

ECG Changes in the Elderly Urology Patients during Pre-Operative Assessment in Ibadan Nigeria

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Abstract

Introduction: Electrocardiograph (ECG) is an important screening tool used to identify significant ECG changes that may alter perioperative management.

Objective: To find out the pattern of ECG changes in the elderly urology patients during the pre-operative review in a tertiary centre.

Study design and method: This was a prospective study of elderly urology patients recruited consecutively at the urology clinic during the pre anaesthetic review over a period of one year.

Result: ECG recordings from 60 elderly patients with age ranged 65-87 years and mean age 70.84 ± 5.58 years were studied. Thirty percent of patients had normal ECG while 70% had abnormal ECG. Hypertension and diabetes mellitus were the two common intercurrent medical diseases in this study.

The abnormal ECG findings were left ventricular hypertrophy 20%, sinus tachycardia 10%, sinus bradycardia 5%, left axis deviation 6.6%, right bundle branch block 6.6%, left bundle branch block 1.7%, AV block 1.7%, atrial fibrillation 3.3%, premature ventricular contraction 6.6% and left atrial enlargement 3.3% and ST elevation 5%.

Conclusion: Majority of elderly presenting for preoperative assessment for urological procedures had abnormal ECG; left ventricular hypertrophy was the commonest. ECG is a readily available vital diagnostic tool for detecting patients at risk of intra and postoperative complications in a low resource centre.

Keywords: Abnormal ECG; Elderly; Preoperative assessment; Urology

Introduction

Increasing number of elderly patients are presenting for surgical procedures due to longer life expectancy [1]. The incidence of perioperative complication is much higher in the elderly due to reduced functional reserve and high incidence of co-morbidities [2].

The objective of preoperative anaesthetic evaluation is to decrease perioperative morbidity and mortality, regardless of patients' age. Laboratory tests are being currently indicated as priority according to history and/or physical evaluation findings [3]. The pre-operative review for the geriatric is more complicated than in the younger population, this complexity results from the increasing number of co morbidities, various medications, poor nutrition, impaired functional status and also from the detrimental impact of ageing on the physiology function [4].

For the cardiovascular system, ageing is related to a wide variety of structural and functional changes in heart and vessels. In addition to age-related physiological changes, there is increased prevalence of cardiovascular diseases (systemic hypertension, atherosclerosis, acute myocardial infarction, congestive heart failure) which further limit the functioning of this system [5].

Electrocardiography (ECG) is a sophisticated galvanometer, a sensitive electromagnet which can detect and record changes in the electromagnetic potentials [6]. The 12-lead electrocardiograph is the primary clinical tool for non invasive assessment of cardiac electrical function and in the diagnosis of previous myocardial infarction and various arrhythmias.

Guideline for perioperative cardiovascular evaluation in non cardiac surgery include history, physical examination and a

performance of a 12 lead ECG to identify patients at risk of perioperative cardiovascular events [7,8]. However its influence to prevent intra operative cardiovascular complications is controversial [9]. Although a normal ECG does not confirm healthy heart but an abnormal ECG can immediately identify a patient at highest risk of cardiac morbidity and it is considered as a trigger for further evaluation [7].

Chest X ray, ECG and echocardiography are the primary tools for screening heart disease in Nigeria. Elderly patients are prone to ECG changes due to ageing coupled with co morbidities and several authors have described increased ECG changes with increasing age [10-12].

The pattern of ECG abnormalities in the elderly urology population is not well defined in our centre, the study is to determine the prevalence of abnormal ECG and the pattern of ECG changes in the elderly presenting for preoperative assessment in urology clinic in our centre.

Patients and Methods

This was a prospective study carried out on 60 patients aged 65 years and above, scheduled for elective urological procedure over a period of one year between January 2012-December 2012.

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All patients scheduled for elective urological procedures were reviewed at least 2 weeks before their proposed surgery. As part of our routine preoperative evaluation, detailed history and thorough physical examination were carried out on all the patients. Preoperative ECG is routine for all patients based on age of >65 years and associated co morbidity in our centre. Echocardiograph was performed on patients with abnormal ECG; abnormal ECG is defined as any ECG apart from sinus rhythm. Only the results of ECG are presented in this paper. Patients with intercurrent medical disease were optimized prior to surgery.

Variables recorded include, age, sex, weight, diagnosis, inter current medical illness, American Society of Anesthesiologists classification (ASA), type of surgery and ECG readings.

ECG criteria

The 12 lead ECG was done by a trained technician and was reviewed by the cardiologist, the ECG calibration was at 25 mm/sec at 10 mm/Mv. Standard criteria for ECG reading was followed for interpretation. Ischemia was said to occur if there was ST depression or T wave inversion. Left ventricular hypertrophy was determined using the sokolow-lyon voltage criterion above 35 mm. Bradycardia, heart rate less than 50 beats/minute and tachycardia was heart rate above 100 beats/minute.

Statistical analysis

Parametric data were expressed as mean ± standard deviation while categorical data were evaluated using t test. Level of significance was set at 0.05 and p value of <0.05 was considered as significant.

Results

A total number of 60 patients aged 65 years and above with single ECG readings were recruited into the study. Majority were males while 2 patients were females. The age ranged between 65-87 years and the mean age was 70.84 ± 5.58 years. Eighteen patients (30%) had normal ECG reading while 42 patients (70%) had abnormal ECG.

Table 1 compares the demographic data of patients with normal ECG with those with abnormal ECG with no statistical difference in their mean age, weight and height.

Table 2 compares the American Society of Anesthesiologist's (ASA) classification of patients with normal ECG with those with abnormal ECG with statistical significant difference in classes 1-3.

Medical diseases observed in this study included hypertension (46.6%), diabetes mellitus (11.3%), hypertension and diabetes mellitus (13.3%), chronic renal failure (5%), chronic obstructive airway disease (3%), Parkinson disease (1.7%) and anaemia (1.7%) (Table 3).

Parameter	Normal ECG	Abnormal ECG	P value
Mean age (years)	70.67 ± 5.3	70.93 ± 5.71	>0.05
Mean weight(kg)	72.24 ± 6.31	72.13 ± 8.5	>0.05
Mean height (m)	1.59 ± 0.04	1.57 ± 0.07	>0.05

Table 1: Patient characteristics.

ASA classification	Normal ECG n=18	Abnormal ECG n=42	P value
Class 1	10	3	0.000
Class2	8	26	0.021
Class3	0	11	0.016
Class4	0	2	0.346

Table 2: ASA classifications.

Diseases	N (%)
Hypertension	28 (46.6)
Diabetes mellitus	3 (11.3)
Hypertension and diabetes	8 (13.3)
Chronic renal failure	2 (5)
Chronic obstructive airway disease	3 (11.3)
Parkinsons disease	1 (1.7)
Anaemia	1 (1.7)

Table 3: Intercurrent Medical diseases.

Indication for surgery	(%)
Benign prostatic hyperplasia	85
Urethral stricture	11.6
Renal mass	1.7
Renal stone	1.7

Table 4: Indication for surgery.

ECG Change	N (%)
Sinus rhythm	18 (30)
LVH	12 (20)
Sinus Tachycardia	6 (10)
Sinus bradycardia	3 (5)
Atrial fibrillation	2 (3.3)
Left axis deviation	4 (6.6)
Right bundle branch block	4 (6.6)
Left bundle branch block	1 (1.7)
Left atrial enlargement	2 (3.3)
AV block	1 (1.7)
Premature ventricular contraction	4 (6.6)
ST elevation	3 (5)

Table 5: ECG pattern in recruited patients.

Table 4 shows the indications for surgery, benign prostatic hyperplasia (85%), urethral stricture (11.6%), renal mass (1.7%) and renal stone (1.7%).

Left ventricular hypertrophy was the commonest ECG abnormality in 20% of patients, other abnormal ECG finding included sinus tachycardia 10%, sinus bradycardia 5%, left axis deviation 6.6%, right bundle branch block 6.6%, left bundle branch block 1.7%, ST elevation 5%, premature ventricular contraction 6.6%, left atrial enlargement, atrial fibrillation 3.3% and AV block 1.7% (Table 5).

Discussion

This study revealed that many ECG abnormalities were found in the elderly patients coming for urological procedures, this tally with results of many authors [10-12]. Liu et al. found 75.2% abnormal ECG in elderly undergoing non cardiac surgery without any risk of perioperative cardiovascular events (PCE) [9]. Seymour et al. described 78.8% abnormal ECG in elderly undergoing general surgery with 8.1% risk of PCE [13]. In our study we found 70% abnormal ECG and whether abnormal ECG increases the risk of developing PCE is controversial [7,9,13].

The abnormal preoperative ECG in this study led to the request for other investigations to further evaluate the cardiovascular status which could be a pointer to major cardiovascular diseases that can lead to PCE. In a study by Mc Donald et al. on evaluation of preadmission screening in elderly patients for major joint replacement, they found that 42 elderly patients had their surgeries postponed due to medical illnesses and 2 had their surgeries cancelled, they advised that pre

admission screening should be carried out during outpatient clinic to prevent loss of valuable time due to optimization of medical illnesses [14].

Medical history of the patients in this study showed that 69% of the patients had medical illness and on medications. Hypertension and diabetes mellitus are the two common risk factors for coronary heart disease in our environment. It has been found that prevalence of hypertension increases with age [15]. A strong relationship also exists between hypertension and diabetes and both diseases play a major role in the development of LVH and Ischemic heart disease [16].

The pattern of surgery in this study shows that majority had prostatectomy which is an intermediate risk surgery and studies have found that there is lack of predictive value of routine ECG to identify risk of PCE in patients with low to intermediate risk surgery and is not cost effective. The absolute difference in the incidence of cardiovascular death between those with or without ECG abnormality was found to be only 0.5% and suggests that routine ECG should be abandon in lower risk surgery [7].

The abnormal ECGs in this study included left ventricular hypertrophy (LVH), arrhythmias and conduction abnormalities. Loss of pacemaker and conducting cells by ischemia or degeneration lead to conduction abnormalities (atrio-ventricular block and bundle branch block) and arrhythmias [12].

The prevalence of LVH in the study was 20%, this was higher than 13.93% obtained by Devkota and colleague [11] while that of ST-T wave abnormalities was 5% similar to 5.5% in a study by Assantachai et al. [17] LVH and ST segment depression on preoperative 12 lead ECG were identified as important marker of increased risk for PCE or cardiac death after major vascular surgery [18].

Sinus tachycardia was seen in 10% of patients; this usually remits over time or at rest, while sinus bradycardia was seen in 5% of patients and these patients had no syncopal attack and did not require any pacing before their elective procedure, sinus bradycardia and tachycardia are usually not considered pathological if not associated with cardiac abnormalities [12].

Two patients (3.3%) had atrial fibrillation in this study; atrial fibrillation is a common arrhythmia in the elderly and present in 2-5% of people above 65 years of age [17]. Elderly patients with hypertension have a risk of atrial fibrillation and this increases the risk of thromboembolic phenomenon and stroke in them.

Campbell et al. found the prevalence of left bundle branch block to be 1.4% while 1.7% prevalence for right bundle branch block [19] compared to 1.7% for left bundle branch block and 6.6% for right bundle branch block.

Our study revealed that elderly patients had many abnormal ECGs; abnormal ECGs were related to their comorbidities. ECG should be routine in all elderly patients coming for intermediate surgery in our environment with limited resources, it can also be used as a baseline measurement to interpret postoperative ECG changes and also to detect patients with PCE. This study is limited by the small number of participants.

Conclusion

Majority of elderly presenting for preoperative assessment for urological procedures had ECG abnormality, LVH being the commonest. ECG remains a vital diagnostic tool for detecting patients at risk of intra and postoperative complication in a low resource centre.

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