

Phototherapy-induced Hypocalcemia

Neonatal jaundice is a common clinical condition. There is a high prevalence of neonatal hyperbilirubinemia in our region which might be attributed to the high frequency of glucose-6-phosphate dehydrogenase (G6PD) enzyme deficiency.

Phototherapy is amongst common therapeutic modalities used in the treatment of uncomplicated neonatal jaundice. So far, several investigations have been conducted to determine the safety of phototherapy in the treatment of neonatal hyperbilirubinemia. Very soon, detrimental effects of phototherapy on eyes and genitalia have been shown. Nonetheless, no change in blood ions/metabolites has been reported except for calcium concentration; a drop in serum calcium has been noticed in patients undergoing phototherapy. This drop in serum calcium level, although statistically significant in most cases, has not been of clinical significance.

The underlying mechanism for phototherapy-induced hypocalcemia, although not yet well-understood, is known to involve changes in serum melatonin concentration which is regulated by the pineal gland. In normal human, pineal gland itself, however, is shown to be influenced by the diurnal light-dark cycle.

In this issue of the Journal, two groups of researchers have independently studied the phototherapy-induced hypocalcemia in neonatal jaundice.^{2,3} Both groups have used almost the same inclusion/exclusion criteria for selection of patients, implemented similar phototherapy equipments/schedule and not surprisingly, came to somewhat similar results; they have shown a decline in serum calcium which although statistically significant, was of little clinical importance over the study period.

Karamifar, et al,² in their study showed the higher sensitivity of premature neonates to phototherapy and reported a higher prevalence of hypocalcemia in premature than in full-term neonates. The level of hypocalcemia, again, though statistically significant, was not of clinical importance. Moreover, they have shown that serum calcium level, ultimately, returned back to normal within 24 hours of discontinuation of phototherapy.²

The reported prevalence of phototherapy-induced hypocalcemia in both premature and full-term neonates are significantly lower than the rates reported by other researchers. As Karamifar, et al, have pointed out, the reason for this discrepancy might be the color of the light they used for phototherapy, and also the color of skin of patients, among other things. Both research groups used blue light that has less effect than white light on the pineal gland, as shown by Gutcher, et al.⁴

Both studies suffer from several limitations and methodological flaws. The methodology used by Eghbalian, et al,³ was more sketchy and their results might be only treated as a preliminary report. Based on the current evidence, it seems that in phototherapy with blue light of those with uncomplicated neonatal jaundice no prophylactic measure for prevention of hypocalcemia is needed.

F. Habibzadeh, MD,

Deputy Editor,
IJMS

Z. Karamizadeh, MD,

Division of Endocrinology and Metabolism,
Department of Pediatrics,
Shiraz University of Medical Sciences

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