

FREQUENCY OF HYPOPHOSPHATEMIA IN NG FED PATIENTS

Amanullah, Mohammad Usman khattak, Nazir shah, Mohammad Sohrab Khan, Rahamt Ali

ABSTRACT

Objective: To determine the frequency of hypophosphatemia among patients subjected to naso-gastric tube feeding.

Methodology: This study was conducted in the Department of Medicine Hayatabad Medical complex Hospital Peshawar from 09 Oct 2015 to 08 Apr 2016 through a descriptive cross sectional Study Design. A total of 174 patients were enrolled for the study, admitted in medical ward, requiring Nasogastric Feeding for nutrition, for at least 5 days. Hypophosphatemia was labeled when the phosphate level was below 2.4mg/dl on two or more than two occasions.

Results: The mean age of the patients in our sample was 49.51 + 15.0 years. Male gender contributed 105 (60.3%) of the sample while female gender contributed 69 (39.7%) of the sample. Hypophosphatemia was observed in 67 (38.5%) of patients.

Conclusion: A considerable number of patients' hypophosphatemia was noted. The higher risk with NG feeding may be due to the incretin effect from absorption of glucose. The low phosphate level may lead to life threatening complications.

Key Words: Hypophosphatemia, Frquency, Naso-Gastric Tube, Feeding.

INTRODUCTION

Medical nutrition therapy has changed substantially since Hippocrates first emphasized the importance of diet to human health in the fifth century BCE. The advent of modern medical nutrition therapy has its roots in the work of nutrition pioneers of the nineteenth and twentieth century. In the United States, the names of scientists Lusk, Chittenden, Mendel, McCollum, Atwater, Rose, Goldberger, Sherman, and Leverton stand out for their tremendous contributions to the basic science of nutrition¹.

Traditionally, nutritional support of critically ill patients has been considered a supportive measure of low priority. Advances in both human and veterinary medicine have demonstrated that nutritional support is an important therapeutic modality and can aid in the management of diseases². Indwelling feeding tube is the method of choice if enteral assisted feeding is necessary for more than two days. After an indwelling tube had been placed, feeding is easier and less stressful. Nasoesophageal, esophagostomy, gastrostomy, and jejunostomy feeding tubes are the most commonly used³.

It is imperative that the nutritional status of the patient be monitored vigilantly as caloric intake may need to be adjusted to prevent weight loss or unintended weight gain⁴. Liquid foods are of two basic types: 1) elemental or monomeric and 2) polymeric. Foods said to be "elemental" are not truly elemental, but contain nutrients in small hydrolyzed absorbable forms and are

best described as monomeric. Monomeric foods are indicated in disease conditions such as inflammatory bowel disease, lymphangiectasia, refeeding parvoviral enteritis and pancreatitis cases and any other condition in which a patient's digestive capabilities are questionable. Polymeric products contain mixtures of more complex nutrients. Protein is supplied in the form of large peptides (e.g., casein or whey). Carbohydrates are usually supplied as corn starch or syrup, and fats are provided by mediumchain triglycerides (MCT) or vegetable oil⁵⁻⁷.

Nutrition support clinicians refer to the abnormalities in laboratory data and changes in clinical signs and symptoms that follow refeeding of starved or malnourished patients as refeeding syndrome. Theoretical descriptions of refeeding syndrome include a complex and extensive list of changes, such as hypophosphatemia, hypomagnesemia, hypokalemia, hyponatremia, hypocalcemia, hyperglycemia, and vitamin deficiency—all of which are accompanied by clinical signs and symptoms⁸.

Phosphate is an integral component of the nucleic acids that form DNA and RNA. Phosphate bonds of adenosine triphosphate carry the energy required for all cellular functions (1). Hypophosphatemia is frequently observed in critically ill patients and it is related to increased mortality and morbidity^{5,7,9,10}. Depending on the severity of the hypophosphatemia, the patient may complain about muscle weakness and generalized weakness as mild symptoms, and it can even lead to respiratory failure and death. Typical causes of hypophosphatemia in critically ill patients are sepsis, postoperative state, trauma, fluid therapy, refeeding, acid-base disorders such as respiratory alkalosis and metabolic acidosis, medications such as glucose/insulin therapy, catecholamines, diuretics, and renal replacement therapy¹¹. In one study by Zeki S et al 33% of patients subjected to NG tube feeding developed

Department of Medicine MTI HMC Peshawar

Address for correspondence:

Dr. Amanullah

Associate Professor

Department of Medicine MTI HMC Peshawar

Cell: 0300-5907636

hypophosphatemia¹². In another study by Coskun R et al, hypophosphatemia was observed in 52.5% of patients who were on NG tube feeding¹³.

The present study is designed to determine the frequency of hypophosphatemia among patients who are on prolonged NG tube feeding. This area is totally neglected in our settings as regular follow up and electrolyte monitoring is not in practice at all. As mentioned above, patients are at risk for developing electrolyte disturbances once put on enteral feed especially if they are critically ill. The low phosphate level may lead to life threatening complications which can lead to respiratory failure and even death. This study will provide us with fresh local evidence of hypophosphatemia among our local patients on prolonged NG feeding and based upon results of this study, we can draw recommendations for future research and preventive strategies.

METHODOLOGY

This cross sectional study was performed in the

Table 1: Gender distribution of hypophosphatemia

Hypophosphatemia * Gender Distribution			
Hypophosphatemia	Gender Distribution		Total
	Male	Female	
Yes	31.4% (n=33)	49% (n=34)	38.5% (n=67)
No	68.6% (n=72)	51% (n=35)	61.5% (n=107)
Total	105	69	174

Table 2: Age stratification of the sample (n=174)

Valid	Frequency	Percent	Valid Percent	Cumulative Percent
18-25	17	9.8	9.8	9.8
26-35	19	10.9	10.9	20.7
36-45	27	15.5	15.5	36.2
46-55	40	23.0	23.0	59.2
56-65	43	24.7	24.7	83.9
66-75	28	16.1	16.1	100.0
Total	174	100.0	100.0	

Table 3: Hypophosphatemia in different age groups

Hypophosphatemia * Age stratification								
		18-25	26-35	36-45	46-55	56-65	66-75	Total
Hypophosphatemia	Yes	0%(n=0)	31.5% (n=6)	68% (n=11)	30% (n=12)	53.5% (n=23)	53.5% (n=15)	38.5% (n=67)
	No	17	13	16	28	20	13	107
Total		17	19	27	40	43	28	174

medical unit Hayatabad Medical complex Peshawar. The study duration was about 6 months (09 Oct 2015 to 08 Apr 2016). Patients were randomly selected from medical wards. Sample size was 174 keeping 33%12 proportion of hypophosphatemia among patients with NG tube feeding, 95% confidence interval and 7% margin of error using WHO sample size calculation formula. Patients between 18 to 75 years of age, of either gender, admitted in medical ward, requiring Nasogastric Feeding for nutrition, for at least 5 days were enrolled for this study. Patients needing NG tube for non nutritional purpose, patients with chronic kidney disease and with mal absorption were excluded from the study. A 10cc sample of blood was obtained from all the enrolled patients on 5th day of NG feeding to determine the serum phosphate level. All these investigations were done by single expert pathologist.

RESULTS

Total 174 patients were enrolled. Male gender contributed 105 (60.3%) of the sample while female gender contributed 69 (39.7%) of the sample. About thirty eight (38.5% n=67) were having hypophosphatemia. The frequency of hypophosphatemia regarding the gender was 31.4% (n=33) in the males and 49% (n=34) in the females. So the frequency of hypophosphatemia was more in the females as compared to males (Table 1). Stratification according to the age of the enrolled patients (Table 02) revealed different frequencies of hypophosphatemia in different age groups (Table 3).

DISCUSSION

Nutrition support clinicians refer to the abnormalities in laboratory data and changes in clinical signs and symptoms that follow refeeding of starved or malnourished patients as refeeding syndrome. Theoretical descriptions of refeeding syndrome include a complex and extensive list of changes, such as hypophosphatemia, hypomagnesemia, hypokalemia, hyponatremia, hypocalcemia, hyperglycemia, and vitamin deficiency all of which are accompanied by clinical signs and symptoms. In practice, clinicians see asymptomatic refeeding hypophosphatemia more often than a full-blown syndrome with multiple laboratory and clinical abnormalities. Confusion results because there is no widely accepted or uniformly applied set of defining characteristics for diagnosing refeeding syndrome. To gain insight into the clinical characteristics of refeeding

syndrome described in the literature, a systematic review of reported cases and case series was conducted. Since 2000, 20 authors described 27 cases that contained sufficient data for review. Hypophosphatemia occurred in 26 patients (96%). While 19 patients (71%) experienced at least 1 other laboratory abnormality, only 14 (51%) exhibited a consistent pattern of abnormally low phosphorus and magnesium levels. Seven patients had hypocalcemia (26%), and hyponatremia was reported in 3 patients (11%). There were no reports of hyperglycemia⁵⁷. Our study reported 38.5% frequency of hypophosphatemia in the NG fed patients for at least 5 days. Since the patients in our study were not necessarily malnourished, therefore the data received was not properly of that refeeding syndrome and so the difference in the frequency of hypophosphatemia. Mean data reported in case series containing data from 63 patients showed that hypophosphatemia was a consistent finding but that other abnormalities were not consistently identified. Findings suggest that refeeding hypophosphatemia is not accompanied by a consistent pattern of biochemical or clinical abnormalities among case reports or case series of patients reported to have refeeding syndrome.⁵⁷

Mortality after NGT feeding initiation was high, mainly due to infectious complications. However, in a considerable number of patients hypophosphatemia was noted, suggesting that refeeding syndrome could be a contributory factor of mortality. Since this is a treatable condition, more attention should be paid to detecting and coping with this problem.⁵⁸

CONCLUSION

A considerable number of patients' hypophosphatemia was noted. The higher risk with NG feeding may be due to the incretin effect from absorption of glucose. The low phosphate level may lead to life threatening complications. The author therefore recommends regular monitoring of all the NG fed patients for prolonged time. Regular biochemistry of the patients is mandatory.

REFERENCES

1. Banerjee B. (Ed.). (2010). *Nutritional Management of Digestive Disorders*. CRC Press. Available at: http://books.google.com.pk/books?hl=en&lr=&id=P2aho2w2YdsC&oi=fnd&pg=PP1&dq=nutritional+management+of+digestive+disorders&ots=prNbFJ1KHm&sig=BWlvNhf_cgbAdD-877IbH7zov50A#v=onepage&q=nutritional%20management%20of%20digestive%20disorders&f=false.
2. Burns KM. Nutrition in Critical Care Patients. In Atlantic Coast Veterinary Conference (October 14-17, 2013). Acvc. Available at: [- tion%20in%20CC%20patients%20Ms.%20Burns.pdf
 3. Thomovsky E. Parenteral nutrition: formulation, monitoring, and complications. *Compend Contin Educ Vet.* 2008;29:88-102.
 4. McClave SA, Martindale RG, Vanek VW, McCarthy M, Roberts P, Taylor B, et al. Guidelines for the provision and assessment of nutrition support therapy in the adult critically ill Patient: society of critical Care Medicine and American Society for Parenteral and Enteral Nutrition. *JPEN.* 2009; 33:277–316.
 5. Patel U, Sriram K. Acute respiratory failure due to refeeding syndrome and hypophosphatemia induced by hypocaloric enteral nutrition. *Nutrition.* 2009;25:364–7.
 6. Benjamin J, Singh N, Makharia GK. Enteral nutrition for severe malnutrition in chronic intestinal pseudo-obstruction. *Nutrition.* 2010;26:502–5.
 7. Fu JH, Zang B. The occurrence of hypophosphatemia and its prognostic value in intensive care unit patients. *Zhongguo Wei Zhong Bing Ji Jiu Yi Xue.* 2012;24:29–32.
 8. Skipper A. Refeeding syndrome or refeeding hypophosphatemia: A systematic review of cases. *Nutrition Clin Pract.* 2011;27\(1\):34-40.
 9. Hoffmann M, Zemlin AE, Meyer WP, Erasmus RT. Hypophosphataemia at a large academic hospital in South Africa. *J Clin Pathol.* 2008;61:1104–7.
 10. Vignaud M, Constantin JM, Ruivard M, Villemeire-Plane M, Futier E, Bazin JE, et al. Refeeding syndrome influences outcome of anorexia nervosa patients in intensive care unit: an observational study. *Crit Care.* 2010;14:R172.
 11. Geerse DA, Bindels AJ, Kuiper MA, Roos AN, Spronk PE, Schultz MJ. Treatment of hypophosphatemia in the intensive care unit: a review. *Crit Care.* 2010;14:R147.
 12. Zeki S, Culkin A, Gabe SM, Nightingale JM. Refeeding hypophosphataemia is more common in enteral than parenteral feeding in adult in patients. *Clinical Nutrition.* 2011;30:365-8.
 13. Coskun R, Gündoğan K, Baldane S, Güven M, Sungur M. Refeeding hypophosphatemia: a potentially fatal danger in the intensive care unit. *Turk J Med Sci.* 2014;44:369-74.
 14. A Skipper, Refeeding syndrome or refeeding hypophosphatemia, *Nutrition in Clinical Practice* \(2012\) 27 \(1\): 34-40
 15. Lubart E1, Leibovitz A, Dror Y, Katz E, Segal R. Mortality after nasogastric tube feeding initiation in long-term care elderly with oropharyngeal dysphagia--the contribution of refeeding syndrome. *Gerontology.* 2009;55\(4\):393-7. doi: 10.1159/000218162. Epub 2009 May 7.](http://c.ymcdn.com/sites/www.invma.org/resource/resmgr/imported/Nutri-

</div>
<div data-bbox=)