NATIONAL PERINATAL EPIDEMIOLOGY CENTRE
Severe Maternal Morbidity Audit

Major Obstetric Haemorrhage and caesarean section in Ireland; findings from a national clinical audit by the National Perinatal Epidemiology Centre (NPEC).

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Background

Major Obstetric Haemorrhage (MOH) in Ireland has been identified through NPEC's Severe Maternal Morbidity (SMM) audit as the most frequently occurring SMM. Rates of MOH have increased significantly from 2.30 per 1,000 maternities in 2011 to 4.50 per 1,000 maternities in 2024. This is approximately one woman in 220 maternities experiencing an MOH in 2024.

Methods

The NPEC conducts a national clinical audit on SMM since 2011. Eligibility for the audit was defined as a pregnant or recently pregnant woman (within 42 days following the end of pregnancy) experiencing at least one of 14 clearly defined organ dysfunction morbidities (including MOH) and/or two management proxies for SMM. MOH was defined as a blood loss of ≥ to 2500ml and/or receiving a blood transfusion of five or more units. Additional SMM definitions can be found through the QR code below.

For the reporting years 2021 and 2022, in the event of a woman experiencing an MOH, an additional detailed MOH data set was completed by maternity units which evaluated management and clinical care of the MOH event.

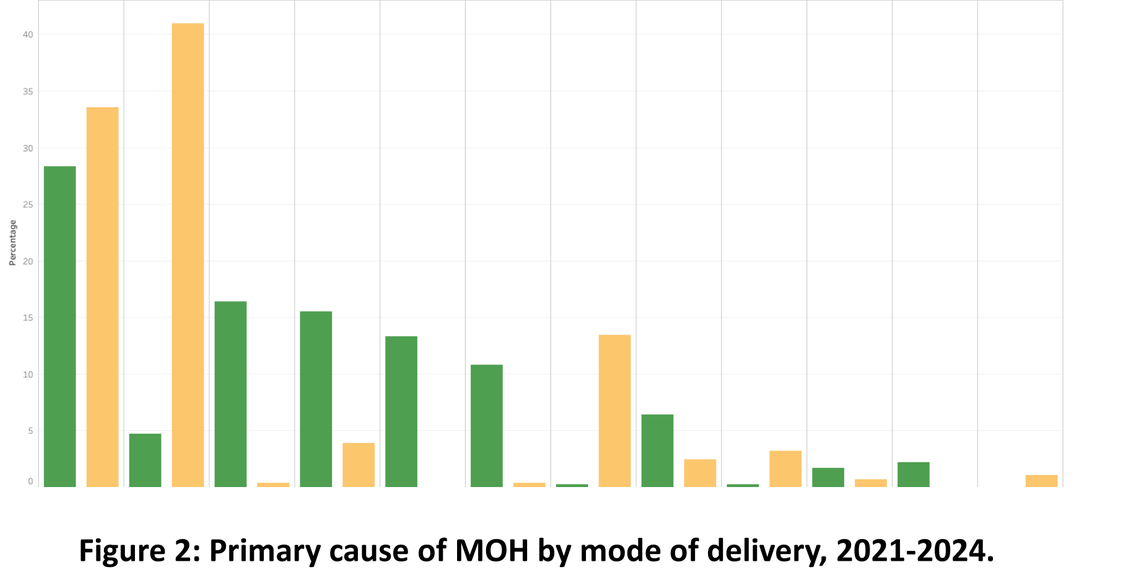

Figure 2: Primary cause of MOH by mode of delivery, 2021-2024.

Findings

From 2021-2024, over half of MOH cases were associated with CS deliveries (56%, n=398 of 708). Spontaneous vaginal deliveries were associated with over a quarter of MOH cases (28.8%, n=204 of 708), followed by assisted vaginal deliveries (15.0%, n=106 of 708) [Figure 1].

The timing of MOH was predominately on the day of delivery. The cause of MOH did vary by mode of delivery, with uterine atony being the primary cause for CS deliveries (28.3%, n=102 of 360), followed by placenta praevia (16.4%, n=59 of 360) and bleeding from the uterine incision (13.3%, n=48 of 360). Conversely the primary cause of MOH for vaginal deliveries was retained placenta/ membranes (41.0%, 116 of 283), followed by uterine atony (33.6%, 95 of 283) [Figure 2].

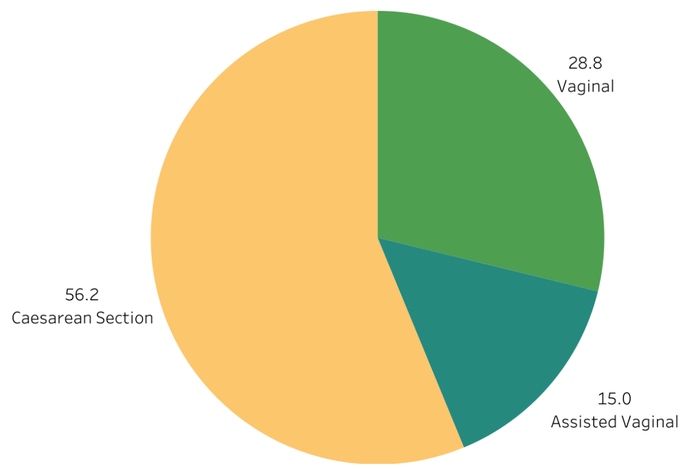

Figure 1: Mode of delivery associated with MOH, 2021-2024.

The in-depth audit of MOH for the reporting years 2021-2022, identified learnings specific to CS delivery. Emergency CS at full dilatation occurred in 16% of MOH cases, with an obstetric consultant reported as being present at three-quarters of these CSs (77%) The indication for half of CS deliveries at full dilatation was failed instrumental delivery. The use of uterotonic agents to arrest bleeding was explored by mode of delivery. Syntocinon infusion was used more often in vaginal births than CS. There was a significant increase in the use of Tranexamic acid in 2021-2022 (85%) compared to a similar audit completed in 2011-2013 (11%). Conversely a decrease in the use of misoprostol in 2021-2022 compared to 2011-2013 was observed [Table 1]. Haemostatic procedures varied by mode of delivery; re-suturing of CS uterine incision and or suturing of lateral extension and hysterectomy were associated with CS [Table 2].

Table 1: Use of uterotonic agents by mode of delivery and for cases associated with uterine atony.

	2011-13			2021-22		
	Vaginal delivery (N=146)	CS (N=282)**	Uterine Atony	Vaginal delivery (N=161)	CS (N=182)*	Uterine Atony (N=150)
Tranexamic acid 1g	12 (8.2%)	35 (12.4%)	21 (12.1%)	143 (88.8%)	148 (81.3%)	130 (86.7%)
Syntocinon infusion (40 units)	135 (92.5%)	253 (89.7%)	168 (96.6%)	127 (78.9%)	88 (48.4%)	104 (69.3%)
Prostaglandin F2-alpha (Carboprost/Haemabate)	84 (57.5%)	125 (44.3%)	123 (70.7%)	86 (53.4%)	93 (51.1%)	101 (67.3%)
Misoprostol	105 (71.9%)	130 (46.1%)	132 (75.9%)	87 (54.0%)	63 (34.6%)	90 (60.0%)
Oxytocin/Syntocinon (5-10 units IM/IV injection)	83 (56.8%)	170 (60.3%)	106 (60.9%)	52 (32.3%)	52 (28.6%)	58 (38.7%)
Ergometrine (0.5mg IM/IV injection)	49 (33.6%)	53 (18.8%)	66 (37.9%)	43 (26.7%)	50 (27.5%)	47 (31.3%)
Syntometrine (5mg)	47 (32.2%)	55 (19.5%)	57 (32.8%)	40 (24.8%)	38 (20.9%)	41 (27.3%)
Other type of drug				4 (2.5%)	6 (3.3%)	7 (4.7%)
No drugs given				3 (1.9%)	8 (4.4%)	3 (2.0%)

Note: More than one uterotonic agent can apply. *Use of uterotonic agents not recorded for one case in 2021-22. [Data for 2021-22 also excludes the 16 pregnancy losses]. **Use of uterotonic agents not recorded for seven cases of CS in 2011-2013. CS= caesarean section.

Table 2: Haemostatic procedures undertaken in women experiencing MOH by mode of delivery.

	2011-13			2021-22		
	Vaginal delivery	CS	Total	Vaginal delivery	CS	Total
Manual procedures	**(N=145)**	**(N=281)**	**(N=426)**	**(N=134)**	**(N=115)**	**(N=249)****
Rubbing up of the Uterus to produce a contraction	110 (75.9%)	155 (55.2%)	265 (62.2%)	111 (82.8%)	75 (65.2%)	186 (74.7%)
Bimanual uterine Compression	63 (43.4%)	74 (26.3%)	137 (32.2%)	61 (45.5%)	48 (41.7%)	109 (43.8%)
Other manual procedures	-	-	-	12 (9.0%)	16 (13.9%)	28 (11.2%)
Surgical Procedures	**(N=146)**	**(N=284)**	**(N=430)**	**(N=161)**	**(N=181)**	**(N=342)*****
Intra-uterine Balloon Tamponade	55 (37.7%)	77 (27.1%)	132 (30.7%)	64 (39.8%)	50 (27.6%)	114 (33.3%)
Manual Evacuation of Placenta	73 (50.0%)	25 (8.8%)	98 (22.8%)	67 (41.6%)	22 (12.2%)	89 (26.0%)
Suturing lacerations (cervical/vaginal)	65 (44.5%)	10 (3.5%)	75 (17.4%)	49 (30.4%)	6 (3.3%)	55 (16.1%)
Laparotomy	-	-	-	3 (1.9%)	35 (19.3%)	38 (11.1%)
Hysterectomy	1 (1%) *	33 (17.5%) *	34 (11.7%) *	0 (0%)	33 (18.2%)	33 (9.6%)
Re-suturing of C section uterine incision and/or suturing of lateral extension	1 (0.7%)	48 (16.9%)	49 (11.4%)	0 (0%)	25 (13.8%)	25 (7.3%)
Intra-myometrial carboprost	7 (4.8%)	49 (17.3%)	56 (13.1%)	1 (0.6%)	16 (8.8%)	17 (5.0%)
Haemostatic brace uterine suturing	7 (4.8%)	33 (11.6%)	40 (9.3%)	1 (0.6%)	16 (8.8%)	17 (5.0%)
Bilateral ligation of uterine arteries	1 (0.7%)	19 (6.7%)	20 (4.7%)	0 (0%)	5 (2.8%)	5 (1.5%)
Other type of surgical procedure	22 (15.1%)	68 (24.1%)	90 (21.0%)	13 (8.1%)	29 (16.0%)	42 (12.3%)
No surgical procedures undertaken	14 (9.6%)	68 (23.8%)	82 (19.0%)	29 (18.0%)	32 (17.7%)	61 (17.8%)

Note more than one procedure might apply therefore values are not mutually exclusive. * Data not available for 140 cases (2011-2013). ** Data not available for 95 of the 344 women who gave birth. ***Data not available for two of the 344 women who gave birth.

Conclusion

Ongoing audit of MOH is vital to monitor quality and responsiveness of maternity care. It is important for healthcare professionals to recognize the varying causes of MOH by mode of delivery, and interventions to arrest bleeding in order to guide clinical practice and inform educational needs and training programs. These results highlight the increased risk of CS at full dilatation, and the need for consultants' presence during these events.

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