so to be included the women had to meet the LEMMoN criteria. Thirteen women were included due to major obstetric haemorrhage (and received four or more packed cells), one was admitted to an intensive care unit and the remaining woman was included in the miscellaneous category. Considering the serious consequences of puerperal uterine inversion it is very unlikely that cases could have been missed with these criteria. We are convinced that complete data has been gathered on the incidence of puerperal uterine inversion in the Netherlands.

Many studies have described nulliparity as a risk factor for uterine inversion^{2,11}. In this study, the proportion of nulliparous women is comparable to that in the Dutch population. We thus cannot confirm nulliparity as a risk factor. A case-control study performed by Watson et al.³ supports our finding. Placental adherence^{1,12}, macrosomia¹³ and precipitate labour¹³ have previously been proposed as risk factors. Other risk factors less frequently described are maternal structural anomalies^{2,12}, connective tissue disorders¹⁴, fundal placenta implantation^{2,12} and a short umbilical cord¹². In our study, one case with fundal placenta implantation was registered and none with connective tissue disorders. Unfortunately, no data were available for the other factors.

As a consequence of the low prevalence of associated factors regarding mother and/or child, factors in obstetric healthcare can be considered. Das et al. described umbilical cord traction and improper method of expressing the placenta as the two main causes (after a spontaneous origin), representing 21 and 19% of all puerperal inversions¹. In 47% of the cases in our study, controlled cord traction was registered. It is difficult to examine possible iatrogenic factors (such as controlled cord traction in a non- or not fully contracted uterus) and we think this item is prone to be underreported. Spontaneous birth of the placenta without any manipulation was registered in only two cases; for the other six cases this remains unclear. Other studies support third stage manipulation of the umbilical cord and placenta in the developing of uterine inversion^{2,12}. On the other hand, active management is needed to prevent other complications of the third stage. Combs et al. report an increased risk for haemorrhage and blood transfusion if the third stage exceeds 30 minutes¹⁵. Considering a mean duration of the third stage of 40 minutes in our study population, active management was indicated in most cases. It is likely that cord traction may become 'less controlled' when the placenta is not easily delivered. Presumably there is an interaction between big babies and prolonged delivery followed by active

management of the third stage by the midwife or obstetrician.

Management of uterine inversion consists of two important therapeutic interventions, to prevent severe blood loss or shock and revert as soon as possible. Shock treatment consists of oxygen, intravenous 0.9% NaCl administration and, if necessary, plasma or blood products. Successful repositioning can be reached by pushing the uterine fundus back while applying pressure from the outside with the other hand (Johnson's manoeuvre). In five cases (33%) of our study the placenta was removed before the uterus was reverted; this is believed to increase blood loss and is contraindicated in this situation. The internal hand should remain in situ until the uterus is contracted (sometimes reached after administering oxytocic agents) so that the risk of recurrence is as low as possible. As with one case in our study it is possible to use a Rusch balloon tamponade to prevent recurrence. When repositioning is not possible due contraction, tocolytic drugs are sometimes needed. Nowadays, laparotomy is not needed for successful repositioning. All these procedures should be performed under general anaesthesia in the operation room.

At the onset of birth, eight of the 14 (57.1%) initially low-risk booked women were still low-risk. This low-risk profile implies that every birth attendant should be able to detect this rare but severe complication. One should then proceed with adequate management as described to avoid the risk for acute severe maternal morbidity. To prevent the condition we advise to only perform controlled cord traction in the case of a well contracted uterus.

References

1. Das P. Inversion of the Uterus. *BJOG* 1940;47:525-48.
2. Shah-Hosseini R, Evrard JR. Puerperal uterine inversion. *Obstet Gynecol* 1989;73:567-70.
3. Watson P, Besch N, Bowes WA Jr. Management of acute and subacute puerperal inversion of the uterus. *Obstet Gynecol* 1980;55:12-6.
4. Dali SM, Rajbhandari S, Shrestha S. Puerperal inversion of the uterus in Nepal: case reports and review of literature. *J Obstet Gynaecol Res* 1997;23:319-25.
5. Rudloff U, Joels LA, Marshall N. Inversion of the uterus at caesarean section. *Arch Gynecol Obstet* 2004;269:224-6.
6. van Vugt PJH, Baudoin P, Blom VM, van Deursen CTBM. Inversio uteri puerperalis. *Acta Obstet Gynecol Scand* 1981;60:353-62.
7. Dirken JJ, Vlaanderen W. Uterine inversion. *Ned Tijdschr Geneesk* 1994;138:38-40.
8. Zwart JJ, Richters JM, Ory F, de Vries JI, Bloemenkamp KW, van Roosmalen J. Severe

maternal morbidity during pregnancy, delivery and puerperium in the Netherlands: a nationwide population-based study of 371,000 pregnancies. *BJOG* 2008;115:842-50.

9. Statistics Netherlands (CBS). Statline, Central Bureau of Statistics, 2007 <http://www.cbd.nl/en-GB> accessed June 2011.
10. The Netherlands Perinatal Registry. Perinatal care in the Netherlands, 2004-2006 http://www.perinatreg.nl/home_english accessed June 2011.
11. Bunke JW, Hofmeister FJ. Uterine inversion – obstetrical entity or oddity. *Am J Obstet Gynecol* 1965;91:934-40.
12. Kitchin JD, Thiagarajah S, May HV, Thornton WN. Puerperal inversion of the uterus. *Am J Obstet Gynecol* 1975;123:51-8.
13. Majd HS, Nawaz T, Ismail L, Luker R, Kalla S. Acute uterine inversion as a cause of major post-partum haemorrhage: a case report and review of the literature. *The Internet Journal of Gynecology and Obstetrics* 2009; Volume 12 number 1.
14. Rahman J, Rahman FZ, Rahman W, al-Suleimand SA, Rahman MS. Obstetric and gynecologic complications in women with Marfan syndrome. *J Reprod Med* 2003;48:723-8.
15. Combs CAM, Laros RKJ. Prolonged third stage of labor: morbidity and risk factors. *Obstet Gynecol* 1991;77:863-7.

