Pattern of Electrocardiographic Changes in Pre-operative check-up In Patients Undergoing ENT Surgery

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Abstract:

Background: The 12-lead ECG is the primary clinical tool for non-invasive assessment of cardiac electrical function. Before any surgery, ECG is commonly used in pre-operative check-up. Therefore pre-operative check-up of large number of people can be a valuable tool for accurate estimates of the prevalence of ECG abnormalities of general population. **Objectives:** To observe the extent of ECG changes in a group of population undergoing ENT surgery and to describe the prevalence of changes in relation to age and sex. **Methods:** 704 consecutive adult stable patients were included between age of 20 – 60 years without previously diagnosed case of any other systemic diseases who came to this hospital for elective surgical procedures and were investigated with new ECG for pre-operative check-up in private Hospital between January 201 to December 2010. **Results:** Total number of ECG recordings were 704; out of them 479 were male & 225 were female. Among 704 ECG recording 486(69.03%) were normal. The number of old myocardial infarction (MI) was in 36 cases (5.11%). Cardiac Ischaemia observed by ST depressions/T inversion was present in 15 cases (2.13%). **Conclusion:** The observation of the study is concludes that nearly 70% of all asymptomatic people (between 20 – 60 years) possessing normal ECG but Ischaemic changes (like Q wave/ST depression & T inversion/ LBBB) was present in about 8% cases. ECG changes of IHD (Ischaemic Heart Disease) increases with age and male groups at higher risk of developing IHD.

Key Words: ECG, Pre-operative Check-up, Myocardial Infarction (MI).

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Introduction:

The 12-lead ECG (electrography) is the primary clinical tool for non-invasive assessment of cardiac electrical function[1]. The authors of the American College of Cardiology/ American Heart Association (ACC/AHA) guidelines recommend a resting ECG as the initial test for all patients presenting with angina or its equivalents, recognizing that although a normal ECG does not confirm healthy heart but an abnormal ECG can immediately identify patients at highest risk for cardiac morbidity[2]. The electrocardiography is a sophisticated galvanometer, a sensitive electromagnet, which can detect and record changes in electromagnetic potentials[3]. In country like Bangladesh Chest X-ray & ECG are primary tools for screening heart diseases. These two investigations are largely used in pre-operative check-up. Therefore pre-operative check-up of large number of people can be a valuable tool for accurate estimates of the prevalence of ECG abnormalities in general population. Although large number of such studies has been done in different centers, but most of them have done in western countries. Such data are scarce in this part of the world.

The objective of the study was to observe accurate estimates of the prevalence of the ECG changes in group of population coming for surgery and to describe this prevalence in relation to age, sex.

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Methods:

Settings:

This was a single center cross sectional study carried out at a private Medical College Hospital. This center provides surgical and medical consultations & treatment to large group of patients across the country.

Study population:

Seven hundred and four consecutive patients who attended the Green Life Medical College Hospital for ENT consultation and recommended for elective operation from January 2010 to December 2010.

Every stable adult patients (between age of 20 – 60 years) without previously diagnosed case of any other systemic diseases who came to this Hospital for ENT consultation & were selected for elective surgical procedures and was investigated with new ECG for pre-operative check-up (within two weeks before schedule date of surgery[4]) in Green Life Medical College Hospital from January 2010 to December 2010 were included in this study. Age limit was 20 to 60 years. Variables recorded include age & sex. No previous medical record has been considered for patients' selection. All samples were included before schedule date

of surgery independent of outcome of surgery or any delay in surgery.

1. ECG done other than pre-operative check-up/ or ECG done more than two weeks before schedule date of surgery,
2. People suffering ENT diseases along with other systemic diseases.
3. People attending for emergency ENT surgery were excluded from the study.

ECG criteria:
The 12 lead ECG was done by trained technicians and reviewed by a cardiologist. FUKUDA cardiosuny machine was used for ECG. The ECG calibration was 25 mm/sec at 10 mm/mV. Standard criteria were followed for ECG interpretation[3]. Ischaemia was considered to be present or suspected if there was ST depression or T wave inversion found in leads representing coronary artery territory.

Statistical Analysis:
Parametric data were expressed in mean ± SD. Categorical data were evaluated by "Z" test. Level of significance of analytical test were set it 0.05 and 'p' value < 0.05 was considered significant.

Results:

Total number of ECG recordings was 704; out of them 479 were male & 225 were female. The male to female ratio was 2.13 : 1. Ages of the documented people were between 20 years to 60 years. Mean age was 36.63(±10.079).

Table-I

Shows frequency distribution of Different ECG Changes

Change	Frequency	Percentage
Normal	486	69.034
Sinus Tachycardia	29	4.119
Sinus Bradycardia	16	2.273
Left Ventricular Hypertrophy	36	5.114
Right Ventricular Hypertrophy	8	1.136
Old MI (Anterior)	19	2.699
Old MI (Inferior)	14	1.989
Old MI (Both Anterior & Inferior)	3	0.426
Ischaemia	15	2.13
RBBB	11	1.562
Bifascicular block	5	0.71
LBBB	9	1.278
Isolated LAD	15	2.13
Isolated RAD	13	1.846
PVC	13	1.847
Others	12	1.7
Totals	704	100

Table-II

Shows frequency distribution of Different ECG Changes in relation to sex

Change	Frequency	Male	Female
Normal	486	334	152
Sinus Tachycardia	29	5	24
Sinus Bradycardia	16	10	6
Left Ventricular Hypertrophy	36	28	8
Right Ventricular Hypertrophy	8	6	2
Old MI (Anterior)	19	14	5
Old MI (Inferior)	14	10	4
Old MI (Both Anterior & Inferior)	3	3	0
Ischaemia	15	12	6
RBBB	11	8	3
Bifascicular block	5	4	1
LBBB	9	7	2
Isolated LAD	15	12	3
Isolated RAD	13	10	3
PVC	13	10	3
Others	12	6	3
Totals	704	479	225

Table-III

Shows frequency distribution of Different ECG Changes in relation to age.

Change	Frequency	20-30 yr	30-40 yr	40-50 yr	50-60 yr
Normal	486	175	245	55	11
Sinus Tachycardia	29	20	5	1	3
Sinus Bradycardia	16	1	3	5	7
Left Ventricular Hypertrophy	36	0	4	13	19
Right Ventricular Hypertrophy	8	1	1	2	4
Old MI (Anterior)	19	0	1	3	15
Old MI (Inferior)	14	0	0	5	9
Old MI (Both Anterior & Inferior)	3	0	0	1	2
Ischaemia	15	0	2	7	6
RBBB	11	1	3	4	3
Bifascicular block	5	0	0	0	5
LBBB	9	0	0	2	7
Isolated LAD	15	1	4	5	5
Isolated RAD	13	0	4	6	3
PVC	13	1	2	4	6
Others	12	8	4	0	0
Totals	704	208	278	113	105

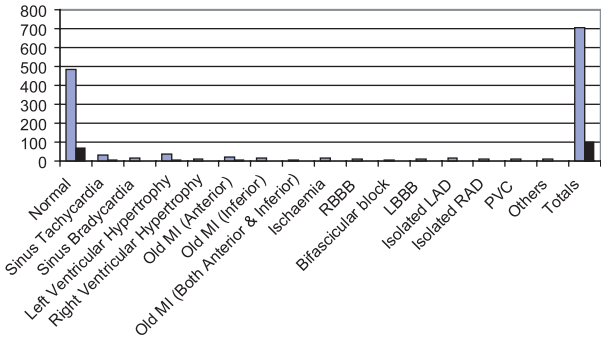

Fig.-1: *Simple Bar Diagram showing Different ECG Changes*

Among 704 ECG recordings 486(69.03%) were normal. In male population out of 479 recordings 334(69.728%) were normal and in case of female out of 225 ECG 152(67.56%) were normal. Mean age of normal ECG 32.98354(± 7.163). Recordings of sinus tachycardia were 29 (4%); where male female ratio was 1:4.8 ($p<0.05$). sinus tachycardia was more common in young age group (20-30). Sinus Bradycardia was found in 16 (2.27%) ECG. Left ventricular hypertrophy was found in 36(5.11%) ECG, mean age 49.1667(± 6.747) & male to female ratio was 3.5:1. Right ventricular hypertrophy was found in 8(1.37%) ECG, mean age 46.25(± 10.458) & male to female ratio was 3:1.

Old anterior Myocardial Infarction (MI) which was observed in 19 ECG (2.7%) mean age was 52.368 (± 5.377), male to female ratio was 2.8:1. Both anterior and inferior MI was found in only 3(0.43%) ECG. All of them were male, mean age 51.67 (± 4.607). So the total number of Old MI (Anterior, Inferior & Both) was in 36 cases (5.11%); among them 27 (3.83%) were male and 9 (1.28%) were female, the ratio was 3:1 (MI with or without ST depressions/T inversion was considered under this category).

Cardiac Ischaemia or probable Ischaemia was found in 15 ECG (2.13%), mean age was 47.667 (± 6.724), male to female ratio was 2:1.

RBBB was found 11 (1.56%) recordings (M:F = 2.67 : 1), mean age 43.18 (± 9.3). Bifascicular block was found in 5 (0.71%) ECG (M:F=4:1). LBBB was present in 9 (1.28%) ECG, mean age 52.58 (± 4.035) & the male female ratio was 3.5:1. Isolated left axis deviation (Anterior fascicular block) was found in 15 (2.13%), male female ratio 4:1. Isolated right axis deviation (posterior fascicular block) was found in 13 (1.85%), male female ratio 3.33:1.

PVC (Premature ventricular contraction) was present in 13(1.85%) ECG; male female ratio was 3.33:1

Other ECG changes, like Ischaemia only suggested by the non-specific T wave inversion or ST depression, Multiple ECG changes (like Bradycardia with inferior MI, Biventricular hypertrophy, RBBB with LVH) in single ECG, arrhythmia (other than RBBB, LBBB, and axis deviation, WPW syndrome etc, ECG that cannot be categorized in any of the previous category, were found in 12 (1.7%) recordings.

Discussion:

There is not much observation regarding ECG in asymptomatic patients. The resting electrocardiogram has become an accepted part of routine clinical examination of asymptomatic patients. Certain occupational groups, however, are subjected to regular electrocardiographic screening in an attempt to detect cardiovascular problems which might predispose to sudden incapacitation while on duty. However, the sensitivity of resting ECG is not that much high[5, 6]. In this study we want to see ECG changes in apparently healthy people undergoing surgery. The prevalence of minor ECG changes was slightly higher in men (10.4% vs 9.5% in women). The occurrence of ischaemia-like finding on the ECG was comparable between men and women (9.0% vs 9.8%) [7].

Sinus tachycardia rarely leads to any symptoms and usually remits over time[8, 9, 10]. Sinus tachycardia and sinus bradycardia are not considered pathological until these are associated with cardiac abnormalities. But here in this study Sinus tachycardia and Sinus bradycardia were included without any other major ECG changes.

Zaman et al showed in their study, the prevalence of Ischaemic heart diseases (IHD) in Bangladesh defined by the presence of pathological Q wave on electrocardiogram or current medication for IHD was 3.4%; prevalence in men (4.6%) was almost twice than in women (2.7%)[11]. Here, in this study we found total MI & Ischaemia or presumed ischaemia in 51 cases (7.24%); among them 39 (5.54% of total sample) were male and 15 (2.13% of total) were female, and ratio was 2.6:1. That is slightly higher from previous observation. Considering LBBB for IHD the observation increases 8.5% which is in concordance with study done on elderly patients [12, 13].

Conclusion:

In conclusion electrocardiographic abnormalities are present in considerable number of patients without known concomitant systemic disease who underwent ENT surgery. Ischaemic heart disease or presumed IHD was also present in some of the patients. The prevalence of IHD in our study population found to be more among the male patients in compare to female patients and among the elderly patients in compare to young.

Electrocardiogram done routinely in patients prior to ENT surgery seems to be of worth.

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