



Retrospective study to investigate the possible relationship between excess blood loss at caesarean section and reduced intra-operative oxytocin dose



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ABSTRACT

Objective: To investigate a possible relationship between the oxytocin dose at caesarean section and blood loss.

Study design: Retrospective analysis of computerised data for all caesarean sections in a UK maternity unit delivering 6000 women annually during 1995–2009 and thus for seven years before and after the 2001 recommended change in oxytocin dose. Validation of computerised and hand-checked clinical data for 1996 and 2006 was performed and annual frequency of blood loss >1000 ml was observed.

Results: Validation showed most variables recorded were similar for both acquisition methods. For 17,405 (98.9%) caesarean sections with blood loss recorded, excess or severe loss occurred in 127 (1.6%) of 7177 cases during 1995–2001 compared with 362 (4.0%) of 9035 during 2003–2009 (OR 2.317, CI 1.888–2.843). It was significantly more frequent with multiple than singleton pregnancies (OR 1.946, CI 1.417–2.673), with general than neuraxial anaesthesia (OR 4.296, CI 3.479–5.305) and with non-longitudinal than longitudinal fetal lie (OR 1.942, CI 1.501–2.512). Excluding these three groups, excess blood loss was still more frequent during 2003–2009 than 1995–2001 (OR 3.181, CI 2.374–4.263). Oxytocin given during labour did not influence the frequency of excess blood loss.

Conclusions: The increased rate of excess blood loss at caesarean section during the latter period could be the result of the reduced oxytocin dose. If similar observations are made by others, this possible relationship should be investigated with appropriate objective randomised studies.

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Introduction

Blood loss remains a major cause of maternal morbidity and mortality in the developing and developed world [1–3] and many studies have shown that excess blood loss is more commonly associated with caesarean section than vaginal delivery [4,5]. Our recent analysis of caesarean sections, blood loss and transfusion during twelve month periods covering three decades showed a decline in blood loss and transfusions between 1976 and 1996 but an increase in both in 2006; the increase in cases of excess blood loss (>1000 ml blood) was statistically significant [6]. Others have reported increasing rates of postpartum haemorrhage during recent years including Australia between 1994 and 2002 [7], the

USA between 1994 and 2006 [8], Canada between 1991 and 2004 [9] and Ireland 1999–2009 [10]. We found excess blood loss was more commonly associated with caesarean section performed antepartum particularly if there was a history of antepartum haemorrhage, in cases involving multiple pregnancies, non-longitudinal fetal lie, the use of general anaesthesia and operations performed during the second stage of labour, especially following a failed attempt at instrumental delivery [6]. These relationships have been observed by others [11–17]. We did not confirm an association with high parity and the classical uterine incision as others have reported [11,13,14,16,18].

We postulated the increase in cases of excess blood loss and need for transfusion between 1996 and 2006 might be due to the recommendation in 2001 by the Confidential Enquiries into Maternal Mortality [19] to reduce the oxytocin dose given during the operation from oxytocin 10 units usually administered by quick intravenous injection to oxytocin 5 units given by slow

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injection. Three studies observing subsequent practice in the United Kingdom reported this recommendation was adhered to by the majority of obstetric anaesthetists [20–22]. The recommendation to use the lower dose was reaffirmed in the Royal College of Obstetricians and Gynaecologists (RCOG) guidance on caesarean section in 2011 [23].

To explore our thesis further, the computerised records for the unit for the 15 year period 1995–2009 have been studied, allowing seven-year periods prior to and after the oxytocin recommendation in 2001 to be examined. The findings are now presented.

Materials and methods

Computerisation of maternity records had been established in 1977 in the obstetric unit of the John Radcliffe Hospital, Oxford.

Until 1990, records were coded by trained Coding Staff following patient discharge from hospital after delivery. In 1990 the system was modified with data entry made directly to computer by the clinical staff providing patient care during the antenatal and postnatal periods. All computerised entries are checked for validation purposes by trained coding staff [24]. Patient demographic data, plurality of the pregnancy, mode of delivery, anaesthesia given for delivery and blood loss estimates are routinely recorded. Operative blood loss was usually recorded to the nearest 50 ml or more commonly 100 ml and was designated 'low' if ≤ 500 ml, 'average' if 501–1000 ml, 'excessive' if 1001–1500 ml and 'severe' if >1500 ml [23,25,26]. Data captured for coding purposes do not allow the same degree of data analysis as described in our previous report on blood loss and transfusion at caesarean section which were obtained by examination of patient

Table 1

Comparison of data capture from computerised records and hand-checked clinical records for 1996 and 2006.

Data capture method	1996			2006		
	Computer record	Hand-checked	Difference ^a	Computer record	Hand-checked	Difference ^a
Total maternities	5846			5998		
Caesarean sections	900	901		1406	1402	
Parity						
Nulliparae	415	420	0.98	663	659	1.01 (0.87–1.17)
Multiparae	485	481	(0.81–1.18)	743	743	
Maternal age						
<30 yr	354	348	<i>P</i> =0.7	462	461	<i>P</i> =1.0
30–39 yr	498	501		810	808	
≥ 40 yr	48	52		134	133	
BMI						
<30	676			870	867	<i>P</i> =1.0
30.0–34.9	82			148	148	
≥ 35	41			83	83	
Not recorded	101	901		305	304	
Gestation						
<30 wk	26	27	<i>P</i> =0.3	35	35	<i>P</i> =0.03
30–36 wk	100	123		115	170	
≥ 37 wk	750	751		1202	1197	
Not recorded	24	0		54	0	
Birthweight						
<2500 g	154	130	<i>P</i> =0.01	191	191	<i>P</i> =1.0
2500–3999 g	649	632		1022	1018	
≥ 4000 g	97	131		193	193	
Not recorded	0	8		0	0	
Plurality						
Singleton	859	859	1.02 (0.66–1.59)	1333	1327	1.02 (0.73–1.42)
Multiple	41	42		73	75	
Lie						
Longitudinal	898	878	0.38** (0.23–0.62)	1319	1314	1.02 (0.75–1.38)
Non-longitudinal	62	23		87	88	
Timing						
Before labour	499	416	1.45** (1.21–1.75)	818	717	1.33** (1.15–1.54)
In labour	401	485		588	685	
Anaesthesia						
Neuraxial	786	782	1.01 (0.77–1.34)	1308	1270	1.15 (0.86–1.52)
General	114	115		98	109	
Blood loss (ml)						
<501	699	703	<i>P</i> =0.9	774	770	<i>P</i> =1.0
501–1000	189	190		536	542	
>1000	5	4		77	75	
1001–1500	3	1		45	44	
1501–2000	2	2		21	20	
2001–2500	0	1		5	5	
>2500	0	0		6	6	
Not recorded	7	4		19	15	

^a OR (95% CI) or chi-squared test for trend.

** *P* < 0.001.

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