

UNDERGRADUATE ARTICLE

An Audit of the Value of Pre-Operative Electrocardiograms before Surgery (General Anaesthetic) in a Day Surgery Unit

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ABSTRACT

Background

As the population presenting for day-case surgery and anaesthesia increases, so does the challenge of adequate pre-operative assessment. The resting 12-lead electrocardiogram (ECG) is relatively insensitive and frequently normal even in the presence of severe coronary artery disease but it is quick, easy to perform and frequently requested, thus its value in day-case surgery remains unproven.

Aims

To assess whether patients at Day Surgery Unit, Gartnavel General Hospital who fit the ECG criteria get an immediate ECG and also to review whether abnormal ECG results leads to any change in the patient's management.

Methods

A prospective audit was performed on all patients coming in for non-cardiac day-case surgery over a 3-week period between February 2006 and March 2006. Patient notes were reviewed before their surgery.

Results

60 patients presenting for day-case surgery over this period should have had an ECG done but only 24 were referred. A significant abnormality was noted in 12.5% of ECGs. None of these patients had their surgery postponed or management changed. No adverse events occurred in patients proceeding to surgery and there were no cases of peri-operative cardiovascular complications or admissions to hospital.

Conclusion

The finding of ECG abnormalities did not prevent the patient proceeding directly to anaesthesia and surgery. Furthermore, they did not predict intra-operative, postoperative complications or hospital admission following the procedure. The ECG is of limited value in the risk stratification of patients selected for day-case surgery.

Introduction

As the population presenting for day-case surgery and anaesthesia increases, so does the challenge of adequate pre-operative assessment. The advantages of day-case, as opposed to inpatient, surgery for both hospital and patient are clear. The increasing popularity of this technique has, however, inevitably led to an expansion of the eligible population to include patients at higher anaesthetic risk. Unfortunately the opportunity for accurate, time-consuming, pre-operative risk assessment of this group is limited. I wished to determine the value of the resting 12-lead electrocardiogram (ECG) because, although it is known to be relatively insensitive and frequently normal even in the presence of severe coronary artery disease, it is

quick, easy to perform and frequently requested. Although ECGs are frequently performed, its value in day-case surgery remains unproven.

Current policy in the Day Surgery Unit (DSU) at Gartnavel General Hospital (GGH) states that all patients over 50 years of age or with significant cardiovascular conditions must have a recent electrocardiogram (ECG) conducted and reviewed prior to general anaesthetic for any day-case procedure.

The aim of my audit is to assess whether patients who come to DSU at GGH who fit the criteria mentioned above do actually get an ECG and also to calculate the percentage of ECG results that are abnormal and whether this leads to any change in the patient's management (cancellation of procedure, choosing different mode of anaesthesia, etc).

Methods

A prospective audit was performed on all patients coming in for non-cardiac day-case surgery over a 3-week period between February 2006 and March 2006. Patient notes were reviewed before their surgery. Questions included past cardiovascular history, drug history, details of their ECGs, etc.

Results

Sixty patients presenting for day-case surgery over this period should have had an ECG done according to the criteria set out for the DSU. Patient criteria for an ECG were based on age (> 50 years), a history of hypertension or heavy cigarette consumption, or a history or symptoms of ischaemic heart disease, respiratory disease, peripheral or cerebrovascular disease. Only 24(40%) were referred for ECG and were read independently by the anaesthetist responsible for the case. A significant abnormality was noted in 12.5% of ECGs, most frequently in patients referred with hypertension. None of these patients with an abnormal ECG had their surgery postponed or

management changed in any other way. No adverse events occurred in patients proceeding to surgery despite the abnormalities.

The 60 eligible patients reviewed were coming to DSU, GGH for a variety of operations, ranging from gynaecological(9), ENT(18), orthopaedic(18), minor operations(3), chronic pain(9) and general surgery(3) (Table I). Male: female ratio was 30:30. BMI trend was 50% <25, 50% >25.

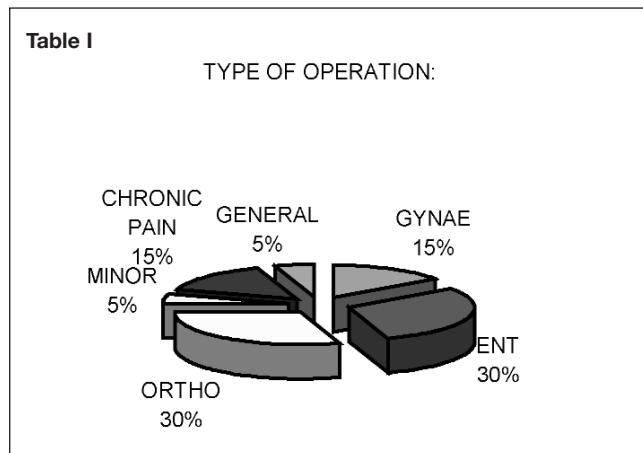


Table II

PREVIOUS MEDICAL HISTORY:	n = 60	%
Previous Heart Attack	0	0
High Blood Pressure	18	30
Previous Angina/Chest pain	6	10
Valve disease/replacement	0	0
Diagnosed Heart Failure	0	0
High cholesterol	6	10
Abnormal Heart Rate/Rhythm	6	10
Family History of Heart problems	4	6.7
T2DM	5	8.3
COPD	5	8.3
Asthma	3	5
Smoker/drinker	16	26.7
Previous GA (with problems)	32(17)	53.4 (28.3)
CARDIAC MEDICATION		
Aspirin	7	11.7
Nitrates (inc GTN spray)	6	10
Ca channel blockers	5	8.3
Beta blockers	6	10
Digoxin/Amiodarone	0	0
Statin	0	0
Diuretic	5	8.3
ACE inhibitors and A2 receptor blockers	8	13.4
Patients with ECG done within 6/12	24	40
Abnormal	3	5
Management change	0	0

Reviewing patient past medical cardiac history, 30% had hypertension, 10% previous angina, 10% abnormal heart rhythm (atrial fibrillation, ectopics, supraventricular tachycardia, etc), 10% hyperlipidaemias, 7% positive family history, some of these occurring concurrently in the same patient. Related medical problems include type 2 diabetes mellitus (5), COPD (5), asthma (3) and 16 were heavy smokers or drinkers. Thirty-two had previously had

general anaesthetic and 17 had had complications with that, mostly mild post-operative nausea and vomiting, breathing difficulties, etc.

The cardiac medication these patients were already on included aspirin (7), nitrates (6), diuretics (5), ACE inhibitors (8), Ca channel blockers (5) and Beta blockers (6).

Of 60 eligible patients (48 due to age, 12 due to previous history), ECGs were requested and available for analysis in 24 (40%; mean age 56.3 years). The anaesthetist reported 21 normal and 3 abnormal ECGs. One tracing was thought by the anaesthetist to show a possible previous inferior infarct, while the other 2 showed nonspecific ST changes and left ventricular hypertrophy (LVH) respectively. Although, none of the patients had their management altered, the most significant alteration in management in a day-case setting is the postponement of surgery because the patient is unfit to undergo day-case anaesthesia. Also, there were no cases of peri-operative cardiovascular complications or admissions to hospital.

Discussion

The incidence of ECG abnormalities in the patients (12.5%) was less to that found in other studies. Nevertheless, the abnormalities did not prevent the patient proceeding directly to anaesthesia and surgery. Furthermore, they did not predict intra-operative or postoperative complications or hospital admission following the procedure. I conclude the ECG is of limited value in the risk stratification of patients selected for day-case surgery. However, I acknowledge that the number of patients as well as the period of review is likely to be insufficient to be statistically significant compared to other studies therefore, a longer and more thorough audit is required to yield more value.

In an audit undertaken by Murdoch et al of 1185 patients,⁴ only 13% of eligible patients received ECGs and only 23% of these were abnormal. 1/5 of these had their surgery postponed ranging from postponing surgery pending further investigation (6), referral for in-patient surgery (1) and admission to the coronary care unit for treatment of a ventricular arrhythmia (1). The participating anaesthetists did not document other changes in management. The ECG abnormalities that were identified but did not lead to postponement of surgery were LVH, nonspecific ST changes, myocardial ischaemia, left bundle branch block, previous inferior myocardial

infarction and previous anteroseptal myocardial infarction. None of the patients with ECG evidence of myocardial infarction gave a positive history. Despite this, there were no cases of peri-operative cardiovascular complications or admissions to hospital. This was one of the few prospective studies to consider the influence of the ECG on the anaesthetic management of day surgery patients, while also allowing independent comparison of the ECG by the anaesthetist and cardiologist. They also came to a conclusion similar to mine.

Another audit done by Escolano et al (2146 patients),⁵ found that although the prevalence of unexpected preoperative ECG abnormalities among non cardiothoracic surgical patients is high but similarly, the influence of such results is minimal. The sensitivity and specificity of preoperative ECG for detecting electrocardiographic abnormalities are low. They suggest that performance of ECG before surgery is useful only in patients over 45 years of age or in those with cardiovascular disease, chronic kidney failure, diabetes mellitus, physical state ASA III-V and those for whom it has not been possible to obtain an adequate medical history or perform a complete physical.

Liu et al⁶ concluded that abnormalities on preoperative ECGs are common but are of limited value in predicting postoperative cardiac complications in older patients undergoing non-cardiac surgery. Obtaining preoperative ECGs based on an age cutoff alone may not be indicated, because ECG abnormalities in older people are prevalent but nonspecific and less useful than the presence and severity of comorbidities in predicting postoperative cardiac complications.

Also, Seymour et al⁸ concluded that a routine preoperative ECG should be carried out in all elderly surgical patients (1) as a baseline measurement to aid interpretation of post-operative ECG changes and (2) as a means of detecting patients with acute myocardial infarctions or serious arrhythmias in whom surgery should be deferred. As a method of predicting post-operative cardiovascular complications, however, the pre-operative ECG appears to be of no value in elderly men and of only limited value in elderly women.

Conclusion

Clearly, more work needs to be done regarding the usefulness of the ECG in a daycase setting as well as specific standardised guidelines on the indications for an ECG need to be set out.

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