

## RESUSCITATION OF INFANTS BORN BY CAESAREAN SECTION

By

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### SUMMARY

The rising rate of caesarean section deliveries has implications for the planning of neonatal care in the operating theatre and for the deployment of personnel skilled in neonatal resuscitation.

The aim of this prospective study was to identify those infants, prior to delivery, at high risk for resuscitative intervention and thus to offer guidelines for the attendance of pediatricians at caesarean sections.

Of 130 consecutive infants born by caesarean section 20 required intubation. Most of these infants (18/20) had fetal distress or malpresentation other than breech. In elective caesarean sections, active resuscitation was rarely necessary.

Where pediatric personnel is limited, they need not be required to attend elective caesarean sections but should be present when the indication is fetal distress or malpresentation other than breech.

The rate of Caesarean section in India has been rising (Ghose, 1983; Alwani and Ambiyee, 1984; Singh and Devi, 1984; Pandey *et al*, 1986; Vijayakar and Rawal, 1987). This trend has been observed in other countries as well (Russell, 1981; Placek *et al*, 1983; Gilstrap *et al*, 1984; Phillipson and Rosen, 1985). Recent studies indicate that the present incidence of Caesarean sections at large Indian hospitals ranges from 2.29-14.25% (Pai *et al*, 1975; Khatau *et al*, 1979; Basak *et al*, 1981; Ghose, 1983; Alwani and Ambiyee, 1984; Singh and Devi, 1984; Pandey *et al*, 1986; Vijayakar and Rawal, 1987).

These figures are somewhat lower than corresponding rates from the UK and USA which vary from 17.9-20.0% (Russell, 1981; Placek *et al*, 1983; Gilstrap *et al*, 1984; Phillipson and Rosen, 1985).

Mortality among infants born by Caesarean section ranges from 2.2-9.12%. In elective Caesarean sections the mortality is lower: 0-4.8% (Russell, 1981; Phillipson and Rosen, 1985; Pandey *et al*, 1986; Vijayakar and Rawal, 1987). In most studies elective Caesarean section has been shown to be safer for the infant than vaginal delivery (Khatau *et al*, 1979; Basak *et al*, 1981; Awani and Ambiyee, 1984; Gilstrap *et al*, 1984).

The increase in the rate of Caesarean section deliveries has implications for the planning of neonatal resuscitative

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Accepted for publication on 25-8-88.

care in the operating theatre and for the deployment of personnel skilled in neonatal resuscitation. None of the above studies have documented the resuscitative measures required for neonates delivered by Caesarean section. Such a study is important, so as to identify, prior to delivery, those newborns at high risk for requiring resuscitation. This information would enable the formulation of guidelines for the attendance of pediatric personnel at Caesarean section deliveries.

We undertook a prospective study with the following aims:

1. To correlate the need for resuscitative intervention with respect to the indications for Caesarean section.

2. To develop a list of maternal and fetal complications that require the presence of a pediatrician in the operating room.

#### Patients and Methods

From June to December 1986, data were collected regarding 130 consecutive Caesarean deliveries. A proforma was used in which the following information was recorded: identification of mother and infant, period of gestation, birth weight, reason(s) for Caesarean section and resuscitative treatment of the infant. Where there was more than one indica-

tion, the one felt to be the most important was recorded. Fetal distress overrode all other indications.

Routine care consisted of nasopharyngeal suctioning and tactile stimulation, with or without oxygen blowby. Manual ventilation was done with a standard Ambu bag and mask.

Every Caesarean section was attended by one of the authors.

#### Results

The indications for Caesarean section were divided into eight categories. (Table I).

TABLE I  
*Indications for Caesarean Section*

Indication	n	%
Repeat C-section	34	27
CPD	16	12
Failure of labour to progress	11	8
Maternal disease: PIH, BOH, Rh-, APH etc.	13	10
Breech	11	8
Other malpresentation	8	6
Fetal distress	31	24
Fetal conditions: prematurity, past dates, IUGR etc.	6	5
Total	130	100

The resuscitative interventions required by the infants are depicted in Table II.

TABLE II  
*Resuscitative Measures According to Indication*

Indication	n	Routine	Mask/bag	Intubation ± drugs
Repeat C-section	34	32	1	1
CPD	16	16	0	0
Failure of labour	11	11	0	0
Maternal disease	13	10	2	1
Breech	11	11	0	0
Other malpresentation	8	8	2	3
Fetal distress	31	14	2	15
Fetal conditions	6	5	1	0
Total	130	102	8	20



The number of infants requiring tracheal intubation are tabulated according to the indication for Caesarean section in Table III.

TABLE III  
Number and Percentage of Infants Requiring Intubation

Indication	No. intubated	%
Repeat C-section	1/34	3
CPD	0/16	0
Failure of labour	0/11	0
Maternal disease	1/13	8
Breech	0/11	0
Other malpresentation	3/8	38
Fetal distress	15/31	48
Fetal conditions	0/6	0
Total	20/130	16

In 102 (78%) infants, no resuscitation was necessary. In 8 (6%) infants Ambu bag and mask were used. For 20 (16%) infants intubation was required, with or without resuscitative drugs. Of these 20 infants, 12 had meconium stained liquor in whom intubation was done to carry out tracheal suction. Of the remaining eight the indications were: fetal distress other than meconium staining 3, malpresentations other than breech 3, maternal disease 1, and repeat Caesarean section 1.

In the maternal disease group the infant requiring intubation was born to a mother with PIH. No fetal distress was noted prior to delivery. One infant born by repeat Caesarean section required intubation for which the reason could not be ascertained. In this case also, no fetal distress was noted prior to delivery.

#### Discussion

The results of this study indicate that Caesarean section born infants are at high risk for requiring resuscitation if

fetal distress or abnormal presentation (other than breech) is present. In another study (Press *et al*, 1985) a low rate of 2.4% intubation was observed in malpresenting babies (other than breech). In contrast the corresponding figure in our study was 38%, though in both studies the sample number is small. In the same study, where the indication was CPD, 13.2% of infants required intubation, whereas in our study, no infant in this group required intubation.

The practice of having a pediatrician or other personnel skilled in neonatal resuscitation present at caesarean section deliveries varies from hospital to hospital. It is estimated that 90% of obstetricians in India supervise newborn care (Bhargava and Kumari, 1983). It is probable that in most small hospitals and nursing homes pediatricians are not present at caesarean sections. This is in spite of the observation that caesarean section rates are higher at private clinics (de Reft *et al*, 1986).

At present no standard policy exists for the attendance of pediatricians at caesarean sections. Though theoretically ideal, it is not possible to have a pediatrician present at every delivery, whether vaginal or operative. It is therefore desirable that pediatric personnel resources be used effectively.

In our study, if a pediatrician had attended only those cases where the indication was fetal distress or malpresentation (other than breech), then 90% (18/20) of the babies requiring intubation would have been covered. Other studies (Primhak *et al* 1984, Gross 1985, Press *et al*, 1985) also suggest that pediatricians need not attend elective caesarean sections.

Based on our data, we recommend that where pediatric staff is limited, their at-

tendance be limited to those caesarean sections where the indications are fetal distress or malpresentation other than breech. A pediatrician need not be required to be present when the indication is repeat caesarean section, CPD, failure to progress or breech presentation.

For optimal neonatal resuscitative care, other medical personnel involved in delivery of infants such as obstetricians, anesthetists and labour-room nurses, must all be skilled in neonatal resuscitation.

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