

Brief Reports

Apnea in Neonates

Anil Narang
Geeta Gathwala
Praveen Kumar

Apnea has been defined as cessation of respiration for more than 10 to 15 seconds or the time without respiration after which functional changes are noted in the infant, such as cyanosis, bradycardia, hypotonia or metabolic acidosis(1). It has the potential of severely compromising the well being of a neonate and there are important implications for the need of ventilation and outcome. Yet, there is a paucity of Indian data. Hence, we carried out a retrospective study of apnea in babies born at our hospital.

Subjects and Methods

Case records of all babies born at Nehru Hospital, Post Graduate Institute of Medical Education and Research, Chandigarh between January 1995 to December 1995 were reviewed for the occurrence of apnea. Apnea was defined as the cessation of respiration for 20 seconds or less when associated with cyanosis and/or bradycardia. Investigations performed included blood glucose, serum calcium, serum electrolytes,

PCV, septic screen (CRP, *i*ESR and ANC), blood culture, X-ray chest, CSF examination and ultrasonography (USG) of the skull. Apnea of prematurity was diagnosed when the entire work up was negative.

The treatment administered included vestibular stimulation with rocking bed, aminophylline and ventilation whenever indicated. All premature babies shifted to the premature nursery were monitored continuously for HR, RR and SaO_r. Babies more than 2000 g were also similarly monitored when symptomatic and admitted to the newborn unit. Apnea was recorded by the staff nurse or the junior resident posted in the Nursery. The data was analyzed for the incidence, cause, need for ventilation and outcome, of babies with apnea. Chi-square test was used to assess the statistical significance.

Results

The incidence of apnea in babies < 30 weeks, 31-32 weeks, 33-36 weeks and ≥ 37 weeks was 16.99, 17.89, 2.65 and 0.13 per 100 live births, respectively. In babies <1000 g, 1000-1499, 1500-2499 g and ≥ 2500 g, the corresponding figures were 18.75, 18.49, 1.8 and 0.16 per 100 live births, respectively. The overall incidence of apnea in low birth weight babies (< 2500 g) was 4.6 per 100 live births.

Twenty babies (37.7%) had only 1-2 episodes of apnea whereas 33 babies (62.3%) had 3 or more episodes. Over one fifth (22.6%) of the apneas occurred on day 1, 75.5% between day 2 to day 7 and 1.8% later. The commonest cause (49.05%) was infection (33.9% had blood culture positive septicemia) followed by apnea of prematurity (24.5%) (Table I).

From the Division of Neonatology, Department of Pediatrics, Postgraduate Institute of Medical Education and Research, Chandigarh 160 012.

Reprint requests: Dr. Anil Narang, Head, Division of Neonatology, Department of Pediatrics PGIMER, Chandigarh 160 012.

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TABLE I-Causes of Apnea.

Cause	Number	Percentage
Infection	26	49.1
Septicemia	18	33.9
Meningitis	3	5.6
Shock	2	3.7
Neonatal necrotizing enterocolitis	2	3.7
Pneumonia	1	1.8
Apnea of prematurity	13	24.5
Intraventricular hemorrhage	4	7.5
Hyaline membrane disease	4	7.5
Hypoglycemia	3	5.6
Seizures	1	1.8
Birth asphyxia	1	1.8
Patent ductus arteriosus	1	1.8

A comparison of the important characteristics of the babies with the two commonest causes of apnea (infection and apnea of prematurity), revealed that the mean birth weight and gestation were 1461 ± 415 g and 31.7 ± 2.28 weeks for the infection group and 1173 ± 265 g and 30 ± 1.6 weeks for the apnea of prematurity group. In the infection group, 57.6% needed ventilation as compared to 15.3% of those in the prematurity group ($p < 0.05$). The survival rate for babies in the infection group was only 23.1% compared to 69.3% in those with prematurity ($p < 0.05$).

Aminophylline was given in 43 babies (81.1%) and 17 (32.1%) received ventilatory support. Ten babies (18.9%) received manual intermittent positive pressure respiration as a ventilator was not available. There was no difference in the proportion of neonates who received aminophylline or ventilation when stratified by birth weight or gestational groups.

The survival rate in babies with apnea

of prematurity was 69.3% as compared to 56.1% in all preterm babies of the same gestation (*i.e.*, ≤ 32 weeks) during the same period. On the other hand, survival with apnea and infection was only 23.1% compared to 60% in all babies with infection during the same period. In babies with 1-2 episodes of apnea, the survival rate was 60% as compared to 33.3% in those with 3 or more episodes.

Discussion

Using a definition of 20 seconds, Henderson-Smart reported an incidence of apnea of 78% in infants born at 26-27 weeks gestation, 75% at 28-29 weeks, 54% at 30-31 weeks, 14% at 32-33 weeks and 7% at 34-35 weeks(2). The incidence in the present study also increased with decreasing gestational age but was 17.2% in babies < 32 weeks gestation and 2.6% in those born between 33-36 weeks. A lower incidence of apneic spells in our babies may be due to decreased survival of more immature babies and a higher incidence of other associated problems. Apnea of prematurity generally begins at 1 or 2 days of age and if it does not occur during the first seven days, it is unlikely to occur later(3). In the present study, all cases of apnea of prematurity occurred within the first four days of life, *i.e.*, from day 2 to day 4.

Infection was the commonest cause (49.05%) followed by apnea of prematurity (24.05%). Apnea of prematurity is reported to occur in 7% of babies with a gestational age of 34-35 weeks(4). However, all babies who developed apnea of prematurity in the present study were < 1500 g and < 32 weeks gestation. The reasons for more mature babies not developing apnea are not clear.

Only 2 babies (15.3%) with apnea of prematurity needed ventilation compared to 15 (57.6%) of those with infection. The