Cardiac arrhythmias in chronic obstructive pulmonary disease

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Abstract

Background: As a result of hypoxia, acidosis and effect of drugs used in chronic obstructive pulmonary disease arrhythmia can develop in many patients. Improvement in pulmonary function will result in decreasing the incidence of arrhythmia

Aim of study: To describe the frequency of cardiac arrhythmia in patient with COPD recorded by 24 hour holter monitoring and their relationship to clinical and homodynamic factors.

Patients and methods: Fifty patient with COPD and fifty patients with normal people monitored by pulmonary function test, 12 lead standards ECG and 24 hour holter monitor.

Result: Different types of arrhythmia were seen in patients with COPD and there is increase incidence of arrhythmia with the development of cor-pulmonal

Key words: ECG (electrocardiograph), COPD (chronic obstructive pulmonary disease), arrhythmia, ectopic.

IRAQI J MED SCI, 2008; VOL.6 (2):44-48

Introduction

The initial evaluation of patient suspected of having a cardiac arrhythmia begins with careful history, addressing specific questions regarding the presence of palpitation, syncope, spells of lightheadedness, chest pain or symptoms of congestive heart failure[1].

Palpitation may results from irregularities in cardiac rate or rhythm or a change in contractility of the heart [2]. The physician should inquired about circumstances that can trigger the arrhythmia, such as emotionally up setting event, ingestion of caffeine-containing beverages, cigarette smoking, exercise, excessive alcohol intake, or gastrointestinal problems[1,2].

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Received: 19th August 2007, Accepted: 11th June 2008.

A careful diet and drug history can be useful, for example, in revealing that palpitations develop only after the use of nasal decongestant that contains sympathomimetic vasoconstrictor or in revealing that the patient has been exposed to street drugs such as cocaine. Clinical States that predict the genesis of arrhythmias should be considered, such as thyrotoxicosis, pericarditis, mitral valve prolapse [3, 4].

Variety of familial disorders can result in arrhythmias including myotonic dystrophy, Duchene muscular dystrophy, dilated cardiomyopathy and congenital conduction disorders can result in sudden death duo to arrhythmias [5, 6, 7].

Patients and methods

This is prospective study that was done on one hundred patients who have been admitted to medical ward and out patient clinic of University Hospital of Al-nahrian College of medicine during the period from the first of June to fifteenth of October 2004.These patients were divided into two groups.

Group A, 50 patients age 40—75 years are complaining of cough, exertional dyspnoea, scanty sputum and have history of smoking for at least 30 years.

Group B, 50 patients who are non smoker considered as control

Full history, including drug history and clinical examination was done for both groups. Also investigations were done for both groups include.

1- Chest X rays
2- Pulmonary function test
3- Electrocardiography
4- Serum electrolyte such as serum potassium.
5- Haematological investigation such as measurement of PCV.
6- echocardiographical Study
7- Holter monitoring for 24 hours

Patients who receive bronchodilator and diuretic are included in this study while those who are compiling ischemic heart disease and who receive digoxin or other anti-arrhythmia are excluded from this study.

Result

The result of clinical characteristic and laboratory investigation, pulmonary function test, standard ECG and 24 hour holter monitor were compared between group A (COPD) and the control group are shown in (Table 1 , 2 , 3,and 4) respectively.

Table 1: Characteristic of patients

characteristic	Group A	Group B
age	55±15	55±15
male	80%	80%
female	20%	20%
smoking	98%	0%
PCV	40%-55%	35%--45%
Serum K. µmol/L	3.4—4.7	3.4---5.0
Presence of oedema	20%	0%
History of admission	47%	4%
Pulmonary hypertension by echo.	50%	0%

Table 2: Characteristic of pulmonary function test

Pulmonary function test	Group A	Group B
FEV_1	0.5—2.8	2.6--3.5 L
FVC	0.9—3 L	2.7 L—3.9 L
FEV_1/FVC	33%--68%	90±10%
PEFR	1.4 –5.2 L/S	4---6 L/S
R. volume	2 L—6 L	1—2 L
T.L.capicty	5.2 L—9.8 L	5 L—7 L
Increase R.V.	O.5 L—5.1 L	
Increase T.L.C.	1.3 L—4 L	

FEV=forced expiratory volume, FVC=forced vital capacity, R=Residual, T.L.C=total lung capicty, R.V=residual volume

Table 3: Standard ECG in patients with (COPD) Group A & Group B

Standard ECG	Group A	Group B	P value
No arrhythmia	76%	84%	0.15
Sinus tachycardia	50%	20%	0.0005
P.pulmonal	20%	2%	0.01
Atrial ectopic	18%	8%	0.06
Ventricular ectopic	22%	6%	0.009
Atrial fibrillation	10%	4%	0.12
Atrial flutter	4%	2%	0.28
Run of SVT	2%	0%	o.16

SVT=Supraventricular tachycardia

Table 4: 24 hour holter monitoring both groups & p value

	Group A	Group B	P value
Sinus tachycardia	80%	10%	0.0001
Ventricular ectopic	64%	40%	0.006
Atrial ectopic	72%	50%	0.01
Atrial fibrillation	24%	8%	0.01
Atrial flutter	12%	2%	0.09
Heart block	12%	2%	0.09
S.V tachycardia	20%	4%	0.019
Run of VT	10%	2%	0.05
W.P.W	2%	0%	0.15

VT=ventricular tachycardia, W.P.W=Wolff Parkinson white syndrome

Table 5: Comparison of incidence of arrhythmia detected by the standard ECG and holter monitoring

	Absent%	Present%	Atrial ectopic%	Ventricular ectopic%
Standard ECG	76%	24%	18%	22%
Holter monitoring	16%	84%	72%	64%

Discussion

Many if not most arrhythmias occur intermittently and patients present to their physician having had a previous episode but without an arrhythmia occurring at the time of evaluation. Therefore, the suspicion that an arrhythmic problem exists as well as the necessity and urgency of further evaluation must frequently determined by the history alone [8, 9, 10].

Cardiac arrhythmias are common in patient with COPD. This study supports the fact that both ventricular and Supraventricular premature beat occur frequently in patients with chronic obstructive lung disease. Their frequency in this population is in fact similar to that observed in high risk patient with

coronary heart disease and it is of high frequency when compared to the normal people [11,12].

These study shows, the people with cor-pulmonal manifested by low FEV_1 and low FVC, high residual volume and high total lung capacity and echocardiography finding have high incidence of arrhythmia than control group (B) p. value 0.007.

Thomas and valabhji detect arrhythmia by standard electrocardiogram in 7% of patients with chronic obstructive lung disease [12].

Corzza and pastor examined the frequency of arrhythmia in patients with chronic obstructive lung disease during standard electrocardiograph are 31% of them had arrhythmia [13,]. That compatible with our study which shows frequency of arrhythmias during standard electrocardiography are 24% of patients with chronic obstructive lung disease.

The arrhythmias detected in patients with chronic obstructive pulmonary by 24 hour holter monitoring more frequency than arrhythmias by standard electrocardiography.

Ventricular ectopic, Atrial ectopic, sinus tachycardia, Atrial fibrillation and Supraventricular tachycardia high frequency in patients with chronic obstructive pulmonary disease than other control group as mention in (Table 4).

The mechanism of arrhythmia in chronic pulmonary disease is not known but is probably diverse and multi factorial including hypoxemia, acidosis, bronchodilator therapy and electrolyte imbalance [14].

Conclusion

patients with sever obstructive pulmonary disease have more risky for arrhythmias than other people and most of arrhythmias detected by 24 hours holter monitoring rather than 12 lead ECG. Patients with cor-pulmonal have more risk for arrhythmias. the arrhythmia in COPD include atrial ectopic 72%, ventricular ectopic 64%, atrial fibrillation 24%, atrial flutter 12%, heart block 12%, Supraventricular tachycardia 10%, and W.P.D(Wolff Parkinson white syndrome)2%.

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