Long term outcome by method of delivery of fetuses in breech presentation at term: population based follow up

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See editorial by Hannah

Abstract

***Objective*—To compare the long term outcome of infants delivered in breech presentation at term by intended mode of delivery.**

***Design*—A population based comparison of outcomes up to school age. Data obtained from maternity, health visitor, and school medical records and handicap register.**

***Setting*—Grampian region 1981-90.**

***Subjects*—1645 infants delivered alive at term after breech presentation.**

***Main outcome measures*—Handicap, developmental delay, neurological deficit, psychiatric referral.**

***Results*—Elective caesarean section was performed in 590 (35.9%) cases. The remainder (1055; 64.1%) were intended vaginal deliveries. Handicap or other health problem was recorded in 269 (19.4%) of 1387 infants for whom records were available. Proportions of elective caesarean sections and intended vaginal deliveries in this group were 37.2% (100 cases) and 62.8% (169) respectively, almost the same as in the total cohort. There were no significant differences between elective caesarean section and planned vaginal delivery in terms of severe handicap or any other outcome measure. Case records were obtained for 23 of 27 infants with severe handicap. 11 (47.8%) were delivered by elective caesarean section. Of these, three had undiagnosed congenital abnormalities and seven were unexplained. Of the 12 (52.2%) planned vaginal deliveries, in only one was handicap possibly attributable to delivery and four cases were unavoidable even if elective caesarean section had been planned.**

***Conclusion*—In selected cases of breech presentation at term planned vaginal delivery with caesarean section if necessary remains as safe as elective caesarean section in terms of long term handicap. It was not possible to determine whether particular babies would have fared better had they been delivered by elective caesarean section.**

Introduction

The optimal method of delivery for breech presentation at term remains uncertain. Many workers claim that elective caesarean section improves immediate neonatal outcome[1-3] whereas others maintain that for appropriately selected cases there is no difference in perinatal outcome whatever the intended method of delivery.[4-6] The methodological quality of most of these studies is questionable; often all caesarean sections (elective and emergency) are compared with vaginal delivery or preterm cases are included. No prospective randomised controlled trial of sufficient size has examined the issue. A recent critical review concluded that, though planned vaginal delivery might cause higher perinatal mortality and morbidity than elective caesarean section (typical odds ratio 3.96; 95% confidence interval 2.76 to 5.67), most studies contained selection bias.[7]

The long term outcome of infants delivered in breech presentation at term has not been extensively studied. Of the three reported studies, two followed up only complicated cases for one to six years[8,9] and the third compared two different methods of selection for vaginal delivery in two consecutive four year periods.[10] None was prospective or randomised. Despite the paucity and diversity of these data meta-analysis of the three studies suggested that planned vaginal delivery was associated with long term morbidity (typical odds ratio 2.88; 95% confidence interval 1.04 to 7.97).[7] This was not a robust conclusion because it is inadequate to follow up only selected cases.

We examined the long term morbidity (up to 4-5 years of age) of a large cohort of infants delivered in breech presentation at term by the planned method of delivery.

Patients and methods

Aberdeen Maternity Hospital is the only specialist hospital for a population of 500 000. The Aberdeen Maternity and Neonatal Databank is a computerised database of obstetric and neonatal data for the total population. All breech deliveries at term (greater than 37 completed weeks of pregnancy) in Grampian from 1981 to 1990 were identified. Stillbirths and neonatal deaths were excluded (perinatal mortality was as reported[11]) and the remaining cohort analysed. Infants with morbidity or handicap were identified from health visitor records and the computerised database of the Raeden Centre (the regional unit for severely handicapped children; all infants identified from this source were defined as "severely handicapped"). Psychiatric handicap included behavioural disturbances such as encopresis and severe tantrums. All identified cases of handicap were severe enough to necessitate referral to professionals.

The proportions of planned vaginal and elective caesarean deliveries in the group of handicapped infants were compared with the proportions in the whole cohort. The same analysis was performed for different classes of handicap and for primiparous mothers. Mean birth weight, mean maternal height, and median parity in the planned vaginal delivery and elective caesarean section groups were compared. The same characteristics and the sex ratio of infants with and without handicap in the successful vaginal delivery group were also compared. Obstetric case notes of the severely handicapped infants were examined.

Statistical analysis was by Fisher's exact test, Student's *t* test, or Mann-Whitney U test as appropriate with commercial statistical software (SPSS for Windows, SPSS Inc, Chicago).

Results

Between 1981 and 1990 in Aberdeen Maternity Hospital there were 1645 breech deliveries of liveborn infants at term who survived the first week of life. Of these, 590 (35.9%) were elective caesarean sections and 1055 (64.1%) planned vaginal deliveries; 610 (37.1%) were successful vaginal deliveries. The proportions of each intended mode of delivery were similar in primiparous and multiparous women (table 1), though the proportion of successful vaginal deliveries was significantly lower in primiparous women (29.5% *v* 45.2% ($P<0.0001$); odds ratio 0.51 (95% confidence interval 0.42 to 0.62)) (table 2).

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Table 1—*Intended mode of delivery of fetuses in breech presentation at term by parity of mothers 1981-90, Grampian region. Figures in parentheses are percentages*

	No	Elective caesarean section	Planned vaginal delivery
Primipara	850	313 (36.8)	537 (63.2)
Multipara	795	277 (34.8)	518 (65.2)
Total	1645	590 (35.9)	1055 (64.1)

Table 2—*Actual mode of delivery of fetuses in breech presentation at term by parity of mothers 1981-90, Grampian region. Figures in parentheses are percentages*

	No	All caesarean section	Successful vaginal delivery
Primipara	850	599 (70.5)	251 (29.5)
Multipara	795	436 (54.8)	359 (45.2)
Total	1645	1035 (62.9)	610 (37.1)

P<0.0001, odds ratio 0.51 (95% confidence interval 0.42 to 0.62).

For 258 (15.7%) of the 1645 cases health visitor records were not identified (108 in the planned caesarean section group, 150 in the planned vaginal delivery group). The remaining 1387 cases were available for analysis.

There were 269 infants (19.4%) with identified handicap. Of these, the intended mode of delivery was elective caesarean section in 100 (37.2%) and planned vaginal delivery in 169 (62.8%). These proportions were not significantly different from those in the whole cohort. There were no significant differences in the frequency of any class of handicap. Twenty seven infants had severe handicap, of whom 14 (51.9%) were delivered by elective caesarean section. There were no significant differences in the frequency of handicap by intended mode of delivery (table 3).

Similar results were obtained with primigravid mothers, though there were significantly more severely handicapped infants in the elective caesarean section group than in the planned vaginal delivery group (2.6% *v* 0.6% (P=0.02); odds ratio 4.67 (1.23 to 17.74)). There were no other significant differences between the groups.

There were more girl infants in all groups. This has been reported before.[12] Mean maternal height in the elective caesarean section group was less than in the planned vaginal delivery group (160 cm *v* 162 cm; t=6.21, P<0.0001) but there were no differences in mean birth weight or median parity (table 4). In those cases in which vaginal delivery was successful there were no significant differences in mean birth weight, mean maternal height, or birth sex ratio between handicapped and non-handicapped infants. However, parity was significantly greater in the non-handicapped group (1.0 *v* 0.7; U=22811, P=0.008) (table 5).

The obstetric case notes of 23 of the 27 severely handicapped infants were examined. Of the 11 (47.8%) who had been delivered by elective caesarean section, three had undiagnosed congenital handicap (one Down's syndrome, one fetal alcohol syndrome, and one multiple congenital abnormalities). In one case the mother did not attend for antenatal care and was not delivered until 44 weeks' gestation. The remaining infants delivered by elective caesarean section had no identifiable antenatal or perinatal cause for their subsequent neurological handicap. Of the 12 (52.2%) severely handicapped infants for whom vaginal delivery was planned, four cases were unavoidable (one severe abruption before admission, one cord prolapse before admission, two advanced labour on admission). In one case antenatal care was inadequate but the cause of handicap could not be ascertained, and one infant sustained severe trauma during difficult delivery of the aftercoming head with forceps. In two cases fetal heart rate abnormalities in labour were not acted on appropriately. In the remaining cases the subsequent handicap could not be explained by any obvious obstetric or perinatal factor.

There were five cases of the sudden infant death syndrome, two in the elective caesarean section group and three in the planned vaginal delivery group (one infant in this group was delivered by emergency caesarean section).

Discussion

Data are not available on how the handicap rate for breech delivery compares with that for cephalic delivery in our population, but other studies have found no significant differences at 2 to 10 years of age.[10 13]

The proportions of infants with handicap were almost identical in women having planned vaginal delivery and those having elective caesarean section. This suggests that given current standards of obstetric and neonatal care the planned mode of delivery has little effect on long term outcome up to school age. Significantly more severely handicapped infants of primigravid women were delivered by elective caesarean section, though it is not plausible that caesarean section could have caused such handicap.

Possibly the case selection for planned vaginal delivery was so good that obstetric accident likely to cause handicap was avoided. This is impossible to assess retrospectively. Some degree of selection was probably employed because of the significant difference in mean maternal height between the planned vaginal delivery and planned caesarean section groups. This difference was small (2 cm) and the range similar. The clinical relevance of the difference is uncertain. There was no consistent method of selection for planned vaginal delivery over the 10 years. Some clinicians used *x* ray pelvimetry or fetal weight estimated by ultrasonography, or both, but others did not. It seems unlikely that ideal selection of cases was responsible for the lack of difference in outcome between the groups.

There were significantly fewer successful vaginal deliveries in primiparous women than in multiparous women. In addition, median parity was significantly lower in the handicapped group which had delivered vaginally than in the non-handicapped group. There were no differences in mean birth weight or maternal height between these two groups. These data support suggestions that parity may be important in determining outcome.[14]

Table 3—*Types of handicap among infants for whom health visitor records were available by intended mode of delivery. Figures in parentheses are percentages*

	No	Severe handicap	Speech delay	Growth delay	General delay	Gross motor	Convulsions	Visual	Auditory	Psychiatric	Total infants with any handicap†
Elective caesarean section	482	14 (2.9)	28 (5.8)	4 (0.8)	13 (2.7)	3 (0.6)	15 (3.1)	18 (3.7)	18 (3.7)	13 (2.7)	100 (20.7)
Planned vaginal delivery	905	13 (1.4)	44 (4.9)	8 (0.9)	13 (1.4)	1 (0.1)	13 (1.4)	25 (2.8)	42 (4.6)	17 (1.9)	169 (18.7)
Total	1387	27 (1.9)	72 (5.2)	12 (0.9)	26 (1.9)	4 (0.3)	28 (2.0)	43 (3.1)	60 (4.3)	30 (2.2)	269 (19.4)

† Some infants had more than one handicap.

Table 4—*Maternal characteristics by intended mode of delivery (whole cohort)*

	Elective caesarean section (n=590)	Planned vaginal delivery (n=1055)	
Mean birth weight (g) (SD) [range]	3263 (492) [1540-4740]	3261 (488) [1240-5020]	NS
Mean maternal height (cm) (SD) [range]	160 (7) [134-183]	162 (6) [144-185]	P<0.0001
Median parity [range]	0 [0-8]	0 [0-7]	NS

Table 5—*Characteristics of groups with and without handicap delivered vaginally*

	With handicap (n=107)	No handicap (n=503)	
Mean birth weight (g) (SD) [range]	3162 (473) [1390-4740]	3207 (457) [1240-4580]	NS
Mean maternal height (cm) (SD) [range]	162 (5) [152-177]	163 (6) [147-185]	NS
Median parity [range]	0.7 [0-4]	1.0 [0-6]	P=0.008; U=22811
Birth sex ratio (M:F)	49:51	43:57	NS

Of the 12 severely handicapped infants in the planned vaginal delivery group, in only one could the handicap be attributed to difficulty with delivery. Though two further infants had abnormal fetal heart rates which were not acted on promptly, this is not a problem associated only with breech presentation. Arguably elective caesarean section would pre-empt such events, but possibly they emphasise that an experienced obstetrician should be present on the labour ward.[15] Congenital handicap should be considered before a policy of universal elective caesarean section is proposed; three severely handicapped infants in this study who were delivered by elective caesarean section had congenital anomalies (in the same time period five infants with lethal malformations were also delivered by elective caesarean section).[11]

So far as we know this is the largest investigation of the long term outcome of breech presentation by intended method of delivery. Some cases will have been lost to follow up but this should have no effect on the proportions of the intended modes of delivery. However, as a retrospective study potential bias in case selection cannot be excluded; we cannot say that these particular babies would not have done better had they been delivered by elective caesarean section. A large prospective randomised controlled trial with long term follow up is still required to provide more definitive information about the safest method of delivering a fetus in breech presentation at term. Meanwhile, it seems that a policy of selective planned vaginal delivery is not associated with an increased risk of long term infant morbidity.

Key messages

- With current methods of selection planned vaginal delivery with caesarean section available is not associated with excess perinatal mortality or long term handicap
- There is no reason for all fetuses in breech presentation at term to be delivered by elective caesarean section
- A prospective randomised trial is urgently needed to provide definitive evidence on the safest method of delivering fetuses in breech presentation at term

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Payment by results

For reasons not difficult to understand, doctors have never favoured payment by results, where the magnitude of their fee, if any, is proportional to their success or otherwise in curing the patient. But payment by results contracts were not unknown in England between the sixteenth and eighteenth centuries, sometimes being imposed on unwilling physitians (sic), surgeons, or apothecaries by cost conscious parish churchwardens responsible for disbursing poor rate moneys for the treatment of the sick, the "deserving" poor.

Here, for example, is a payment by results agreement, dated 1723, found among the miscellaneous documents in the parish chest at Cuckfield, west Sussex:

MEMORANDUM

An Agreement made between We whose names are underwritten all inhabitants of the parish of Cockfeild and George Mace of Cockfeild Apothecary this 27th day of December 1723.

First We the Inhabitants have agreed to pay George Mace the sum of Four Pounds four shillings in case he makes a perfect Cure of Thomas Bashford's Legg and Foot before Easter next.

In Case the sd George Mace does not make a Cure of the said Thomas Bashfords Legg and Foot before Easter next. Then we agree to pay him Four Pounds and Four Shillings within a yr after he shall have made a perfect Cure of the sd Bashford's Legg and Foot.

But in Case the said George Mace shall make a Perfect Cure of the said T Bashfords legg and Foot before Easter next and shall have reced the Four Pounds and four shillings for so doing and the said T Bashford's Legg and Foot shall happen to grow bad againn within a year of the same then It is agreed that the sd George Mace shall repay the said Four pounds four shillings into some of the parishioners hands for the parish Use

Witness our Hands
Robt Norden Charles Savage Berd Heasman
Mich Feild—Churchwardens
Walter Gatland William Anscomb—Overseers
George Mace

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