



PREVALENCE OF PHOTOTHERAPY INDUCED HYPOCALCEMIA IN TERM NEONATES IN EASTERN BIHAR

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KEYWORDS :

Hyperbilirubinemia is a very commonly prevalent benign clinical condition in term neonates in the first two weeks of life. Although most term neonates with jaundice are healthy but they make us anxious because excess of bilirubin is toxic to the central nervous system. Phototherapy is used routinely for the treatment and prevention of neonatal hyperbilirubinemia^[1]. Phototherapy is a non invasive and relatively cheaper modality which is easily available and effective in degrading unconjugated bilirubin. Phototherapy may lead to complications including skin rash, diarrhea, hyperthermia, chills, dehydration, DNA damage to lymphocytes, retinal degeneration, bronze baby syndrome especially in cholestatic jaundice and PDA opening in LBWs and Hypocalcemia^[2].

A cross sectional study was performed on 294 icteric neonates managed with phototherapy in Jawahar Lal Nehru Medical College Hospital in Bhagalpur from 2017 to 2018. Phototherapy was provided with four blue light fluorescent lamps (Phillips) placed at 20 cm distance from newborns. Neonates with any underlying disease or risk factors of hypocalcemia were excluded. Serum calcium and bilirubin were measured on arrival and 48 hours after phototherapy. We considered hypocalcemia as a total serum calcium of <8 mg/dl. Demographic data, bilirubin and calcium levels were recorded and analyzed by ANOVA, and Chi-square tests. *P* value <0.05 was considered as significant. The study was approved by Ethics Committee of Post Graduate Department Of Pediatrics, JLNMCH Bhagalpur, Bihar. A written informed consent was taken from one of the parents prior to enrollment after explaining the study.

The study was done on 294 term infants (146 females, 148 males). The mean±SD chronological age and time of jaundice appearance was 7±4 days and 4±3 days respectively. The mean±SD weight was 2768±340 gram and mean±SD serum bilirubin level was 17.4±4.6 mg/dl in admission.

The mean±SD serum calcium level in admission and 48 hours after phototherapy were 9.5±0.9 and 9.2±0.6 mg/dl respectively (Table 1). One hundred sixty five (56%) babies had decrease in serum calcium level. Only twenty (7%) newborns (4.2% females, 10.4% males) developed hypocalcemia after 48 hours of phototherapy. There was a significant difference between serum calcium level before and after phototherapy (*P*=0.03).

Serum Ca changes	Sex	Mean (SD)	Range
	Total	9.7 (0.9)	8-11.8
Serum Ca before phototherapy (mg/dl)	Female	9.6 (0.8)	8.1-11.4
	Male	9.9 (0.8)	8.2-12.4
Serum Ca after phototherapy (mg/dl)	Total	9.5 (0.9)	7.3-11.4
	Female	9.4 (0.9)	7.9-11.3
	Male	9.5 (1)	7-11.4

SD: standard Deviation

Phototherapy^[3] with blue light is widely used in clinical practice. Hakinson^[4] and Hunter^[5] hypothesized that phototherapy inhibits pineal secretion of melatonin which blocks the effect of cortisol on bone calcium. So cortisol increases bone uptake of calcium and induces hypocalcaemia. Kim^[6] suggested decreased secretion of parathormone as the cause of hypocalcemia. Zecca et al also found that vitamin { 25(OH)D3 } is ineffective in the prevention of hypocalcemia

induced by phototherapy in neonates. In Hooman's study the urinary calcium excretion was significantly higher in phototherapy group^[7].

Yadav^[8] observed that 66% of term and 80% of preterms developed hypocalcemia after phototherapy. The prevalence of hypocalcemia in Jain's study^[9] was 30% in full term neonates and in Ehsanipoor's 15%^[10]. In our study 83 (56%) newborns had decline in serum calcium level, and only 7% had hypocalcaemia like Karamifar's study (8.7%)^[11]. In Jain's study the frequency of hypocalcemia was higher in patients with high level of serum bilirubin.

In Eghbalian's study, one of hypocalcemic newborns had apnea^[12]. In Yadav's study 80% of hypocalcemic term neonates became symptomatic, the most common sign was jitteriness^[8]. In Karamifar's study, none of the patients developed symptoms similar to our findings^[11].

In conclusion it is suggested that calcium level be assessed in newborns treated with phototherapy for 48 hrs or more and managed accordingly. Suggestions to possibly prevent development of hypocalcemia in phototherapy treated newborn include either giving them oral calcium as prophylaxis or covering their heads and occipital area using a special hat during phototherapy. It seems that prevalence of phototherapy associated hypocalcemia is not so high and we recommend further and larger studies for estimation of this prevalence rate.

REFERENCES

- Fanaroff A, Wlsh M. Neonatal-Perinatal Medicine, Diseases of the Fetus and Infant. 9th edn. Elsevier Mosby; 2010, pp. 1443-1481.
- Xiong T, Qu Y, Cambrier S, et al. The side effects of phototherapy for neonatal jaundice: What do we know? What should we do? Eur J Pediatr. 2011;170(10):1247-55. [PubMed]
- Vrman HJ, Wong RJ, Stevenson DK, Route RK, Reader SD, Fejer MM. Light-emitting diodes: a novel light source for phototherapy. Pediatr Res. 1998 Nov;44(5):804-94.
- Hunter KM. Hypocalcemia. In: Cloherty JP, Eichenwald CE, Stark AR, editors. Manual of Neonatal Care. 5th ed. Philadelphia: Lippincott Williams & Wilkins; 2004. pp. 579-88.
- Kim SH, Park JH. Effect of phototherapy on bone metabolism in newborn rats. J Korean Soc Neonatal. 2001;8(2):206-10.
- Hooman N, Honarpisheh A. The effect of phototherapy on urinary calcium excretion in newborns. Pediatr Nephrol. 2005;20(9):1363-4. [PubMed]
- Yadav RK, Sethi RS, Sethi AS. The evaluation of the effect of phototherapy on serum calcium level. People's. J Sci Res. 2012;5(2):1-4.
- Jain BK, Singh H, Singh D, et al. Phototherapy-induced hypocalcemia. Indian Pediatr. 1998;35(6):566-7. [PubMed]
- Ehsanipoor F, Khosravi N, Jalali S. The effect of hat on phototherapy induced hypocalcemia in icteric newborn. Razi J Med Sci. 2008;15(58):25-29. [In Persian]
- Karamifar H, Pishva N, Amirhakimi GH. Prevalence of phototherapy-induced hypocalcemia. Iran J Med Sci. 2002;27(4):166-8.
- Eghbalian F, Monsef A. Phototherapy-induced hypocalcemia in icteric newborn. Iran J Med Sci. 2002;27(4):169-71.