



A Comparative Study of Apnea in Preterm And Full term Infants.

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ABSTRACT

Significant new information has been forthcoming in recent decades on sudden infant death syndrome (SIDS) and apnea during early infancy. We compared apnea spells between Pre term & Full term infants. Respiration was recorded on polygraph. Data was analyzed by using student's t test. We found statistically significant difference between Pre term & Full term infants. Thus we can conclude that apnea is more common in pre term infants.

KEYWORDS : apnea, pre term, full term infants.

INTRODUCTION

Sudden death is known to occur in all ages. In adults it is frequently the result of cardiac arrhythmias, in adolescents it is often accidental & in infants many times it's unexplained & is called as sudden infant death syndrome (SIDS).

SIDS has been defined as "the sudden death of an infant under 1 year of age that remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history"⁽¹⁾. There are various risk factors for SIDS. Recent studies have shown that 4-13% of SIDS cases had a history of apnea⁽²⁾.

The term apnea has been described by various investigators and clinicians. Infant apnea is defined by the American Academy of Pediatrics as "an unexplained episode of cessation of breathing for 20 seconds or longer, or a shorter respiratory pause associated with bradycardia, cyanosis, pallor, and/or marked hypotonia"⁽²⁾.

Long respiratory pauses are more likely associated with life threatening alterations in cardiovascular, metabolic, and neurologic functions. Infants have relatively small lung volume & oxygen stores than adults & higher oxygen consumption per unit of body weight. Therefore it is possible that relatively short pauses that are not important in the adults can cause consequential clinical effects in the newborn infant.

MATERIALS AND METHODS

The present study was carried out in department of Pediatrics, Grant Government Medical College & Sir JJ Groups of Hospitals, Mumbai. Total 100 new born babies were considered for study & divided in two groups.

50 new born babies who were admitted in the N. I.C.U. weighing 860-2500 gm considered as pre term.

50 full term babies delivered normally were taken for control purpose.

Preterm infant - a baby born before 37 completed weeks of gestation from the first day of last menstrual period.

Full term infant - a baby born after 37 completed weeks of gestation from the first day of last menstrual period

The Gestational period was calculated according to the history given by the mother of the last menstrual cycle & the date of delivery.

The respiratory amplifier with a small size thermister, manufactured by MEDICAID system, Ambala was used. Respiration recording output has been fed into polygraph, which facilitates the recording of apnea episodes on paper. To calculate time factor time tracing has been made at the bottom of the recorded respiration.

Mother's informed written consent was taken prior to recording. After feeding, the babies were kept in the tray in clean conditions. When the baby attained deep sleep, the thermister was slowly kept in front of the nostril.

As soon as the record started, the baby's respiration records as well as chest movements were observed. The colour of the baby's skin & mucous membrane was noted when the apnea spells were on.

It was carefully observed that there was no movement of the chest & no records of respiration. The position of the thermister was intact, to avoid false recordings.

The records were obtained for time ranging from 690 to 1200 seconds as the baby did not remain in one position for longer periods even in deep sleep. From this total duration of apnea & episodes were calculated. The episodes which were greater than or equal to 20 seconds were classified as apnea spells. Data was analyzed using SPSS software and P value was calculated. Values lesser than 0.05 was considered as significant.

AIMS & OBJECTIVES

To compare duration of apnea in Preterm & Full term infants.
To compare apnea spells in Preterm & Full term infants.

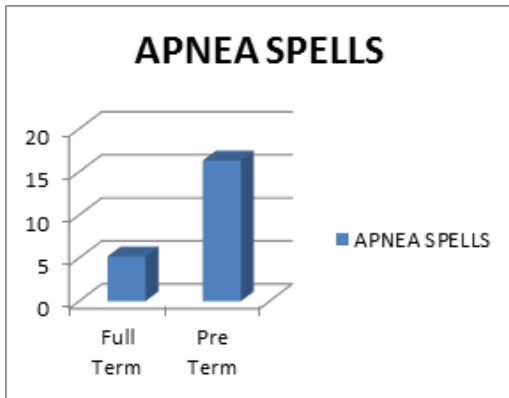
OBSERVATION & RESULTS

Table no.1 showing comparison of parameters between Pre & Full Term infants.

Sr no.	Parameters	Full Term	Pre Term	P value
1	Period of apnea	93.4±25.52	211.96±49.04	<0.05
2	Episodes	20.4±4.42	30.12±7.07	>0.05
3	apnea spells	5.2±2.41	16.34±4.33	<0.05
4	Gestation week	38.72±0.47	32.98±2.04	>0.05
5	weight	2.680±0.63	1.758±0.7	>0.05

There was significant difference in the duration of apnea & apnea spells between Pre term & Full term infants.

Diagram no.1 Bar diagram showing comparison of apnea spells Pre & Full term infants.



DISCUSSION

The findings of the present study was in accordance with Richard Naeye⁽³⁾, Guillemnault⁽⁴⁾, Steinschneider A⁽⁵⁾, Joseph Oren⁽⁶⁾, Schechtman VL⁽⁷⁾.

Richard Naeye proved that pulmonary arterial musculature was increased in response to hypoxia and apnea. Age-matched infants living at high altitude at the time of death had 2.3 times as much muscle in their small pulmonary arteries as the low-altitude controls. These findings are consistent with the observation that some victims of the syndrome have had periods of apnea before death.

Guillemnault et al suggested that central cardiorespiratory control during sleep is deranged. This abnormality would involve the autonomic nervous system & may explain the stopped breathing episode as well as the accompanying bradycardia in near miss SIDS cases.

Steinschneider A, Weinstein SL concluded that prolonged apnea or airway obstruction is part of the pathophysiologic process resulting in SIDS and those hypotheses implicating unstable respiratory activity during sleep as well as apnea and pharyngeal/laryngeal dysfunction induced by liquid stimulation of the upper airway They are also compatible with the growing body of evidence indicating that factors that predispose an infant to SIDS originate in the perinatal period.

Joseph Oren obtained a pneumogram recordings in infants resuscitated for apnea of infancy. They found significantly higher mean respiratory rates, heart rates, and tachycardia indices.

Schechtman VL et al stated that Coordination between physiological measures (i.e., the tendency for measures to co-vary with each other) develops with maturation in the infant. He hypothesized that correlations between cardio respiratory measures would increase with maturation in normal infants and that infants destined to die of sudden infant death syndrome (SIDS) would show lower correlations than those of age-matched control.

The mechanism underlying apnea is not fully clear, but is certainly linked to the immaturity of the central nervous system (CNS) of the preterm neonate, and particularly to a poor myelination of the immature brainstem. [1, 2, 5]. The neurological control of respiration is located on the ventral medullary surface, where the chemoreceptors for CO₂ are found. In response to hypercapnia, a preterm neonate, unlike an adult, does not increase respiratory frequency or tidal volume, but prolongates the expiratory period, resulting in a lower volume/minute. Once hypoxia has occurred, it does aggravate apnea⁽⁸⁾.

CONCLUSIONS

Thus we can conclude that apnea is more common in pre term infants compared to full term infants & they are more prone to sudden infant death syndrome.

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