ORIGINAL RESEARCH PAPER

Pulmonary Medicine

A STUDY OF SERUM SODIUM, POTASSIUM, CHLORIDE ABNORMALITIES IN CHRONIC STABLE ASTHMATIC PATIENTS

KEY WORDS: Asthama, Hyponatremia & Hypokalemia

Prashant R Gohil Associate Professor, Pulmonary medicine, C.U.Shah Medical College, Surendranagar, Gujarat

Mahendrasinh Parmar* Resident, Pulmonary medicine, C.U.Shah Medical College, Surendranagar, Gujarat *Corresponding Author

Akash Korvadiya Resident, Pulmonary medicine, C.U.Shah Medical College, Surendranagar, Gujarat

Pooja Patel Resident, Pulmonary medicine, C.U.Shah Medical College, Surendranagar, Gujarat

Jasu N Patel Professor, Pulmonary medicine, C.U.Shah Medical College, Surendranagar, Gujarat

ABSTRACT

Introduction: Abnormal electrolyte concentrations i.e. Hypokalemia, hyponatremia, and hypocalcemia are reported in asthmatic patients which is attributed secondary to use of ß -agonists and aminophylline therapy. Bodenhamer J et al carried out a study to evaluated use of nebulized beta-agonists for asthma and its effects on serum electrolytes and reported that Aggressive administration of nebulized salbutamol during the emergency treatment of acute bronchospasm is associated with statistically significant decreases in serum potassium, sodium, and magnesium level. Hence, present study was undertaken to evaluate the serum electrolyte concentration disturbances among chronic stable asthmatic patients.

Methodology: The present prospective study was undertaken among 50 stable asthmatic patients taken from outpatient Department of Pulmonary Medicine, C.U.Shah medical college & Hospital, Surendranagar, Gujarat. All patients were subjected to detailed history & most common electrolyte disturbance in our study. Henceforth, serum electrolytes should be checked during admission of the patient.

Result: In this study electrolyte disturbance observed in most commonly in 14 to 23yr old patient with female predominance and also hypokalemia is most comman followed by hyponatremia.

Conclusion: In conclusion, electrolyte disturbances are common in asthma. Hypokalemia and hyponatremia were found to be the most common electrolyte disturbances in our study. Henceforth, serum electrolytes should be checked during admission of the patient.

INTRODUCTION

Long standing inflammatory condition of the airways is commonly known as asthma which affects people of all ages. It exerts a sizeable burden on the patients, their families, and the community due to the complementary action between factors that affect at molecular level and the external soundings [1]. The most commonly quoted hostile factors are airborne pollutants which can be indoor or outdoor, high salt intake, indoor allergens, drugs and vaccines. [2] Respiratory symptoms are characterized with severe attacks that require immediate first aid, if not can lead to death. The burden of asthma is enormous, about 300 million people are currently suffering from asthma worldwide, and about 30 million are living in India. Asthma is associated with limitations in day to day activities, absence from school and work days, impairment of lung function, quality of life is reduced, and an unfavourable socioeconomic burden. About 3-38% in children and 2-12% in adults, is currently estimated to be the prevalence of asthma, which is one of the commonest chronic disorder among children. An Indian Study put the prevalence of asthma in India to be around 2.05% among those aged >15 years, with an approximate national burden of 18 million asthmatics. A large number of asthma patients are over confident about their control level. Exacerbations (67%) have been reported by Indian asthmatics, with a good amount of functional and emotional limitations. This on the whole shows how poorly asthma is controlled and reflects how inadequately treatment is taken up by the patients. The use of bronchodilators, inhaled corticosteroids, and influenza vaccinations is seen in low-income countries like India. [3]

Acidosis and hypoxemia can result due to the use of beta-adrenoceptor agonists and other sympathomimetic bronchodilators, during treatment of asthma, which can increase the risk of cardiac arrhythmias. It is commonly seen that a derangement exists in the serum potassium levels in asthmatic patients undergoing beta 2- agonist therapy. The first electrolyte that was found to be deranged and subsequently reported in cases of acute asthma was Hypokalemia and was due to beta 2-agonists and aminophylline therapy. [4,5] The long-term implications of using beta 2 -agonists are tremors, tachycardia, palpitation, and anxiety which are commonly seen. Later, asthmatic patients treated with beta 2 agonist were also been reported with hypnatremia, & hypophosphatemia. [6,7]

METHODOLOGY

The study was carried out at Department of Pulmonary Medicine, C.U. SHAH MEDICAL COLLEGE, Surendranagar after Institutional Ethics committee approval with proper informed consent of the patient. Patients of all ages & either sex were selected randomly from patients admitted in ward & attended at OPD. Baseline data including age, gender, occupation, detailed medical history including number of symptoms per week and number of nocturnal symptoms per month, clinical examinations and relevant investigations were included as part of the methodology. The present prospective study was undertaken among 50 chromic stable asthmatic patients taken from outpatient within 14 to 60 years age group. The following parameters were collected: age, gender, religion, blood pressure and chemistry parameters. Blood samples was collected in clot activated tube from each

participant then The serum samples were then used to determine the concentrations of Sodium, Potassium, & chloride.

RESULTS

Table 1: Age distributions

Age Group	No. of patients	Percentage
14 to 23	28	56%
24 to 33	13	26%
34 to 43	07	14%
>43	02	04 %

In our study most commonly affected age group is 14 to 23 (56%) followed by 24 to 33 (26%).

Table: 2 Sex distributions

Gender	No. of patients	Percentage
Male	16	32 %
Female	34	68 %

There is female predominance is our observation.

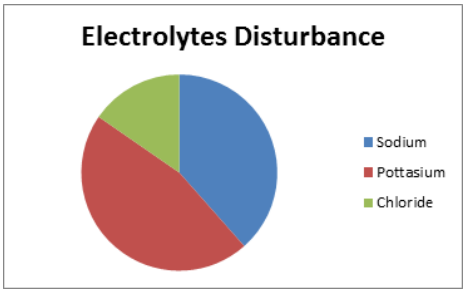
Table 3: Mean value of Spirometry findings

FEV1/FVC ratio %	65.08 ± 8.09
FEVI %	74.88 ± 4.11
PEFR %	78.92 ± 6.39
FEF 25-75%	66.16 ± 5.23

Table 4: Electrolytes disturbances

Electrolytes disturbances	No. of patient
Hyponatremia	25
Hypokalemia	30
Hypochloremia	10

In this study most commonly electrolytes which is disturbed is potassium (Hypokalemia seen in 30 patient) followed by Sodium (Hyponatremia seen in 25 patient).



DISCUSSION:

The present study found that Hypokalemia and hyponatremia were found to be the most common electrolyte disturbances among chronic stable asthmatic patients. Alamoudi OSB et al found electrolyte disturbances in 43% of the patients [8] amoung this 85% of the patients had one electrolyte disturbance, 10% had two electrolyte disturbances, and 5% had three electrolyte disturbances. In our study the highest proportions were for pottasium followed by sodium and the lowest proportions is for chloride for electrolyte disturbance. In this study mean of FEV1/FVC is 65.08 ± 8.09 & mean of FEV1 is 74.88 ± 4.11.

CONCLUSION

In conclusion, electrolyte disturbances are common in asthma. Hypokalemia and hyponatremia were found to be the most common electrolyte disturbances in our study. Henceforth, serum electrolytes should be checked during admission of the patient. Therapeutic agents used to treat patients with bronchial asthma have a role on abnormal electrolyte levels.

REFERENCES

1. Global Initiative for Asthma. Global Strategy for Asthma Management and Prevention. [Last accessed on 2015 Mar 15]. Available from: http://www.ginasthma.org/uploads/users/files/GINA Report 2014.pdf.
2. Gupta KB, Verma M. Nutrition and asthma. Lung India. 2007; 24(3): 105-14
3. Gnatiuc L, Buist AS, Kato B, Janson C, Aït-Khaled N, Nielsen R, et al. BOLD tors Collaboration. Gaps in using bronchodilainhaled corticosteroids and influenza vaccine among 23 high- and low-income sites. Int J Tuberc Lung Dis. 2015; 19:21 30.
4. Jindal SK, Aggarwal AN, Gupta D, Agarwal R, Kumar R, Kaur T, et al. Indian study on epidemiology of asthma, respiratory symptoms and chronic bronchitis in adults (INSEARCH) Int J Tuberc Lung Dis. 2012; 16:1270 7.
5. Thompson PJ, Salvi S, Lin J, Cho YJ, Eng P, Abdul Manap R, et al. Insights, attitudes and perceptions about asthma and its treatment: Findings from a multinational survey of patients from 8 Asia-Pacific countries and Hong Kong. Respirology. 2013; 18:957 67.
6. Kung M, White JR, Burki NK. The effect of subcutaneously administered terbutaline on serum potassium in asymptomatic adult asthmatics. American Review of Respiratory Diseases 1985; 129: 329-32.
7. Whyte KF, Reid C, and Addis GJ et al. Salbutamol induced hypokalemia: the effect of theophylline alone and in combination with adrenaline. British Journal of Clinical Pharmacology. 1988; 25: 571-8.
8. Alamoudi OSB. Electrolyte disturbances in patients with chronic, stable asthma. Chest. 2001; 120:431-6.