

(the Stortz infant bronchoscope is 2.5 to 3.5 mm diameter). Thus a direct surgical approach was required.

Peroperative airway management represents a major problem in the infant. Direct right and left bronchial intubation by the open trachea is possible and well described, though in a 4000 g infant (4–5 mm trachea) would be a cumbersome arrangement. The use of fine catheters and high frequency (jet) ventilation might represent a refinement of this technique.

As far as we are aware, cardiopulmonary bypass has not been utilised for excision of tracheal haemangioma but provided near perfect operative conditions,⁵ allowing accurate resection, haemostasis, and closure of the trachea. The possibility of resection of the complete involved circumference of the trachea had been anticipated and would have been quite feasible.⁶ Good oxygenation and temperature control were provided by cardiopulmonary bypass and it is probable that the operation was achieved more quickly and certainly with greater safety by this means.

The only tracheal suture line is vertical and closed with interrupted absorbable material to minimise the possibility of local scarring.

While we would not presume to question the

conventional wisdom of treatment of life or system threatening haemangiomas with steroids, with hindsight in these circumstances we would recommend early rather than later surgical intervention, once it is apparent that there is no benefit from steroids.

We would commend this technique for such procedures in the trachea as providing safe maintenance of oxygenation without the hinderance of tracheal or bronchial intubation.

We are indebted to our colleagues in the dermatology department, in particular Professor C Vickers and Dr J Verbov for providing much background information, and to Mrs S Critchley for typing this manuscript.

- 1 Amir J, Metzker A, Krikler R, Reisner S. Strawberry hemangiomas in preterm infants. *Pediatr Dermatol* 1986;3: 331–2.
- 2 Frost N, Esterley N. Successful treatment of juvenile hemangiomas with prednisone. *J Pediatr* 1968;72:351–7.
- 3 Edgerton M. Treatment of hemangiomas (with special reference to the role of steroid therapy). *Ann Surg* 1976;183:517–32.
- 4 Sadan N, Sade J, Grunebaum M. Treatment of subglottic hemangiomas in infants with prednisone. *Int J Pediatr Otorhinolaryngol* 1982;4:7–14.
- 5 Idriss F, DeLeon S, Ilbawa M, Gerson C, Tucker G, Hollinger L. Tracheoplasty with pericardial patch for extensive tracheal stenosis in infants and children. *J Thorac Cardiovasc Surg* 1984;88:527–36.
- 6 Louhimo I, Leijala M. Cardiopulmonary bypass in tracheal surgery in infants and small children. In: Wurnig P, ed. *Progress in pediatric surgery*. Vol 21. Berlin: Springer Verlag, 1987:59–63.

Caesarean section and duration of breast feeding among Brazilians

C G Victora, S R A Huttly, F C Barros, J P Vaughan

Abstract

A birth cohort study of 4912 Brazilian infants showed that the incidence and duration of breast feeding for children delivered vaginally and for those born by elective caesarean section were similar. Those delivered by emergency caesarean section, however, were not breast fed for as long. This difference persisted after adjustment for confounding variables.

Brazil probably has the highest rate of caesarean sections in the world—31.6% of all babies born in 1981–6, and 43.2% of those born in Rio de Janeiro and São Paulo.^{1 2} If it is true that mothers having caesarean sections are less likely to breast feed, then these appalling rates would be of great consequence not only for perinatal health but also for survival.^{3–5} The associations between the incidence of starting breast feeding and the duration according to the mode of delivery were studied in a Brazilian birth cohort.

Subjects and methods

The study population comprised 5914 liveborn infants delivered in the city of Pelotas, southern

Brazil, in 1982, which represented over 99% of all births in the city in that year.⁶ Deliveries were classified as vaginal, elective caesarean section, or presumed emergency caesarean section. Elective caesarean sections are carried out for convenience (scheduled deliveries), because the mother has previously had one, or for tubal ligation (which is illegal in Brazil, but doctors often do caesarean sections to sterilise the mother). Also classified as elective caesarean sections were those in which the first indication (according to the mother) was either prolonged labour or fetal-pelvic disproportion, but in which the second indication was 'repetition' or tubal ligation.

These children were visited again in early 1984, when they were aged between 12 and 27 months. On this occasion mothers were asked whether they had ever breast fed (incidence) and if so, on the duration of breast feeding in months and days.

The analyses were restricted to singleton births, and life table analysis was used to calculate the duration of breast feeding. The odds ratios for being breast fed at the age of 6 months according to the mode of delivery were calculated using logistic regression after adjusting for the following confounding variables: family income, maternal age and education, number of

Departamento de
Medicina Social,
Faculdade de Medicina,
Universidade Federal
Pelotas, CP 464, 96001
Pelotas, RS, Brazil

C G Victora
S R A Huttly
F C Barros

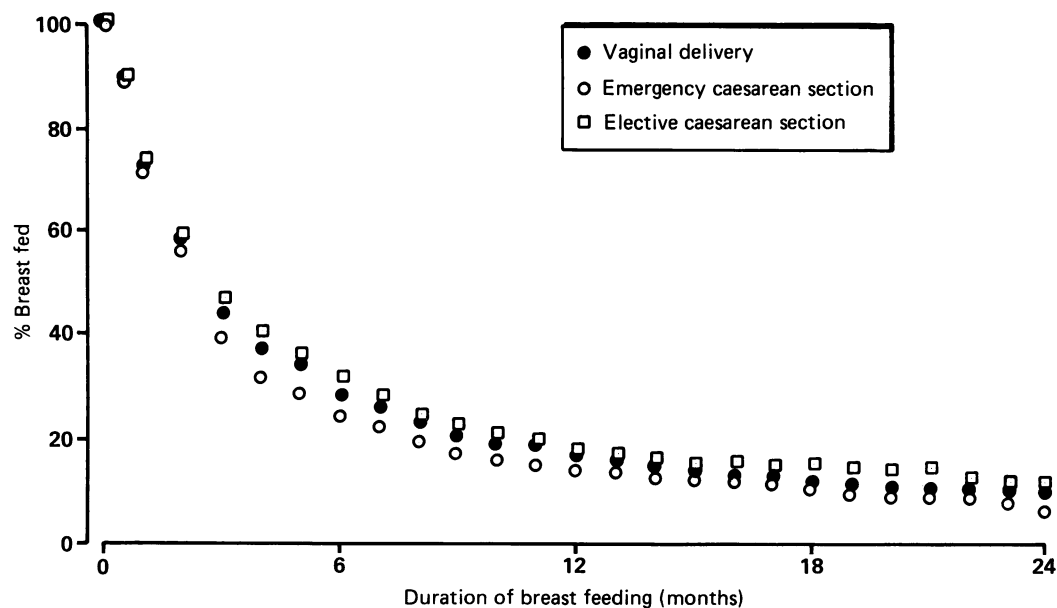
Evaluation and
Planning Centre,
London School
of Hygiene and
Tropical Medicine,
London

S R A Huttly
J P Vaughan

Correspondence to:
Dr Victora.

Accepted 9 January 1990

(*Arch Dis Child* 1990;65:632–4)



Percentage of children who were breast fed at different ages according to the mode of delivery (excluding about 8% who were never breast fed).

Odds ratios with 95% confidence intervals for being breast fed at the age of 6 months by mode of delivery

Mode of delivery	Odds ratio			
	Crude	95% Confidence intervals	Adjusted*	95% Confidence intervals
Vaginal	1.0		1.0	
Emergency caesarean section	0.78	0.67 to 0.92	0.78	0.66 to 0.92
Elective caesarean section	1.12	0.90 to 1.40	0.97	0.77 to 1.22

*Adjusted for income, age and education of mother, number of antenatal attendances, gestational age, gestational risk, and birth weight.

antenatal attendances, birth weight, gestational age, and gestational risk.²

Results

Complete information was available for 4912 children (87% of those born in 1982 who were not known to have died in infancy). Those traced did not differ significantly from the remainder in birth weight or mode of delivery.⁶ Of the 4912, 3559 (72%) had been delivered vaginally, 955 (19%) by emergency caesarean section, and 398 (8%) by elective caesarean section. The incidences of starting to breast feed were 92%, 92%, and 93%, respectively.

'Survival curves' of the duration of breast feeding for children who were ever breast fed are shown in the figure. Significant differences were found among the three groups, with children delivered by emergency caesarean section being breast fed for shorter periods than the other two groups (log rank $\chi^2=6.89$, $df=2$, $p<0.05$).

The numbers of breast fed babies at the age of 6 months were 920 (26%) for those delivered vaginally, 117 (29%) for elective caesarean section, and 214 (22%) for emergency caesarean section.

Odds ratios for being breast fed at the age of 6 months are shown in the table. After adjustment for confounding variables the vaginal delivery and elective caesarean section groups had similar proportions of breast fed children.

The babies in the emergency caesarean section group, however, were breast fed for significantly shorter periods than normally delivered infants.

Discussion

The results show that when those caesarean sections that were presumably emergencies (being a consequence of either maternal or infant morbidity) were separated from the elective ones, the babies in the former group were breast fed for shorter periods than children delivered vaginally, whereas the latter infants were likely to be breast fed for longer. These findings are in contrast with earlier studies in which lower rates of breast feeding at hospital discharge were reported among babies delivered by caesarean section.³⁻⁵ None of these studies differentiated between elective and emergency caesarean sections, or attempted to adjust for confounding variables.

Our results might have been affected by the methods we used, including the difficulty we had in separating elective from emergency caesarean sections, as this was based on arbitrary criteria and on information provided by the mother. It is reassuring, however, that this classification was successful in differentiating between two groups with different breast feeding behaviour, and that the results came in the expected direction. Misclassification would have been likely to cause elective caesarean

sections to be regarded as emergencies, and would thus lead to underestimation of the true differences.

The fact that the incidence and duration of breast feeding were similar in infants born vaginally and those delivered by elective caesarean section should not be a reason for complacency about the high rates of operative delivery in Brazil. The present results do, however, suggest that caesarean section may not be associated with lower incidence and duration of breast feeding. Previous studies showing such an association may have been confounded by the fact that emergency caesarean sections are often carried out because of complications affecting the mother or the infant, which would have an independent effect on breast feeding patterns. Our results also suggest that mother-infant contact immediately after delivery is perhaps not as important for the successful establishment of

breast feeding as has been suggested, and that breast feeding can be successful in a large proportion of babies born by caesarean section.

The study was financed by the Overseas Development Administration of the United Kingdom.

- 1 Arruda JA, Rutenberg N, Morris L, Ferraz EA. *Pesquisa nacional sobre saúde materno-infantil e planejamento familiar. Brasil, 1986*. Rio de Janeiro: BEMFAM-IRD, 1987:152.
- 2 Barros FC, Vaughan JP, Victora CG. Why so many caesarean sections. The need for further policy change in Brazil. *Health Policy and Planning* 1986;1:19-29.
- 3 Taaminen T, Verronen P, Saarikoski S, Goransson A, Tuomiranta H. The influence of perinatal factors on breast feeding. *Acta Paediatr Scand* 1983;72:9-12.
- 4 Palmer SR, Avery A, Taylor R. The influence of obstetric procedures and social and cultural factors on breastfeeding rates at discharge from hospital. *J Epidemiol Community Health* 1979;33:248-52.
- 5 Boulton TJC, Flavel SE. The relationship of perinatal factors to breastfeeding. *Aust Paediatr J* 1978;14:169-73.
- 6 Barros FC, Victora CG, Vaughan JP. The Pelotas birth cohort study, 1982-1987. Strategies for following up 6,000 children in a developing country. *Paediatric and Perinatal Epidemiology* 1990;4:267-82.