

Cesarean section improves neonatal outcomes only from 24+0 weeks for periviable breech but not cephalic infants

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BACKGROUND

Although in late pregnancy vaginal breech birth is associated with higher perinatal morbidity and mortality compared with cephalic presentation, the optimum mode of birth at periviable gestations remains unclear. Whilst cesarean delivery may minimise birth trauma, intrapartum stillbirth and birth asphyxia, it may not necessarily improve longer term outcomes.

OBJECTIVES

To assess the impact of mode of birth on neonatal outcomes for infants with breech compared to cephalic presentation at periviable gestations (22+0 – 25+6 weeks).

STUDY DESIGN

Retrospective cohort study of women who delivered a single, non-anomalous infant at 22+0 – 25+6 weeks gestation at the Mater Mother’s Hospital in Brisbane, Australia. Maternal demographic, intrapartum and perinatal outcome information was analysed. Obstetric and neonatal outcomes were analysed comparing both breech and cephalic presentation and mode of delivery.

RESULTS

688 women fulfilled the inclusion criteria. 39.7% were breech births and 60.3% were cephalic. Vaginal breech birth was associated with higher odds of very low Apgar scores, intrapartum stillbirth and neonatal death compared to both vaginal cephalic births and cesarean breech births. At 22+0 – 22+6 weeks gestation outcomes were universally fatal regardless of mode of delivery. At 24+0 – 24+6 weeks and at 25+0 – 25+6 weeks gestation vaginal breech birth was associated with lower odds of survival compared to cesarean breech births.

	22+0 – 22+6 Weeks Gestation						23+0 – 23+6 Weeks Gestation						24 +0 – 24+6 Weeks Gestation						25+0 – 25+6 Weeks Gestation					
	Br (n = 45)			Ceph (n = 58)			Br (n = 53)			Ceph (n = 71)			Br (n= 90)			Ceph (n = 131)			Br (n = 85)			Ceph (n = 155)		
	Vag (n = 42)	CS (n = 3)	aOR (95% C.I.)	Vag (n = 55)	CS (n = 3)	aOR (95% C.I.)	Vag (n = 45)	CS (n = 8)	aOR (95% C.I.)	Vag (n = 67)	CS (n = 4)	aOR (95% C.I.)	Vag (n = 49)	CS (n = 41)	aOR (95% C.I.)	Vag (n = 97)	CS (n = 34)	aOR (95% C.I.)	Vag (n = 32)	CS (n = 53)	aOR (95% C.I.)	Vag (n = 101)	CS (n = 54)	aOR (95% C.I.)
NICU	0.0 (0/42)	0.0 (0/3)	NA	0.0 (0/55)	0.0 (0/3)	NA	11.1 (5/45)	37.5 (3/8)	0.19 (0.03 – 1.21)	14.9 (10/67)	50.0 (2/4)	0.20 (0.02 – 2.04)	36.7 (18/49)	82.9 (34/41)	0.11 (0.03 – 0.31) ****	70.1 (68/97)	79.4 (27/34)	0.38 (0.12 – 1.03)	59.4 (19/32)	92.5 (49/53)	0.06 (0.01 – 0.26) ***	72.3 (73/101)	88.9 (48/54)	0.22 (0.07 – 0.58) **
Apgar <3	100.0 (34/34)	100.0 (1/1)	NA	97.4 (37/38)	100.0 (3/3)	NA	100.0 (39/39)	71.4 (5/7)	NA	86.8 (46/53)	75.0 (3/4)	1.58 (0.06 – 19.79)	65.9 (27/41)	28.2 (11/39)	4.79 (1.85 – 13.20) **	25.9 (22/85)	21.9 (7/32)	1.57 (0.57 – 4.78)	37.0 (10/27)	13.5 (7/52)	4.18 (1.35 – 13.87) *	21.7 (20/92)	15.4 (8/52)	2.23 (0.86 – 6.43)
Acidosis	0.0 (0/42)	0.0 (0/3)	NA	0.0 (0/55)	0.0 (0/3)	NA	0.0 (0/45)	12.5 (1/8)	NA	0.0 (0/67)	25.0 (1/4)	NA	8.2 (4/49)	7.3 (3/41)	1.30 (0.26 – 7.15)	4.1 (4/97)	2.9 (1/34)	1.43 (0.20 – 28.86)	3.1 (1/32)	7.5 (4/53)	0.39 (0.02 – 2.83)	4.0 (4/101)	11.1 (6/54)	0.34 (0.08 – 1.27)
Intrapartum SB	66.7 (28/42)	0.0 (0/3)	NA	58.2 (32/55)	66.7 (2/3)	1.63 (0.06 – 29.01)	66.7 (30/45)	12.5 (1/8)	17.80 (2.54 – 379.66) *	44.8 (30/67)	0.0 (0/4)	NA	38.8 (19/49)	7.3 (3/41)	7.40 (2.20 – 34.17) **	22.7 (22/97)	8.8 (3/34)	5.60 (1.53 – 28.67) *	37.5 (12/32)	3.8 (2/53)	55.27 (7.67 – 975.69) ***	21.8 (22/101)	5.6 (3/54)	6.33 (1.96 – 28.87) **
NND	100.0 (14/14)	100.0 (3/3)	NA	100.0 (24/24)	100.0 (1/1)	NA	93.8 (15/16)	85.7 (6/7)	1.92 (0.04 – 62.37)	89.2 (33/37)	100.0 (4/4)	NA	63.3 (19/30)	47.4 (18/38)	1.92 (0.71 – 5.35)	45.3 (34/75)	54.8 (17/31)	0.84 (0.34 – 2.07)	35.0 (7/20)	21.6 (11/51)	4.83 (1.21 – 22.19) *	19.0 (15/79)	31.4 (16/51)	0.82 (0.33 – 2.09)
Overall Survival	0.0 (0/42)	0.0 (0/3)	NA	0.0 (0/55)	0.0 (0/3)	NA	2.2 (1/45)	12.5 (1/8)	0.16 (0.006 – 4.88)	6.0 (4/67)	0.0 (0/4)	NA	22.4 (11/49)	48.8 (20/41)	0.33 (0.13 – 0.84) *	42.3 (41/97)	41.2 (14/34)	0.83 (0.36 – 1.94)	40.6 (13/32)	75.5 (40/53)	0.10 (0.03 – 0.34) ***	63.4 (64/101)	64.8 (35/54)	0.73 (0.34 – 1.52)

	22+0 – 22+6 Weeks Gestation						23+0 – 23+6 Weeks Gestation						24 +0 – 24+6 Weeks Gestation						25+0 – 25+6 Weeks Gestation					
	Vag (n = 97)			CS (n = 6)			Vag (n = 112)			CS (n = 12)			Vag (n= 146)			CS (n = 75)			Vag (n = 133)			CS (n = 107)		
	Br (n = 42)	Ceph (n = 55)	aOR (95% C.I.)	Br (n = 3)	Ceph (n = 3)	aOR (95% C.I.)	Br (n = 45)	Ceph (n = 67)	aOR (95% C.I.)	Br (n = 8)	Ceph (n = 4)	aOR (95% C.I.)	Br (n = 49)	Ceph (n = 97)	aOR (95% C.I.)	Br (n = 41)	Ceph (n = 34)	aOR (95% C.I.)	Br (n = 32)	Ceph (n = 101)	aOR (95% C.I.)	Br (n = 53)	Ceph (n = 54)	aOR (95% C.I.)
NICU	0.0 (0/42)	0.0 (0/55)	NA	0.0 (0/3)	0.0 (0/3)	NA	11.1 (5/45)	14.9 (10/67)	0.62 (0.17 – 1.95)	37.5 (3/8)	50.0 (2/4)	0.60 (0.05 – 7.39)	36.7 (18/49)	70.1 (68/97)	0.24 (0.10 – 0.53) ****	82.9 (34/41)	79.4 (27/34)	0.98 (0.28 – 3.38)	59.4 (19/32)	72.3 (73/101)	0.41 (0.16 – 1.09)	92.5 (49/53)	88.9 (48/54)	1.31 (0.33 – 5.58)
Apgar <3	100.0 (34/34)	97.4 (37/38)	NA	100.0 (1/1)	100.0 (3/3)	NA	100.0 (39/39)	86.8 (46/53)	NA	71.4 (5/7)	75.0 (3/4)	0.83 (0.01 – 13.22)	65.9 (27/41)	25.9 (22/85)	7.95 (3.14 – 21.76) ****	28.2 (11/39)	21.9 (7/32)	1.32 (0.44 – 4.17)	37.0 (10/27)	21.7 (20/92)	3.63 (1.21 – 11.21) *	13.5 (7/52)	15.4 (8/52)	0.85 (0.27 – 2.61)
Acidosis	0.0 (0/42)	0.0 (0/55)	NA	0.0 (0/3)	0.0 (0/3)	NA	0.0 (0/45)	0.0 (0/67)	NA	12.5 (1/8)	25.0 (1/4)	0.42 (0.01 – 13.07)	8.2 (4/49)	4.1 (4/97)	2.35 (0.52 – 10.69)	7.3 (3/41)	2.9 (1/34)	2.91 (0.33 – 63.84)	3.1 (1/32)	4.0 (4/101)	0.78 (0.04 – 5.52)	7.5 (4/53)	11.1 (6/54)	0.77 (0.18 – 3.04)
Intrapartum SB	66.7 (28/42)	58.2 (32/55)	1.52 (0.63 – 3.75)	0.0 (0/3)	66.7 (2/3)	NA	66.7 (30/45)	44.8 (30/67)	3.70 (1.56 – 9.25) **	12.5 (1/8)	0.0 (0/4)	NA	38.8 (19/49)	22.7 (22/97)	2.06 (0.90 – 4.74)	7.3 (3/41)	8.8 (3/34)	0.91 (0.15 – 5.61)	37.5 (12/32)	21.8 (22/101)	2.91 (1.09 – 7.90) *	3.8 (2/53)	5.6 (3/54)	0.69 (0.09 – 4.48)
NND	100.0 (14/14)	100.0 (24/24)	NA	100.0 (3/3)	100.0 (1/1)	NA	93.8 (15/16)	89.2 (33/37)	1.40 (0.16 – 29.68)	85.7 (6/7)	100.0 (4/4)	NA	63.3 (19/30)	45.3 (34/75)	1.90 (0.79 – 4.72)	47.4 (18/38)	54.8 (17/31)	0.88 (0.32 – 2.37)	35.0 (7/20)	19.0 (15/79)	3.66 (1.10 – 12.24) *	21.6 (11/51)	31.4 (16/51)	0.87 (0.33 – 2.32)
Overall Survival	0.0 (0/42)	0.0 (0/55)	NA	0.0 (0/3)	0.0 (0/3)	NA	2.2 (1/45)	6.0 (4/67)	0.30 (0.02 – 2.25)	12.5 (1/8)	0.0 (0/4)	NA	22.4 (11/49)	42.3 (41/97)	0.44 (0.19 – 0.97) *	48.8 (20/41)	41.2 (14/34)	1.15 (0.44 – 3.01)	40.6 (13/32)	63.4 (64/101)	0.30 (0.12 – 0.73) **	75.5 (40/53)	64.8 (35/54)	1.31 (0.54 – 3.22)

Data is presented as % (n). Vag: vaginal delivery; CS: cesarean section; Br: breech presentation; Ceph: cephalic presentation; aOR: adjusted odds ratio; C.I.: confidence interval; NICU: neonatal intensive care unit; SB: stillbirth; NND: neonatal death. Acidosis is defined as pH ≤ 7, lactate ≥ 6mmol/L, BE ≤ -12mmol/L. Adjusted for: birthweight. * p-value ≤ 0.05; ** p-value ≤ 0.01; *** p-value ≤ 0.001; **** p-value ≤ 0.0001.

PRINCIPAL FINDINGS

- No difference in overall survival between periviable breech and cephalic infants.
- Survival regardless of mode of birth or presentation for infants born <23+0 weeks is uniformly dismal.
- Vaginal breech birth is associated with lower odds of survival compared to cesarean breech birth as well as compared to vaginal cephalic birth.
- Vaginal breech birth was associated with higher odds of intrapartum stillbirths compared to cesarean breech births, regardless of gestation.

DISCUSSION

The results of this study show that cesarean section improves survival and neonatal condition at birth for periviable breech infants >24+0 weeks gestation. However, no difference in outcomes was seen in the periviable cephalic cohort.

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