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Original Research Article

Preoperative Versus Postoperative ECG changes in Relevance to General Anaesthesia

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Abstract

General anaesthesia (GA) is a medically induced coma and loss of protective reflexes resulting from the administration of one or more general anaesthetic agents. A variety of medications may be administered, with the overall aim of ensuring sleep, amnesia, analgesia, relaxation of skeletal muscles, and mostly loss of control of reflexes of the autonomic nervous system. The optimal combination of these agents for any given patient and procedure is typically selected by an anaesthesiologist or another provider such as an anaesthesiologist assistant or nurse anaesthetist. The objective is to determine the side effects of general anaesthesia on the cardiovascular system, through changes in the electrocardiography (ECG). This study was conducted in Al-Sader Teaching Hospital in Missan province in Iraq. Where the collection of data was last for nine months and the work was finished at Al-Nahrain University /High institute for infertility diagnosis and ART's. The study was included 50 patients, all of them were healthy it can be divided into 30 men and 20 women, 25 were aged less than 50 years, rest of patients were aged more than 50 years. ECG was performed for each one before the operation and ECG was normal for all patients. After a surgical operation and under general anaesthetic, taking into consideration not to give preanaesthetic medications. Within an hour after operation, the ECG was done again. The results were as follows: 39 patients with normal ECG, 23 patients were younger than 50 years, while the rest 16 were greater than 50 years, the number of men 22 and women 17. As for the remaining 11 patients, ECG showed sinus tachycardia, they were 8 men and 3 women, all of whom were aged greater than 50 years, except for two patients. There is accumulating evidence that anaesthetic management may indeed exert a number of influences on longer term postoperative out-comes. Further prospective, randomized, large scale, human trials with long- term follow-up are required to clarify the association between anaesthesia technique and postoperative outcome.

Keywords: General Anaesthesia, Pre Operative ECG, Post Operative ECG, Normal ECG, Sinus tachycardia

INTRODUCTION

However the aim of the anaesthetist is to choose the method which is safest and most comfortable for the patient, prior to planned operation or procedure, the anaesthetist reviews the medical record and/or interviews the patient to determine the best combination of drugs and dosages and the degree to which monitoring will be required to ensure a safe and effective procedure. Key factors of this evaluation are the patient's age, body mass index, medical and surgical history, current medications, and fasting time. Thorough and accurate answering of

Table 1. Normal and abnormal ECG according to the age.

Age	Normal ECG	Sinus tachycardia	Total
Less than 50 years	23 patients	2 patients	25
More than 50 years	16 patients	9 patients	25
Total	39	11	50

Table 2. Normal and abnormal ECG according to the gender

Gender	Normal ECG	Sinus tachycardia	Total
Male	22 patients	8 patients	30
Female	17 patients	3 patients	20
Total	39	11	50

the questions is important so that the anaesthetist can select the proper anaesthetic drugs and procedures (Eur. J. Anaesthesiol., 2015; Li and Pearce, 2000). General anaesthesia is a medically induced coma and loss of protective reflexes resulting from the administration of one or more general anaesthetic agents. A variety of medications may be administered, with the overall aim of ensuring sleep, amnesia, analgesia, relaxation of skeletal muscles, and mostly loss of control of reflexes of the autonomic nervous system. Commonly used premedication agents include opioids such as fentanyl or sufentanil, gastrokinetic agents such as metoclopramide, and histamine antagonists such as ranitidine (Basics of Anaesthesia, 2015). The optimal combination of these agents for any given patient and procedure is typically selected by an anaesthesiologist or another provider such as an anaesthesiologist assistant or nurse anaesthetist, in consultation with the patient and the medical or dental practitioner performing the operative procedure. General anaesthesia has many purposes including: 1- Analgesia — loss of response to pain, 2- Amnesia — loss of memory, 3- Immobility — loss of motor reflexes, 4- Unconsciousness — loss of consciousness, 5- Skeletal muscle relaxation (Eur. J. Anaesthesiol., 2015; Li and Pearce, 2000). The effects of anaesthetics on the cardiovascular system have a complicated character, and almost all of the effects lead to dose-related myocardial depression and decreases in heart rate and arterial pressure. In anaesthesia practice, individual responses of patients against procedures such as induction, intubation, and surgical stimulation are influenced by many factors, including preoperatively used drugs, anaesthesia type, preferred anaesthetic agents, and the autonomic nervous system (Eur. J. Anaesthesiol., 2015; Li and Pearce, 2000). Many of the anaesthetics used in anaesthesia practice interact with the QT interval. Depolarization and repolarization of the myocardium take place within the QT interval. Varying QT intervals have been associated with heterogeneous repolarization and ventricular arrhythmias (Fee and Thompson, 1997; Pagel et al., 1991). Therefore, prolonged QT intervals may be harmful, at least in cases with myocardial pathologies, necessitating anaesthesia methods that do not influence the QT interval (Hingham and Campell, 1994).

MATERIALS AND METHODS

This study was conducted in Al-Sader Teaching Hospital in Missan province in Iraq. It was performed as comparative study on 50 healthy patients attended for different surgeries, where the collection of data was last for nine months and the work was finished at Al-Nahrain University /High institute for infertility diagnosis and ART's. The study was included 50 patients, it can be divided into 30 men and 20 women, 25 of them were aged less than 50 years, the rest of them were aged more than 50 years. The patients should be attached to standard monitors including ECG, blood pressure, and pulse oximetry. Record an initial set of vital signs. ECG was performed for each one before the operation and ECG was normal for all patients. After a surgical operation and under general anaesthetic, taking into consideration not to give preanaesthetic medications. Within an hour after operation, the ECG was done again.

RESULTS

The results were as follows: 39 patients were showed with normal ECG, 23 patients were younger than 50 years, while the rest 16 were greater than 50 years, the number of men 22 and women 17. As for the remaining 11 patients, ECG was showed sinus tachycardia, they were 8 men and 3 women, all of whom were aged greater than 50 years, except for two patients. These results can be showed in the tables (1, 2) and figures (1,2,3).

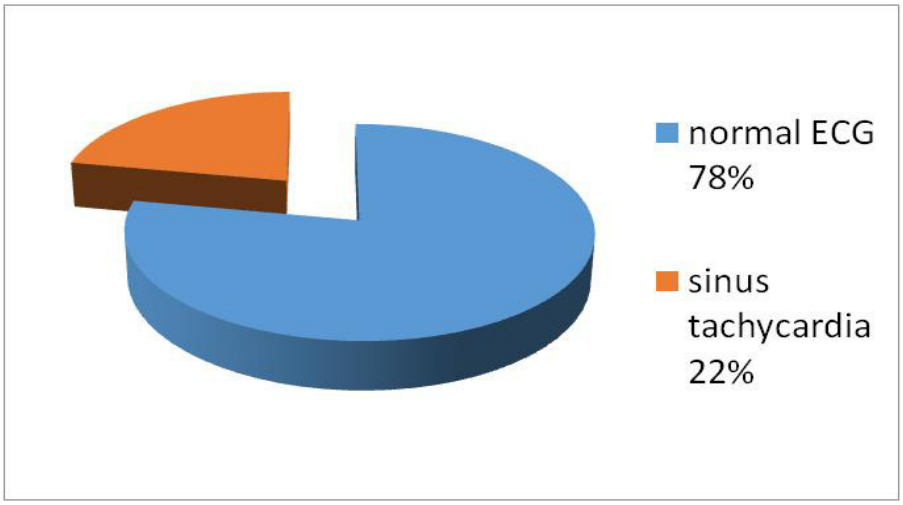

Figure 1. The incidence of normal ECG and tachycardia after GA

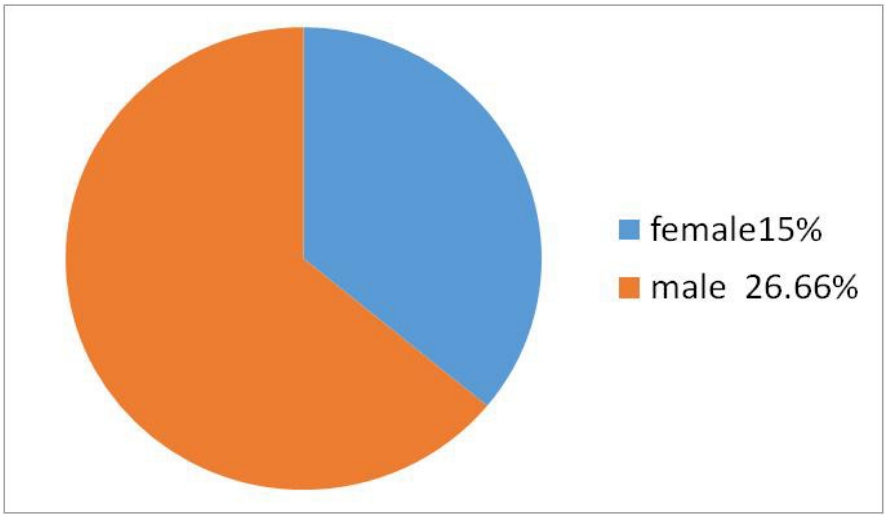

Figure 2. The incidence of tachycardia in relevance to gender

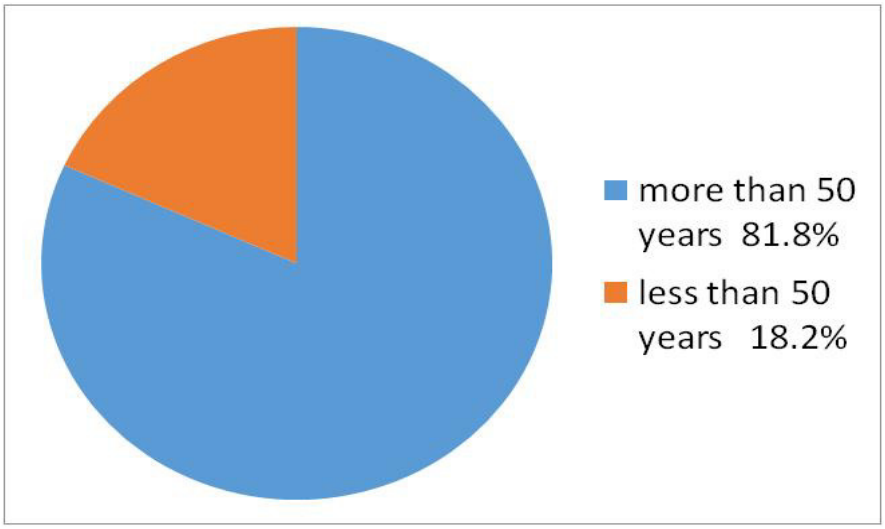

Figure 3. The incidence of tachycardia in relevance to age

DISCUSSION

The abnormal finding of ECG was tachycardia in 22% of total number of patients. This results was closed to studies in other countries such as in USA (Post Operative Arrhythmias, 2012), Turkey (Murat et al., 2017) and other study (Noncardiac surgery, 2000). And it's closed to study done by Departments of Medicine, Harvard Medical School and Peter, Bent Brigham Hospital, the Department of Cardiology, Children's, Hospital Medical Center, Boston, Massachusetts (Vatner and Braunwald, 1975) and the New England Regional Primate Research Center, Southboro, Massachusetts. Several conditions, such as diabetes mellitus, arrhythmia, ischemic cardiac diseases, pulmonary disease, uremia, electrolyte and acid/base disorders, and prolonged QT syndrome, and the drugs used in their treatment, such as antihypertensives, beta-blockers, antidiabetics, and opioids, are known to influence the QT interval (Malik and Batchvarov, 2000).

The tachycardia attributed to one or more of the following reasons: 1-Effects of GA agents like propofol, halothane and ketamine. 2-Atropine that may be used during operation. 3-Pains and anxiety. 4- Hypotension (in non-good correcting cases, or in bleeding) 5-Hypoxia. 6-Manipulation of thyroid gland during surgery of goiter can cause transient release of thyroid hormones that cause tachycardia. 7-Minor pulmonary embolism. Several studies investigating the effects of sevoflurane on QT, QTd, and QTc have revealed differing results (Abe et al., 1998; Gallagher et al., 1998). Michaloudis et al. applied VIMA with sevoflurane and isoflurane and found that isoflurane prolonged the QTc interval but did not change QTd or QTcd, whereas sevoflurane did not affect those three parameters; overall, they determined that sevoflurane was a good agent (Michaloudis et al., 1999).

CONCLUSIONS

There is accumulating evidence that anaesthetic management may indeed exert a number of influences on longer term postoperative out-comes. Further prospective, randomized, large scale, human trials with long- term follow-up are required to clarify the association between anaesthesia technique and postoperative outcome.

RECOMMENDATIONS

1-Patients need careful post-operative follow up including monitoring of Blood pressure, temperature, Blood Oxygen Levels (SPO_2), cardiac rhythm monitoring. 2-Patients need careful use of pain-killer post-operative and careful use of intravenous (IV) fluids.

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