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Original Article

A Study of Electrocardiographic Changes Among the Patients of Bronchial Asthma

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Abstract

Background: Bronchial asthma isone of the major health problems and causes of chronic morbidity and mortality in Bangladesh as well as worldwide. ECG was performed to observe changes among the patients of bronchial asthma.

Objectives: To observe ECG changes among the patients ofbronchial Asthma.

Methods: It was a cross-sectional observational study carried out in the Department of Medicine, Rajshahi Medical College Hospital, Rajshahi from July, 2010 to June, 2012. According to inclusion and exclusion criteria 73 people having bronchial asthma were selected. Thorough history, physical examination and spirometric along with ECG assessment were done.

Results: In case of bronchial asthma, 03(4.11%) cases showed ECG changes and 70 (95.89%) cases showed normal ECG.

Conclusion: In this study, ECG changes were 4.11% in bronchial asthma patients.

Keywords: Bronchial Asthma, ECG

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Introduction

Our lungs are affected by multiple disorders such as Obstructive lung diseases e.g. COPD and Bronchial Asthma. These diseases are the major health problems and cause of chronic morbidity and mortality in Bangladesh as well as worldwide [Burden of Obstructive Lung Diseases in Bangladesh (BOLD-BD), October-2010].

Asthma is a chronic inflammatory disease of lung. Small and medium air ways typical symptoms (cough, wheezing, breathlessness, chest tightness) and air ways narrowing that are partially or completely reversible either spontaneously or by treatment associated with increased air ways responsiveness to a variety of stimuli (Bangladesh Lung Health Manual, 2009).

Asthma is a serious respiratory problem affecting 300 millions of people throughout the world. According to First National Asthma Prevalence study (NAPS), 1999, in Bangladesh about 7 million people (5.2% of the population) are suffering from current asthma (i.e. at least three episodes of asthma attack in last 12 months (Bangladesh Lung Health Manual, 2009).

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For asthma in addition to spirometry 2 peak expiratory flow, ECG and Echocardiography can be done to see changes (Bangladesh lung health manual, 2009).

Material and Methods

Type of study: It was a cross-sectional observational study.

Place of study: Department of Medicine, indoor and outdoor, Rajshahi Medical College Hospital, Rajshahi.

Period of study: 02 years (July,2010 to June, 2012)

Study population: All Bronchial Asthma patients fulfilling the inclusion and exclusion criteria as cases.

Sample size: Sample size was 73 cases having bronchial asthma. In case of bronchial asthma prevalence in Bangladesh = 5.2%

Results

This study was intended to observe the electrocardiographic changes among the patients ofbronchial Asthma. To achieve this goal, a total 73bronchial asthma patients aged 40-70 years were included in this study. The patients were free from diseases other than bronchial asthma. The cases had under gone through complete history taking, physical examination and spirometric examination. Spirometry was done firstly without using bronchodilator inhalation in all the cases and those who showed obstruction, they were also under gone through post bronchodilator spirometry to confirm irreversible obstruction i.e. COPD (FEV_1<15%) and post bronchodilator spirometry if FEV_1 increases ≥15%, it was treated as bronchial asthma. Then staging of bronchial asthma was done according to National Guidelines Asthma's Criteria (2010).

Then ECG weredone among the asthma cases to observe changes among them.

Table-1: Age distribution of the study population

Age group (yrs.)	Asthma (n=73)	
	N	%
40-50	27	36.99
51-60	31	42.47
61-70	15	20.55
Total	73	100

Maximum age group of bronchial asthma were between 51-60 years, number of subjects were 31(42.47%).

Minimum age group of asthma were between 61-70 years, number of subject were 15(20.55%).

Table-2: Sex distribution of the study population

Sex	Asthma (n=73)	
	N	%
Male	40	54.79
Female	33	45.21
Total	73	100

40 (54.79%) cases were male and 33 (45.21%) case were female out of 73 cases.

Table-3: Occupation distribution among cases of Asthma

Occupation	Asthma (n=73)	
	No.	Percentage
Farmer	25	34.25
Businessman	13	17.8
Service	11	15.07
Housewife	24	32.87
Total	73	100

Maximum of the cases of asthma were farmers 25(34.25%) out of 73 were farmer.

Minimum cases of asthma were service holder 11(15.7%).

Table-4: Axis deviation in ECG among cases of Asthma

Axis	Asthma (n=73)	
	No.	Percentage
Normal	71	97.3
Right axis deviation (RAD)	02	2.7
Left axis deviation (LAD)	00	00
Total	73	100

71(97.3%) had normal axis, 02(2.7%) had right axis deviation.

Table-5: P-wave changes in ECG among the cases of Asthma

P-wave changes	Asthma (n=73)	
	No.	Percentage
Normal	70	95.89
Pulmonale	03	4.11
Biphasic	00	00
Multiform	00	00
Total	73	100

P-pulmonale: P wave was more than 2.5 mm tall.
P-wave were normal 70(95.89%) and p-wave were changed i.e. p-pulmonale 03(4.11%) out of 73 cases.

Table-6: QRS changes in ECG among the cases of Asthma

QRS complex	Asthma (n=73)	
	No.	Percentage
Normal	70	95.89
RVH	03	4.11
LVH	00	00
BVH	00	00
Total	73	100

RVH: Tall R wave in V_1>7mm (also deep S in V_5 or V_6).

LVH: S in V_1 + R in V_6 or V_5> 35 mm (SV_1 + RV_6> 35 mm).
BVH : Finding of RVH and LVH as described above.
70(95.89%) were normal QRS complex and 03(4.11%) showed right ventricular hypertrophy out of 73 cases.

Table-7: Changes of Heart rate in ECG

ECG	Asthma (n=73)	
	No.	%
Normal (60-100)/min	30	41.10
Sinus tachycardia (>100)/min	43	58.90
Total	73	100

30(41.10%) were normal and 43(58.90%) showed Sinus tachycardiaout of 73 asthma cases.

Table-8: Total No. of normal and ECG change among the cases of Asthma

ECG	Asthma (n=73)	
	No.	%
Normal	70	95.89
Change	03	4.11
Total	73	100

70(95.89%) were normal ECG and 03(4.11%) showed ECG changes out of 73 asthma cases.

Discussion

Bronchial asthma is an obstructive pulmonary disease. The disease is a major health problem and cause chronic morbidity and mortality in Bangladesh as well as worldwide.

In our study, maximum age group of asthma were between 51-60 years, number of subjects were 31(42.47%). Minimum age group of the cases were between 61-70 years, number of subjects were 15(20.55%).

In our study, 40 (54.79%) cases were male and 33 (45.21%) cases were female out of 73 cases.

According to GOLD (Global Initiative for Chronic Obstructive Lung Disease) in its Global Strategy for diagnosis, management and prevention executive summary, update 2009, the risk of developing asthma is inversely related to socioeconomic status i.e. it occurs more in illiterate and primary (75.3%), farmers (34.25%) and low income group earning <3000 Tk/month (52.1%).

Duration of illness, 31.51% were <5 years, 23.29% were within 6-10 years, 10.96% were 11-15 years, 12.33% were within 16-20 years and 21.92% were >21 years.

According to a study conducted in Bangladesh on Burden of Obstructive. Lung Diseases in Bangladeshi, patients involved by asthmaare 40-50 years (31.51%). For the age group 51-60 years involvement was 42.47% and for 61-70 years it was 20.55%.

Spirometric classification of asthma based on National Guidelines Asthma was 2.7% mild, 66.3% moderate, 34.2% severe and 2.7% life threatening.

On the other hand Costa JL Da et al (1974) showed in their study in Singapore in case of asthma sinus tachycardia was invariable observed, 11.11% were right axis deviation (RAD) 38.89% were peaked p-wave.

In our study 41.10% asthma cases were having normal heart rate while 58.90% were having sinus tachycardia, 2.7% cases were right axis deviation (RAD), 4.11% were peaked p-wave.

In case of bronchial asthma, study population were 73. In our study 70(95.89%) showed normal ECG and 03(4.11%) showed ECG changes.

Conclusion

In this study, ECG changes were 4.11% in bronchial asthma patients. So while treating asthmapatients physician should be aware of the cardiac condition also.

Bibliography

- Agarwal R.L., Kumar Dinesh, Gurpreet, Agarwal D.K., Chabra G.S. (2008). Diagnostic values of electrocardiogram in chronic obstructive pulmonary disease. Lung India, 25: Pp 78-81.
- Anton Von K-Moordegraaf, J. Tim Marcus, SebastiaanHolverda, Bea Roseboom, Pieter E. Postmus. CHEST June 2005, vol. 127, no.6, 1898-1903. Available from http:// www. chestjournal. chestpubs.org.
- Bangladesh Lung Health Manual, Published by Bangladesh Lung Foundation, October 2009, vol-01, p.iii.
- Bangladesh Lung Health Manuals, Published by Bangladesh Lung Foundation, October 2009, vol-01, p-01.
- Bangladesh Lung Health Manuals, Published by Bangladesh Lung Foundation, October 2009, vol-01, p-13.
- Bangladesh Lung Health Manuals, Published by Bangladesh Lung Foundation, October 2010, vo-02, p-05.
- Bangladesh Lung Health Manuals, Published by Bangladesh Lung Foundation, October 2010, vo-02, p-06.
- Bousquet J, Clark T.J.H, Hurd S, Khaltaev N, Lenfant C, Byrne P, Sheffer A. (2007). Review article-GINA guide lines on asthma and beyond. The Authers, Journal compilation 2007 Black welManksgaard.
- Burden of Obstructive Lung Disease in Bangladesh (BOLD-BD) conducted by Bangladesh Lung Foundation, October-2010, p-05.
- Costa J.L.Da, Chia B.L (1974). The Electrocardiographic changes in bronchial Asthma and their relationship to the severity of airways obstruction. Singapore Medical Journal, vol-15, No. 2, p-101.
- Drazen JM (2007). Respiratory diseases. In: Goldman Lee, Ausiello Dennis. Cecil Medicine, 23rd edition, vol-I. Saunders Elsevier, p.619.
- Frew AJ and Holgate ST (2009). Respiratory disease. In: Professor Parveen Kumar, Dr. Michael Clark. Kumar and Clark's Clinical Medicine, 7th edition, Spain: SAUNDERS ELSEVIER, p-835.
- Global Initiative for Chronic Obstructive Lung Disease executive Summary, update 2009. Globan Strategy for Diagnosis, management and prevention of COPD, Available from http:// www. goldcopd.org 2009.
- Gupta NK, Agarwal PK, Srivastav AB, Ved ML (2011). Echocardiographic evaluation of heart in COPD patient and its co-relation with severity of disease, Lung India, 28(2): Pp 105-109.
- Incalzi Raffacle Antonelli, Fuso Leonello, Rosa Marino De, Napoli Anteo Di, Basso Salvatore, Pagliari Gabriella, Pistelli Riccardo (1999).

Electrocardiographic Signs of Chronic CorPulmonale-A Negative Prognostic Finding in Chronic Obstructive Pulmonary Disease. Circulation. 99: Pp 1600-1605. Also available at http://ww.cireulationnaha.org.

- John J. Reilly Jr., Edwin K. Silverman, Steven D. Shapiro (2008). Chronic obstructive pulmonary disease. In: Fauci AS, Braunwald E, Kasper DL, Loscalzo J. Harrison's Principles of Internal Medicine. 17th edition, vol-II, McGraw Hill: Medical Publication Division, New York, p. 1635.
- Longmore, Wilkinson, Davidson, Foulkes, Mafi (2010). Oxford Clinical Medicine, 8th. edition, Oxford University Press, p.176.
- Lyzohub VH, Altunina NV, Voloshyna O, Bondarchuk OM (2007). Changes of electrography parameters in patient with bronchial Asthma. LikSprava. (8): Pp 20-30.
- Mark S. Chesnutt, Alex H, Gifford, Thomas J, Prendergast (2010). Pulmonary disorders. In: Lawrence M. Tierney, Jr. Stephen J. McPhee, Maxine A. Papadakis. Current Medical Diagnosis and Treatment. 49th edition, McGraw Hill Medical Lange. p-234.
- Menezes AM, Perez-Padilla R, Jardim JR, Maino. A, Lopez MV, Valdivin G, Montesde Oca M, Talamo C, Hallal PC, Victora CG (2005). Chronic Obstructive Pulmonary disease in five Latin American cities. (The PLANT NO study): a prevalence study lancet, 366: Pp 1875-1881.
- Nayak SK, Dash AK, Pandhi PK, Barik BK, Das P (2008). VSS Medical College, Electrocardiographic and Echocardiographic profile of COPD patients, Pulmonalogy, 01: p-01.
- Pearson Mike, Ayres Jon G, Sarno Maria, Massey Dan, Price David (2006). Diagnosis of airways obstruction in primary care in the UK: the CADRE (COPD and Asthma Diagnostic/management RE assessment) programme 1997-2001. International Journal of COPD, 1(4): Pp435-443.
- Reid, P.T. and Innes J.A (2010). Respiratory disease. In: Nicki R. College, Brain R. Walker, Stuart H. Ralston. Davidson's Principles and practice of Medicine, 21st edition; Churchill Livingstone Elsevier; p-671.
- Samuelsson Sig, Rey Kuvik, Iceland (1952). Chronic Cor-pulmonale in bronchial asthma, October 1, 143(1): Pp-15-31.
- Vij A, Bhardwaj, Kapila S, Vij C, Sachdeva GS, Gill BS, Sumon JS, Patiala (2008). Study of Electrocardiographic and Echocardiographic profile of COPD patients, Pulmonalogy, 2: p-01.

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