

Prevalence of Hypocalcemic Fits in Exclusively Breast Fed Infants

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ABSTRACT

Aim: To determine the prevalence of hypocalcemia fits in exclusively breast fed infants.

Study design: Prospective study.

Place and duration of study: Department of Paediatric Medicine, Abbas Institute of Medical Sciences/Medical College Muzafarabad AJ Kashmir from 01-04-2021 to 31-03-2022.

Methodology: One hundred breast fed infants were enrolled. A 0.5cc blood of child was withdrawn for conductance of serum calcium and 25(OH) vitamin D3 test while 2cc of mother blood was also withdrawn for analyzing their calcium levels as well as vitamin D status in duplicate batches. Radiological imaging through x ray image of wrist for detection of rickets was performed in each infant. Infants having complain of fits were specifically observed fit/seizure time duration of the fit, the time when it occurred, eye rotation and cyanosis condition. Any family history regarding epilepsy especially in mothers was also noted.

Results: The mean age of the infants was 5.5±2.3 months with a range of 1-12 months. Majority of the infants were male gender with a parentage of 66% while there were 34% female gender infants. Within the total number of infants included 30 children were having clinically defined rickets with 25 such infants who were having vitamin D level below the level of 20ng/ml.

Conclusion: There is a low prevalence of hypocalcemia fit among breast fed infants.

Keywords: Prevalence, Hypocalcemic fits, Breast fed infants.

INTRODUCTION

Fits or seizures can be a result of various conditions which excite neuronal cells. These transient states can be fever, electrolytic imbalances, infections of central nervous system like meningitis or infection causing encephalitis, head injury or ischemia¹. One of the reasons of fits can be electrolyte such as calcium imbalance. Hypocalcemia has been associated with a factor if seizures/fits in growing children. A balanced amount of calcium is essential for the brain critical functioning. This is combined with vitamin D balanced levels for proper brain homeostasis.

Hypocalcemia in specific defines as a condition where calcium intestinal absorption is not sufficiently completed. The reason for this is dietary insufficiency of calcium or and vitamin D in the body. Hypocalcemia patients suffers from alterations in their skeleton as well as secondary-hyperparathyroidism. In active hypocalcemia stage a coarse demineralization of bones is presented with corticular-distinction loss and other obvious physical changes². Severe conditions are attributed with pathological bone fracture²⁻⁵.

Vitamin D is prepared through the activation process utilizing sunlight rays below the skin layers. Vitamin D is stored in liver where it formulates its mature type, however the biologically active form if vitamin D is present in the kidney. Patients having darker screen required more sunlight exposure for preparation of vitamin D as melanin blocks the sun rays to enter the skin and activate the pre-vitamin D into vitamin D⁶⁻⁸. The present study was organized to determine the prevalence of hypocalcemia in infants who are completely fed through breast milk⁹⁻¹⁰. The results of this study will provide substantial data on the factors which can attribute into formation of hypocalcemia fits even in children who are fed by mother milk.

MATERIALS AND METHODS

This prospective study was conducted at Department of Paediatric Medicine, Abbas Institute of Medical Sciences/Medical College Muzafarabad AJ Kashmir and 100 breast fed infants were enrolled

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under clinical settings. Permission was granted by Ethical Committee. This study not only enrolled and collected data regarding infants but also it included data regarding the mother of each infant for proper assessment. An informed consent was taken from the mother of each infant for their and their child participation in the study. A 0.5cc blood of child was withdrawn for conductance of serum calcium and 25(OH) vitamin D3 test while 2cc of mother blood was also withdrawn for analyzing their calcium levels as well as vitamin D status in duplicate batches. Serum separation and storage was maintained under quality-controlled procedure where serum was kept after separation in -20 degree Celsius until analysis. Serum calcium was measured through calorimetric method using Human Diagnostic kits while Vitamin D was measured using Cal biotech kits based on Enzyme linked immune sorbent assay protocol. Calcium level <8mg/dl and 25(H) vitamin D3 <20ng/ml was considered as deficient. The clinical presentation, symptoms and history of each infant was recorded especially in context to hypocalcemia fits. Radiological imaging through x ray image of wrist for detection of rickets was performed in each infant. Infants having complain of fits were specifically observed fit/seizure time duration of the fit, the time when it occurred, eye rotation and cyanosis condition. Any family history regarding epilepsy especially in mothers was also noted. The data regarding age, gender and analytical data was recorded on a well structured proforma. Data was analyzed using SPSS-26.0.

RESULTS

The mean age of the infants was 5.5±2.3 months with a range of 1-12 months. Majority of the infants were male gender with a parentage of 66% while there were 34% female gender infants (Table 1).

Table 1: Age and gender distribution of infants (n=100)

Characteristic	No.	%
Age (months)		
1-4	22	22.0
5-8	46	46.0
9-12	32	32.0
Gender		
Male	66	66.0
Female	34	34.

Within the total number of infants included 30 children were having clinically defined rickets with 25 such infants who were having vitamin D level below the level of 20ng/ml. A significant number of mothers were suffering from vitamin D deficiency with almost all mothers of hypocalcemia infants to be themselves deficient in calcium levels as well (Table 2).

Table 2: Rickets and vitamin D status in infants and mother

Variable	Infants	Mothers	P value
Hypocalcemia	30 (30%)	40 (40%)	0.12
Vitamin D Status			
Greater than 30 ng/ml	65 (65%)	32 (32%)	0.045
20-30 ng/ml	10 (10%)	56 (56%)	0.033
Less than 20 ng/ml	25 (25%)	12 (12%)	0.012

There were nine such infants who presented with hypocalcemia fits/seizure. Infants presented with hypocalcemia fit often presented the condition after breast fed and sleeping with a random eye rotation during the seizure episode which only stayed for 2-3 minutes time. The mother of these infants was severely deficient in vitamin D (Figure 1).

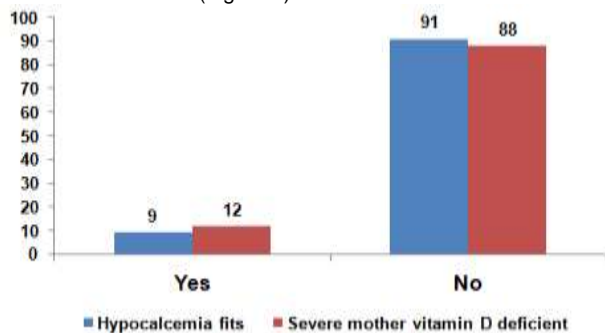


Figure 1: Prevalence of hypocalcemia fits among breast fed infants

The radiological examination of hypocalcemia infants also presented with rickets as shown on their wrist examination. The children suffering from hypocalcemia fit however presented with irregular metaphysis, increased epiphyseal plates width and absence of provisional calcification (Figure 2).



Figure 2: X-ray imaging showing rickets (A) irregular metaphysis, increased epiphyseal plates width (B) absence of provisional calcification in hypocalcemia fits.

DISCUSSION

Vitamin D as well as calcium deficiency continues to be a problem in various regions of the world specifically in countries which are either under developed or are in developing phases. The presence of hypocalcemia infants to the mothers with severe vitamin D as well as calcium deficiency raises many questions that how a mother living in a country near to equator and highly exposed to sun was severely deficiency in vitamin D and calcium. However still the prevalence of hypocalcemia fit is very low among the

vitamin D deficient mother infant population but requires mandatory attention and management¹¹⁻¹⁴.

The reason for persistent severe vitamin D deficiency could be the high melanin content in majority of the residing women as well as lack of sun exposure due to either religious boundaries or usage of sun protecting creams.¹⁵ The diet of these mothers is considered very poor and does not meet the gestational demands leading into hypocalcemia infants with calcium and vitamin D efficiency in them¹⁶⁻¹⁷.

Despite the fact that nine infants fed with breast milk developed hypocalcemia. The reason behind this was deficiencies in the mother diet and their sun exposure, which lead to very low calcium as well as vitamin D in them. These women's milk was not providing sufficient amount of vitamin and mineral required to protect against hypocalcemia leading into hypocalcemia fit/seizure. Similar results have been reported by various other studies¹⁸⁻²⁰.

CONCLUSION

There is a low prevalence of hypocalcemia fit among breast fed infants however the prevalence is still un-ignorable and requires proper management strategies.

Conflict of interest: Nil

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