

CLINICAL PROFILE OF SEVERE BIRTH ASPHYXIA

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ABSTRACT

In this retrospective analysis, 56 babies with Apgar score 3 and less were studied. In 33, successful bag-mask ventilation was carried out. Seventeen babies received endotracheal IPPV. In 9 out of them bag-mask ventilation was never tried whereas in 8 bag-mask ventilation had failed. In 6 babies physical stimulation and blast of oxygen on the face was adequate. Following this experience, in the subsequent years, endotracheal intubation was required mainly in extremely low birth weight babies or babies with Apgar score 0 at birth. During the study period, drugs were used in about 50% babies. In subsequent years this figure has come down to 10%, that too in special situations.

This study helped us to evolve a policy in resuscitations severely asphyxiated babies. Bag-mask ventilation is the first choice. Failure to achieve progressively improving Apgar score by 1 minute, usually 4-5, is an indication for endotracheal intubation. Drugs are required in special situations only.

Key words: *Resuscitation, Birth asphyxia, Newborn.*

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Birth asphyxia is one of the major causes of perinatal mortality and morbidity especially in developing countries. Resuscitation of an asphyxiated newborn is comparatively easier because a newborn can withstand hypoxemia for a longer period(1). Secondly, with sternal compressions cardiac massage can be given more effectively(2). At the same time there is pessimism towards resuscitation of a severely asphyxiated baby because of two misconceptions: (a) very high proportion of the babies develop neurological deficit, and (b) endotracheal intubation is required in the majority for an effective ventilation. However, over a period of time, quantity as well as quality of survivals has improved in asphyxiated babies because of better understanding of pathophysiology of asphyxia and, consequently better management. Availability of better equipment has also played an important role in improving the success rates in resuscitation of asphyxiated babies.

This retrospective study was carried out with an objective to find out the usefulness of bag and mask ventilation in resuscitating severely asphyxiated newborns.

Material and Methods

Out of 2823 births at J.J. Hospital, Bombay from January 1 to December 31, 1987, fifty-six babies with Apgar score 3 and less at 1 minute formed the material for this study. Clinical evidence of intrapartum asphyxia, resuscitation measures, response to resuscitation and immediate outcome were studied.

Bag and mask failure was defined as inability to achieve ascending Apgar score especially improvement in heart rate and breathing from apnea to gasping breathing by one minute and spontaneous breathing by 5 minutes.

TABLE I — Birth Weight, Gestational Age and Apgar Score

Apgar score at 1 min	Birth weight (g)					Gestational age (weeks)				Total cases (No.)
	≤1000	-1500	-2000	-2500	>2500	<28	-33	-36	≥37	
0	2	1	0	1	1	1	2	0	2	5
1	3	2	5	4	9	1	7	5	10	23
2	0	3	3	1	7	1	5	1	7	14
3	1	1	2	7	3	1	1	4	8	14
Survivals	1/6	4/7	8/10	10/13	16/20	1/4	11/15	6/10	21/27	39/56
Survivals (%)	16.3	57.1	80.0	70.7	80.0	25.0	70.3	60.0	70.7	69.6

Results

Survivals improved with increase in birth weight, *i.e.*, from 16.6% in less than 1000 g to 75% in more than 2500 g babies (Table I). Survivals also improved with better maturity, *i.e.*, from 25% survivals in babies less than 28 weeks to 77.7% in babies more than 37 weeks mature (Table I).

In as many as 23 cases (41%) there were no warning signals of fetal distress (abnormal fetal heart rate or meconium passage *in utero*) clinically heralding birth of a severely asphyxiated babies (Table II).

TABLE II — Apgar Score and Evidence of Intrapartum Asphyxia, *i.e.*, Fetal Distress (No.)

Apgar score	Abnormal FHR	Meconium passage	Both	None
0	1	0	2	2
1	6	4	3	10
2	5	3	1	5
3	2	1	5	6

Bag and mask ventilation was resorted to in 41 babies. In 11 babies out of these (26.8%), Apgar score remained below 5 at 5 minutes. Five babies (12.2%) developed

hypoxic ischemic encephalopathy (HIE) (Grade I in 1 baby, Grade II in 3 babies and Grade III in 1 baby), and 11 babies (26.8%) died. Bag-mask failure was defined in 8 cases who were then resuscitated with endotracheal intubation. Details of outcome in 33 successful bag and mask ventilation are provided (Table III).

In 8 cases endotracheal intubation was carried out following bag-mask failure. In 6 out of them Apgar score still remained below 5 at 5 minutes (75%). One of them had HIE (Grade III) and 4 of the 8 babies died (50%). Endotracheal intubation was carried out in a total of 17 babies (8 bag and mask failures and 9 *de novo*).

In 12 (70.5%) of these Apgar score remained below 5 at 5 minutes and 3 babies developed HIE (16.6%) (2 had Grade II and 1 had Grade III HIE). Death occurred in 9 out of these 17 babies (52.9%). Six of the 56 newborns responded to physical stimulation and blast of oxygen on the face only.

Discussion

In this study, the results of bag-mask resuscitation are apparently better than endotracheal resuscitation. This may be to some extent due to the fact that endotra-

TABLE III — Outcome in 35 successful Bag and Mask Resuscitation

Apgar ₁	Cases	Apgar ₅		HIE (Grade)			Outcome		
		<5	≥5	I	II	III	Survived	Died	Survived (%)
0	2	1*	1	—	—	—	1	1*	50.0
1	11	3	8	—	2	—	8	3	72.7
2	13	1	12	1	—	—	12	1	92.3
3	7	—	7	—	1	—	5	2	71.4

*600 g, 26 weeks.

TABLE IV— Endotracheal Intubation — Direct (Bag-mask Failure)

Apgar ₁	Cases (No.)	Apgar ₅		HIE (Grade)			Outcome	
		<5	≥5	I	II	III	Survived	Died
0	3	3	—	—	—	—	—	3
1	11 (7)	7 (5)	4 (2)	—	1*	1(1)	6(4)	5(3)
2	1	—	1	—	—	—	1	—
3	2(1)	2(1)	—	—	1	—	1	1(1)

cheal intubation is an automatic choice in bad cases. Endotracheal ventilation also requires more skills and is likely to take more time to establish in inexperienced hands like a junior resident.

All the people conducting deliveries should learn basics of resuscitation and a person with better skills and expertise should be available within seconds. In situations where birth of an asphyxiated baby is anticipated, presence of a person with expertise in resuscitation is mandatory in the delivery room.

Not many recommend trial of bag and mask resuscitation in a severely asphyxiated baby(3,4) excepting for the Swedish National Programme(5). Use of endotracheal intubation can be confined to cases where bag-mask ventilation fails.

Given the ease and simplicity with which bag and mask ventilation can be mastered and effectively carried out, it

seems logical that it be attempted initially and endotracheal intubation, being technically more difficult, only be carried out in bag-mask failures. In 1988, intubation as a first resort became progressively less so also instances of bag-mask failure. In 1989 they have become rare.

Drugs were not required in more than 50% of the cases. It is well appreciated that in the ABCD of resuscitation, D (drugs) comes last. Rushing for drugs diverts the attention towards unimportant things and delays the restoration of ABC (Airways, Breathing and Circulation). Just as bag-mask ventilation has been effective in the majority, the need for drugs has progressively declined. In 1989, not more than 10% of severely asphyxiated babies required drugs. Plasma in cases of antepartum hemorrhage in mother and epinephrine in cases of O Apgar have been the main indications for drugs.

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