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TEARS IN NEWBORM BABIES

Paediatrics

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ABSTRACT

Presence of tears in newborn babies is debated since long. In our day to day observation we find that tears are present in newborn babies. We conducted a prospective observational study to find out the presence of tears in newborn babies and if there is any difference in tear production in mode of delivery, between preterm and term babies and the sex of the baby. Results- Present study showed that tears are present in newborn babies. There is no difference in tear production between preterm and term babies or the mode of delivery but males had significantly more tear production as compared to females. Conclusion-Present study done reconfirms that tears are present in newborn babies. There was no difference between tear production in preterm and term babies but there was significant difference among both sexes in terms of tears production.

KEYWORDS:

Tears, neonates, Schirmer test

Introduction:

The presence of tears in newborn babies is debated since long. Earlier literatures reviewed suggest that tears are not present in newborn babies [1]. Subsequent studies done on newborn babies suggested presence of tears in newborn babies. This differentiation also has a number of practical applications if newborns are found to have little reflex secretion. Topical medication may not be adequately diluted by reflex tear production, allowing the medication to remain more concentrated .This could lead to systemic concentrated. This could lead to systemic toxic effects, as has been seen with phenylephrine and other medications. 23

Not all investigators agree on the distinction between reflex and based secretion. 10 Some think that nearly all tearing is reflex, although some tearing is produced when no stimulations occurs. Reflex secretion may not be totally eliminated by topical anesthesia because stimulation of the eyelid margin and lashes may still lead to tearing.

In our day to day practice, we observe that tears are present in crying newborn babies. With this observation, we planned to study the amount of reflex tear production in newborn babies.

Aim and Objective

1. To study the presence of tears in newborn babies.
2. To find out any difference in tear production among sexes, maturity and mode of delivery.

Material & Methods:

1. Place of Study: This study was conducted at central India Nagpur (Maharashtra)

Period of Study: This was a prospective observational study from December 2012 till February 2013.

2. Inclusion Category

All the medically stable newborn babies born in the Obstetrics department within first 5 days of delivery were included in this study.

3. Exclusion

Babies whose parents did not gave consent for the study and those babies who developed eye discharge were excluded from the study.

4. Sample size: Data was collected from obstetrics department (medically stable newborn babies) admitted and treated in NKPSIMS & Lata Mangeshkar Hospital Nagpur ,were included in the study (n=513)

5. Study Design: Cross sectional study (Observational Study)

Statistical Analysis

The obtain data were statistically analyzed by applying descriptive (chi square test and p value) . We have entered all data in Microsoft Excel and further Statistical Analysis was done with the help of QI-Macros 2014 Software.

Design:

Methodology:

The measurement of total tear production was done by Schirmer test without application of local anesthetic agent. Parents of the newborn babies were explained about the test and its outcomes. The gestational age of the babies as assessed by Ballard score was recorded simultaneously.

Schirmer test [2]consists of placing a small strip of filter paper inside the lower eyelid (inferior fornix). The eyes are closed for 5 minutes. The paper is then removed and amount of moisture is measured (total tear production). Sometimes a topical anesthetic is placed into the eye before the filter paper to prevent tearing due to irritation from the paper. The use of the anesthetic ensures that only basal tear secretion is being measured (basal tear production).

Results of Schirmer's test are read as

1. Normal which is $\geq$ 15 mm wetting of the paper after 5 minutes.
2. Mild which is $\geq$ 14 -9 mm wetting of the paper after 5 minutes.
3. Moderate which is $\geq$ 8 – 4 mmwetting of the paper after 5 minutes.
4. Severe which is < 4 mm wetting of the paper after 5 minutes.

Observations:

A total of 560 babies were enrolled for this study out of which 47 were excluded due to either non willingness for the study or medically unstable condition or eye discharge due to any reason.

Of the 513 babies on whom the study was conducted 216 were male and 297 were females. 113 babies were preterm (gestational age < 37 weeks) and 400 were term babies. There were no post term babies in the study. Of the 113 preterm babies, 62 were males and 51 were females and of the term 400 babies 154 were males and 246 were females. Of the total 216 male babies, 119 were born by normal vaginal delivery and 97 were born by cesarean section. Of the total 297 female babies 97 were born by normal vaginal delivery and 200 were born by cesarean section. See table no. 1 and 2.

Of the 62 preterm males, 28 were born by normal vaginal delivery and 34 were born by cesarean section. Of the 51 preterm females, 14 were

born by normal vaginal delivery and 37 by cesarean section. Out of the 154 term males, 91 were born by normal vaginal delivery and 63 by cesarean section. Of the 246 term female babies, 83 were born normally and 163 by cesarean section.

Table no.1 - According to maturity and sex

	Preterm	Term	Total
Total number	113	400	513
Males	62	154	216
Females	51	246	297

Table no.1 According to gestational age:

Total cases (513)	Preterm (113)	Term (400)
NVD Males	28	91
NVD Females	14	83
LSCS Males	34	63
LSCS Females	37	163

According to gestational age:

Preterm babies

The average tear production was 12.8 mm in 91% preterm babies born by cesarean section while in 9% it was 17mm. None had tear production less than 10 mm. In preterm babies born normally by vaginal route, 12% had average tear production of 7.2mm, 83% had average tear production of 14.7mm, while 5% had average tear production of 17.2mm.

Term babies

In term babies born by cesarean section, 2% had average tear production of 8.1mm, while 84% had 14.1mm and 14% had 16.2mm of average tear production.

In term babies born by normal vaginal delivery, 4% had average tear production of 9.3 mm, 84% had average tear production of 13.2 mm and 12% had average tear production of 16.4 mm.

Table no. 3- Tear production cesarean / normal deliveries no.2- According to mode of delivery

Areas	Section	0-10 mm	10-15 mm	>15 mm	Total cases
Preterm babies	Cesarean section	Nil	65 (avg 12.8mm)	6 (avg 17 mm)	71
	Normal delivery	5 (avg7.2 mm)	35 (avg 14.7 mm)	2 (avg 17.2 mm)	42
Term babies	Cesarean section	6 (avg 8.1mm)	189 (avg 14.1 mm)	31 (avg 16.2 mm)	226
	Normal deliveries	7 (avg 9.3mm)	146 (avg 13.2 mm)	21 (avg 16.4 mm)	174

Avg- Average

According to Gender

About 89% of preterm female babies born by cesarean section had average tear production of 12.6 mm while 11% had average tear production of 1.8 mm. 94% of preterm males born by cesarean section had average tear production of 12.8 mm while only 6% had average tear production of 17 mm.

85% of preterm females born by normal vaginal delivery had average tear production of 12.3 mm & 15% had average tear production of 16.5 mm. On the other hand, 18% of preterm males born by normal vaginal delivery had average tear production of 8.7 mm & 82% had average tear production of 12.5 mm. None of the preterm males born by normal vaginal delivery had tear production more than 15 mm.

About 90% of term females born by cesarean section had average tear production of 13.8 mm while 8% had average tear production of 16.3 mm. only 2% had average tear production of 9.1 mm. On the other hand, 68% of term males born by cesarean section had average tear production of 13.8 mm while 27% had average tear production of 16.6 mm. only 5% had average tear production of 8.9 mm.

89% of term females delivered by normal vaginal delivery had average tear production of 13.6 mm, 6% had average tear production of 17.1 mm and 5% had 9.2 mm. On the other hand 79% of term male babies born by normal vaginal delivery had average tear production of 13.6 mm, 18% had 17.1 mm & only 3% had average tear production of 9.4mm.(See table no.4)

Table no. 4- Tear production according to maturity, sex of the babies and mode of delivery

	Sex	0-10 mm	10-15 mm	>15mm	Total cases
Preterm LSCS	females	Nil	33 (avg 12.6 mm)	4 (avg 16.8mm)	37
	Males	Nil	32 (avg 12.8 mm)	2 (avg 17 mm)	34
Preterm NVD	Females	Nil	12 (avg 12.3 mm)	2 (avg 16.5mm)	14
	Males	5 (avg8.7m m)	23 (avg 12.5 mm)	Nil	28
Term LSCS	Females	3 (avg 9.1 mm)	146 (avg13.8m m)	4 (avg 16.3mm)	163
	Males	3 (avg 8.9 mm)	43 (avg13.6m m)	17 (avg16.6 mm)	63
Term NVD	Females	4 (avg 9.2mm)	74 (avg13.6 mm)	5 (avg 17.1 mm)	83
	Males	3 (avg 9.4mm)	72 (avg12.2m m)	16 (avg17.3 mm)	91

Discussion:

Various articles reviewed showed that the researchers had questioned the earlier belief that newborns don't have tears way back in early 1960's. Leonard et al, [1] in 1964 documented that tears are present in newborn babies.

Table no. 5- Comparison between tear productions

	0-10 mm	10-15 mm	> 15 mm	Chi square test	P value
Pre term babies	5	100	8	3.22	0.199 (NS) P>0.05 (Non-Significance at 0.05)
Term babies	13	335	52		
Male babies	11	170	35	20.01	<0.005 (S) P<0.05 (Significance at 0.05)
Female babies	7	265	15		
LSCS	6	254	27	4.64	0.0983P> 0.05 (Non-Significance at 0.05)
NVD	12	181	23		

LSCS- Lower segment cesarean section, NVD- Normal vaginal delivery

Subsequent studies measured the average tear production in term and preterm babies. Toker E et al, [3] observed that mean total tear production was 16.3 (+/- 3.6) mm in term and 7.4 (+/- 3.2) mm in preterm infants. Total tear secretion significantly correlated with birth weight and post conception age and that the total tear secretion significantly increased in post natal period. Our study also did not show any statistically significant difference in tear secretion in term babies as compared to preterm babies. Our study did not measure the term production according to the birth weight of the babies

S J Isenberg et al, [4] observed that basal tear secretion was 6.2 (+/-) 4.5) mm in preterm and 9.2 (+/- 4.3) mm in term infants. Reflex tear secretion was 7.4 (+/-4.8) mm in preterm and 13.2 (+/- 6.5) mm in term infants and also increased with increasing weight for all newborn babies. Preterm infants had reduced reflex and basal tear secretion. These finding were different from our findings as regards to reflex tear production. There was no significant difference in tear production in preterm and term babies.

Similarly Yusuf Akar et al, [5] observed that mean basal tear secretion was 4.8 (+/- 4.1) mm and 8.8 (+/- 3.2) mm in preterm and term babies respectively. Reflex tear production was 6.1 (+/- 3.9) mm in preterm and 10.3 (+/- 4.4) mm in term infants. They found no gender differences in the tear production. In our study there was a statically significant difference in reflex tear production with more tear production in males as compared to female babies.

Rohatgi J et al, [6] studied both eyes of 102 full-term normal neonates. They were prospectively evaluated for tear secretions by serial recording of the Schirmer I test (total tear secretions), Basal Secretion Test, and Schirmer II test (emotional tears) was done, the first one being within 6 hours of birth. All the tests were repeated in each infant until normal adult values for each test were obtained. Theaverage values of the Schirmer I test, Basal Secretion Test and Schirmer II test at birth were 23.2 (+/- 3.96) mm, 6.2 (+/- 2.15) mm and 19.2 (+/- 4.94) mm, respectively.

Beden et al, [7] assessed the quality and quantity of tears among premature and term newborns (23 terms and 23 preterm babies). Mean total, basal and reflex Schirmer's test results were 13.5 mm, 6.7 mm and 6.8 mm, on the right and 14.0 mm, 7.1 mm and 6.9 mm on the left eye, respectively. Median ferning score was 2 (range 1-3) bilaterally. Results of our study differed from other studies that there was a significant difference in tear production when both sexes were compared but there was no difference between term and preterm babies tear production. We did not study the ferning pattern. See table no. 5 and 6 .

Conclusion:

Present study done reconfirms that tears are present in newborn babies. There was no difference between tear production in preterm and term babies but there was significant difference among both sexes in terms of tears production. Males had more tear production as compared to females. There was no difference in tear production when mode of delivery was compared.

Limitation of the present study

1. Being a prospective study, the variables were mode of delivery, sex and gestational age, it was incidental that there were more number of females babies born by LSCS during the study period. Hence the comparison of presence of tears amongst the two sexes had a discordant number in each group.

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