An-Najah National University

Faculty of Graduate Studies

INCIDENCE OF POST-OPERATIVE ATRIAL FIBRILLATION IN PATIENTS UNDERGOING CORONARY ARTERY BYPASS GRAFTING SURGERY AFTER GIVING PERIOPERATIVE BETA BLOCKERS:A PROSPECTIVE OBSERVATIONAL STUDY IN A UNIVERSITY HOSPITAL IN PALESTINE

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Dedication

إلى من علمني النجاح والصبر

إلى من حصد الأشواك عن دربي ليمهد لي طريق العلم

إلى القلب الكبير والدي العزيز

إلى نبع الحنان إلى صاحبة الصدر الرحيم إلى من تجرعت كأس الشقاء مرا

لتسقيني رحيق السعادة أمي الحبيبة

إلى القلوب الطاهرة الرقيقة والنفوس البريئة عائلتي

زوجي وأولادي

للنجاح أناس يقدرون معناه وللإبداع أناس يحصدونه شكرا لجهودك المضنية

إلى كل من ساندني ووقف بجانبي إليكم أهدي هذا العمل.

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Last but not the least, I thank and appreciate every patient who agreed to take part in my research.

Declaration

I, the undersigned, declare that I submitted the thesis entitled:

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I declare that the work provided in this thesis, unless otherwise referenced, is the researcher's own work, and has not been submitted elsewhere for any other degree or qualification.

Student's Name: _____

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ABSTRACT

Background: The most prevalent arrhythmia, after cardiac surgery, is postoperative atrial fibrillation (POAF).It affects 30% to 50% of patients and significantly increases morbidity and length of hospital stay. Also, it significantly increases hospital costs. A number of risk factors have been found to be associated with a higher frequency of post-coronary artery bypass grafting (CABG) AF. Beta-blockers emerge as the preventive drug, unanimously regarded as a therapy assisting in the reduction of POAF incidence.

Aim: This study sought to determine the incidence of postoperative atrial fibrillation in patients undergoing on-pump CABG surgery after perioperative beta blocker (Bisoprolol) administration.

Material and method: Patients were scheduled for elective CABG surgery in this prospective observational trial. Valve surgery, redo CABG surgery, and renal failure patients were excluded from the study. The (Already on Beta-Blockers) group and the (Newly Administered of Beta-blockers-Bisoprolol) group were afterwards formed from the original one group of the study sample for the purposes of analysis. Patients who were already taking beta-blockers (Already on Beta-Blockers) should continue taking them postoperatively after being extubated and awakened. They should start taking them the evening before surgery. For patients who were receiving beta blockers for the first time postoperatively(Newly Administered of Beta-blockers-Bisoprolol) and they were not on beta blocker preoperatively, the dose was adjusted according to heart rate, and blood pressure starting from 1.25mgBisoprolol (orally) and titrating according to previous parameters

Results: The incidence of POAF stood at 17/150 (11.3%) post operatively in the whole group, when a subgroup analysis was done, the whole group was divided into two groups: group one Already on Beta-Blockers (n=54) and group two newly administered of Beta-blockers (n=96). The results showed that the percentages of AF cases in group one (n=2, (3.7%) were lower than group two (n=15, (15.6%).The p= 0.027, bradycardia 37/54(68.5%) in group one and 47/96(31.3%) in group two, p=0.000 was in favour of group two. Hypotension was 37/54(68.5%) in group one and 26/96(27.1%) in group two; p= 0.000 wasin favour of group two. CCU length of stay in days 4.00 ± 0.87 in group one and 3.57 ± 1.41 in group two; p= 0.046 was in favour of group two. Hospital length of stay in days was7.85 ± 2.79 in group one and 4.70 ± 2.68 in group two; p=0.000 was in favor of group two. Pain Assessment (VAS) was3.65 ± 0.84 in group one and 4.14 ± 1.16 in group two; p= 0.007 was in favour of group one,

Conclusion: A perioperative beta blocker (Bisoprolol) could lower the risk of developing postoperative AF and lessen the intensity of pain following coronary bypass graft surgery. Patients on chronic beta blockers increased the likelihood of hospital and intensive care unit length of stay. Preoperative risk factors for AF include heart failure, and COPD.

Keywords: Beta Blocker; Bisoprolol; Postoperative Atrial fibrillation; Coronary Artery Bypass Grafting (CABG); perioperative; length of stay.

Chapter One

Introduction

1.1 Backgrounds

One of the uncommon arrhythmia is postoperative atrial inflammation since it occurs to 30%-50% of patients. Furthermore, the number of CABG operations in the US is 553,000. Also, it causes patients' long stay leading to increase of the cost of sanatoriums (Aranki SF, Shaw DP and Adams DH, 1996; Chung MK, Asher CR, and Dykstra D, 1996; Frost L and Christiansen EH, 1995; Mathew R and JS, 1996; Tamis JE and JS., 2000).

Paients with AF remained more than 13 hours in the ICU more than the ones who did not have it. (Mathew et al.,1996). In order to reduce the occurance of postoperative atrial fibrillation, different methods have been followed. Still, there is a failure in proving an advantage over placebo using verapamil and digoxin (Andrews TC and Reimold SC, 1991). Furthermore, postoperative AF was prevented by using two beta-blockersin a meta-analyses that have decreased the threat greatly(Khuri, et al 1978).

Using antiarrhythmics in conjunction with intravenous (IV) procainamide, oral amiodarone, and oral sotalol had been tackled byGold MR, O'Gara PT and MJ (1996); Laub GW, L and S, (1993), Butler J , Harriss DR and Sinclair M, (1993); Gomes JA and F, (1999); McCullough and Redle, (1998); Redle JP, Khurrana S and R, (1999) , Gomes JA and F, 1999; Parikka H, Toivonen L and K, (1998).

Despite the aforementioned, the majority of the proof on the usage of beta -blockers comes from early trials in the ones who've been handled non-selective -blockers such timolol, pindolol, and propranolol. Non-selective beta -blockers, on the other hand, were linked to lower affected character tolerability and compliance than cardio selective 1-blockers(Kendall, 1999), which have grown in popularity in the ultimate decade for treating arterial hypertension, coronary artery disease, cardiac arrhythmias, and coronary heart failure (Ellison, 2005). At present, it's far widely that β-blockers with immoderate β1-selectivity (e.g., atenolol, metoprolol, bisoprolol) provide a cardio shielding effect in the patients frequently denied β-blockers collectively with patients who were elderly, diabetic and those with reduced respiratory function(Gottlieb, 1998).

Bisoprolol is broadly utilized in scientific practice because of the maximum aerobic selective 1-blocker without intrinsic sympathomimetic activity (Broncel, 1998) has a plasma removal half-time of 10–12 hours, allowing treatment with a single daily dosage. Preoperative usage of bisoprolol is becoming more commonplace due to its advantageous pharmacodynamic and pharmacokinetic characteristics. Despite its theoretical and empirical superiority, bisoprolol is no longer specifically investigated for preventing AF following coronary heart surgery. The aim of the current study isto assess the effect of perioperative beta blockers (Bisoprolol) in the decreasing incidence of postoperative atrial fibrillation in patients undergoing CABG surgery.

1.1.1 CABG Surgery

In the late 1960s, parallel routes that protected bypassing coronary artery blockages saw the beginning of coronary artery bypass grafting, the usage of each Internal Mammary artery (IMA) was due to the fact the pass conduit or reversed saphenous vein graft (SVG)from the leg. Each technique had early proponents, but the use of saphenous vein graft have turn out to be the dominant technique via the majority of cardiac surgeons in 1970s. This desire is based entirely on the simplicity of using a large and technically much less challenging saphenous vein graft, in addition to the vein graft's greater adaptability.The majority of patients who undergo CABG surgical remedy in recent times geta Left Internal Mammary artery (LIMA) graft to the Left Anterior Descending (LAD) coronary artery. Other greater bypasses are constructed the usage of reversed saphenous vein grafts with proximal aortic anastomoses(Shikhman& Scott, 2018).

The most common cause of myocardial ischemia, or inadequate oxygen delivery to the heart, is coronary artery disease. Modern medicine has advanced significantly with the understanding of the pathophysiology of artery disease with sub intimal atheroma and plaque development. Even with better knowledge of heart disease, it continues to be the most common cause of death for Americans. More men and women die from cardiovascular disease than from cancer, trauma, and pulmonary disease combined.

The first CABG operation, the use of saphenous vein conduit, turned into an achievement through Dr. David Sabiston at Johns Hopkins Hospital in 1962 and has advanced into the “gold general” remedy for patients with multi-vessel coronary artery ailment. Although percutaneous interventional techniques have advanced, CABG

remains one of the most frequently performed procedures in the United States, costing about $50 billion USD annually for health care (Shikhman& Scott, 2018).

1.1.2 Risk Factors of Stroke after Myocardial Revascularization

The threat signs of postoperative stroke can be divided into preoperative, intra-operative, and postoperative factors (Charles worth, Likosky, &Marrin, 2003). Preoperative factors include advanced age, atherosclerosis inside the ascending aorta, unstable angina, hypertension, information of stroke, and redo surgical remedy. Another crucial predictor of stroke following CABG surgery is urgent surgical treatment for severe left main coronary artery disease (luminal narrowing more than or equal to 70% with or without angina). Intra-operative factors include the staying strength of extracorporeal movement and aorta clamping or operation type. Some evaluations show off that the kind of revascularized vessels (greater or identical to three) is associated with a higher incidence of stroke after CABG procedure.

1.1.3 Atrial Fibrillation

AF is the most common complication following coronary artery bypass graft surgery (CABG). Post-CABG, AF occurs most commonly on the second postoperative day and declines in incidence thereafter. A number of risk factors have been found to be associated with a higher frequency of post-CABG AF. These risk-factors include advanced age, a prior history of AF, hypertension, and heart failure(Surgery, 2000)

AF is characterizedvia way of means of disorganized, speedy, and abnormal atrial activation with lack ofatrial contraction and with an abnormal ventricular charge.This is decidedvia way of means of AV nodal conduction. In an untreated patient, the ventricular chargeadditionallyhas a tendency to be speedy and variable, among one hundred twenty and one hundred sixty beats/min. However in a few patients, it could exceed two hundred beats/min.

Patients with excessive vagal tone or AV nodal conduction sicknessmight also additionally have sluggish ventricular rates (J. Larry Jameson, S., Fauci, & L., 2018). AF is the maximumnot unusual place sustained arrhythmia and is a major public health concern.Prevalence increases with age, and >95% of AF patients are >60 years of age. The incidencevia way of means of age eighty is ≈10%. The risk of developing AF over their lifespan for males who are 40 years old is ≈25%. AF is barely more common in

men than in women, and it is more common in white people than in black people. Risk elements for growing AF similarly to age and underlying cardiac sicknessconsists of hypertension, diabetes mellitus, cardiac sickness, obesity, and sleep apnea. AF is related to a 1.5 to 1.9-fold elevated hazard of mortality after controlling for underlying coronary heartsickness. AF is likewise related to a hazard of growingcoronary heart failure and vice-versa patients with coronary heart failure have an elevatedhazard of growing AF. AF increases the hazard of stroke via way of means of fivefold and is predicted to be the reason behind 25% of strokes. It additionally increases the hazard of dementia and silent strokes detected via way of means of Magnetic Resonance Imaging (MRI).

Determining how much AF contributes to associated higher mortality and morbidity is difficult since AF is a marker for a variety of predictors of mortality and morbidity, including the degree of coronary heart disease. (Hylek& Philips, 2001). Lahtinen & Jamo from Finland examined the data of 52 stroke patients following CABG surgery and found that 19 patients (36 percent) experienced this complication by a median of 21.3 hours, the first AF episode came before the improvement of the stroke. In thirteen individuals, the ascending aorta's calcification was blamed for the stroke (25 percent of the whole patients). Sixteen individuals, or 31% of all patients, had inner carotid artery stenosis of greater than 70%. (Biancari, 2007).

1.1.4 Perioperative Beta-Blockers

According to recent research, individuals should keep taking beta-blockers before undergoing elective cardiac surgery (Broecke & Hert, 2003). Due to the regular survival benefit and decrease in arrhythmia during the early postoperative period that result from doing so (Blessberger & Kammler, 2015). However, the effectiveness of catecholamine in the early postoperative period may be restricted thru manner of way of concurrent treatment with beta-blockers until the day of the operation (Carl M & Alms A, 2010).

Whether one should initiate a beta-blocker in the preoperative or postoperative period is less clear (Sjoland H & K, 1995), and such a decision should be individualized, which involves weighing the risks and benefits. Initiating beta-blockers preoperatively may be considered for the prevention of POAF. Whether beta-blockers prevent preoperative MI and death is controversial. Studies have shown that beta-blockers are particularly

beneficial in patients with a recent MI (Puymirat E & E, 2016). Indeed, it is suggested that the benefit of beta-blockers before CABG to prevent MI and death is limited only to patients with a recent MI (Booij& Damman, 2015). There is conflicting evidence on whether preoperative beta-blockers are beneficial in patients with reduced Left ventricular ejection fraction (LVEF) but without a recent MI(Brinkman W & MA, 2014). However, if beta-blockers are initiated preoperatively, careful up-titration of short-acting agents according to blood pressure and heart rate, starting several days before surgery, is recommended(Brinkman W & MA, 2014).

The aim for the preoperative use of beta-blockers is to decrease myocardial oxygen call for and usual ischemic activities via way of means of blunting the chronoscopic and inotropic impact of catecholamine surge in the postoperative duration (Kalman JM, Munawar M, & LG, 1995).

Thus, via way of means of lowering ischemic activitiesall through surgery, beta-blockers have a useful impact in lowering destructive activities, consisting of the improvement of AF(E Boersma, Poldermans, & Bax, 2001), so long as care is taken now no longer to reasoninmoderatebradycardia, hypotension or hemodynamic instability in the postoperative duration(Group PS, PJ, & 2008; LA, , & 2014). In patients on continual beta-blockers, its abrupt discontinuation postoperatively consequences in a two- to fivefold boom in theoccurrence of POAF (Jideus L, Blomstrom P, & L, 2000).

1.1.5 Postoperative Beta-Blockers

In addition to a preoperative beta-blockade in patients with reduced LVEF, continuing beta-blockers at a few degrees during the early postoperative section has moreover been demonstrated to noticeably reduce the 30-day mortality charge following CABG(Lin T & NW, 2010). Strong evidence suggests that beta-blockers reduce the variety of deaths in patients with a latest MI or reduced LVEF (<35%) (Brophy JM & L, 2001). Therefore, it's miles essential that beta-blockers be continued upon discharge for long-term secondary prevention in patients with a latest MI or reduced LVEF (Chatterjee S & G, 2013; HJ, 2001). Approved selective beta-blockers are Metoprolol succinate, Bisoprolol, Nebivolol and Carvedilo (Ponikowski P & AA, 2016).

1.2 Statement of the Problem

Postoperative Atrial fibrillation (POAF) is an extreme trouble that complicates postoperative care via way of means of elevating the danger of postoperative stroke and duration of stay in the hospital. Beta-blockers become the preventive drug this is unanimously appeared as a remedy that assists in the reduction of POAF occurrence in all regarded research. Beta-blockers are actually blanketed in traditional remedy guidelines for prophylactic intervention towards POAF' If the danger of arrhythmias amongst CABG patients submit operatively is decreased o be able to result in lower the period of live at clinic and so decreases the value of clinic charges, and lowers morbidity (coronary heart failure, strokes, etc.). Strategies have been attempted in the past to decrease the incidence of POAF with mixed results, trials using preoperative verapamil and digoxin showed no significant benefits compared to placebo.

Two meta-evaluation of beta blockers (Merrick AF, MJ, & DJM, 1995; PR, Taylor JE, & Rials SJ, 1992) have proven advantages with the usage of beta blockers in the prevention of submit-operative AF with 50% risk reduction at best. It is commenced to discover the opportunity of a further advantages of postoperative beta blockers in addition to lessening the occurrence of submit-operative AF, shortening the CCU and hospital period of stay

1.3 Significance of the Study

The most prevalent arrhythmia after cardiac surgery is AF. Its frequency varies depending on the type of surgery performed. Hemodynamic worsening, stroke risk, and death are all risks associated with postoperative AF. Effective postoperative AF prevention is critical because it minimizes hospitalization and overall morbidity. Beta-blockers have been shown to successfully prevent AF after cardiac surgery and should be administered consistently if no contraindications exist.

1.4 Aim of the Study

To determine the incidence of postoperative atrial fibrillation in patients undergoing on-pump CABG surgery after perioperative beta blocker (Bisoprolol) administration.

1.5 Objective of the Study

To assess the incidence of postoperative Atrial fibrillation in CABG surgery patients after perioperative beta blocker (Bisoprolol) administration

1.6 Research Question

The question of the study was whether perioperative beta-blocker (Bisoprolol) treatment can alter postoperative outcomes focusing on postoperative AFin CABG surgical patients?

1.7 Research Hypothesis

When utilizing perioperative beta-blockers, CABG patients experience reduced postoperative AF.

Outcomes

The primary outcome of the study was the incidence of postoperative AF.

The secondary outcomes were the rate of side effects related to the study drugs and length of CCU and hospital stay.

1.8 Literature Review

In a meta-analysis study comparing amiodarone with beta blocker for prevention of POAF, no difference was found in the incidence of POAF in amiodarone and beta-blocker arms. Mean rate following cardiac surgery were similar between the two risks for postoperative AF. The reported incidence of Atrial arrhythmias after coronary artery bypass grafting depends upon the length and type of monitoring as well as the definition of arrhythmia using intensive care unit monitoring and citing only sustained Atrial fibrillation, Atrial flutter, or paroxysmal Atrial tachycardia, found an incidence of only11.4% (Tyras & Amp, 1979) .

In a study of 128 patients, Mills et al.,(1983) examined preoperative variables (diabetes, smoking, hypertension, Atrial fibrillation after coronary bypass, mortality, hospital stay (days), angina, syncope, cerebral vascular accident, myocardial infarction, family history of coronary artery disease, and aortic cross-clamp times). They found that atrial

fibrillation was more common in older patients, diabetic patients, and patients with longer cross-clamp times.

Furthermore. Silverman et al, (1982) conducted a study on 100patients; they examined five preoperative characteristics (age, hypertension, prior myocardial infarction, extent of coronary artery disease, and preoperative propranolol dosage) and they found no characteristic predictive of postoperative AF.

In an early study, Johnson and associate (1976) evaluated sex, age, coronary risk factors, extent of coronary disease, and postoperative potassium levels and hypoxia. In their series of 120 patients, none of these risk factors was predictive. Because of newer operative techniques, this study could be invalid and, again, no multivariate analysis was performed. No single risk factor or group of risk factors, including the previously suggested age, diabetes, extent of coronary artery disease, or aortic cross-clamp time, defined a group of patients at increased risk for postoperative AF.

Csicsko et al (1981) reported a reduction in the frequency of supraventricular arrhythmias' by very low-dose Propranolol therapy (5 mg every 6 hours). This study only randomized patients receiving preoperative Propranolol and therefore the conclusions are limited to this select group. The authors concluded that prospectively randomized series of all patients with preserved left ventricular function, postoperative propranolol significantly reduced the incidence of postoperative AF.

According to a systematic review study conducted by Koniari et al (2010), Beta-blockers should be used as the first line of treatment for the prevention of AF in all patients having cardiac surgery, unless contraindicated. Sotalol may be more successful than typical B- blockers in preventing AF while having fewer side effects. Amiodarone should be administered to prevent AF in all patients undergoing cardiac surgery who are unable to receive B-blocker therapy. Amiodarone may be used as a supplementary prophylactic in high-risk patients taking beta-blocker medication for the prevention of AF, with an acceptable risk of complications. Temporary pacing wires should be put intra-operatively to protect these individuals from the risks of bradycardia.

Masuda &Luo, (2020) conducted a meta-analysis in order to determine the benefit of beta-blockers for the decrease of isolated AF following cardiac surgery. By comparing the efficacy of beta-blockers and control participants in isolated POAF for cardiac

surgery, randomized controlled trials (RCTs) were searched and filtered. Using standardmeta-analysis procedures, seventeen RCTs were examined. Subgroup analyses were undertaken for operation type and beta-blocker start time, method of administration, and in travenous Landiolol Hydrochloride dosage. Beta-blockers were found to be effective in reducing isolated POAF risk. According to the authors, beta-blocker medication during the postoperative phase for on-pump coronary artery bypass graft had the lowest risk of isolated POAF incidence in subgroup studies.

Zhang & Yuan, (2015) performed a study in order to evaluate how effective chronic beta-blocker therapy was for secondary prevention following coronary artery bypass grafting surgery. The study comprised 5, 926 patients who underwent CABG and were alive when they were discharged. In individuals with and without a prior history of myocardial infarction, the prevalence and consistency of B-blocker use were investigated. B-blockers were used in all1, 280 patients (50.9%) who had a prior MI and 1, 642 (48.1%) who did not. Consistent use of-blockers was linked to a decreased risk of long-term mortality and adverse cardiovascular events in patients receiving CABG, whether they had previously had a MI or not. To better understand and improve the discharge prescription of B -blockers and long-term patient adherence, strategies should be devised.

Elshafei & Hussein, (2020) conducted a study to determine the influence of perioperative beta-blockers on post-surgery outcomes in coronary artery bypass graft patients It was a prospective controlled nonrandomized study on 50 patients undergoing elective CABG at Ain Shams University hospitals, in which the study group, who were compliant on beta-blocker therapy, received 1 mg of Propranolol before removing the aortic cross clamp and continued on beta-blocker therapy in the postoperative period, while the control group, who were not on beta-blocker therapy, received an equivalent volume of normal saline before removing the aortic cross clamp and received beta-blocker therapy in the postoperative period. Trans esophageal echo intra-operatively and transthoracic echo intra-operatively were used to examine both groups; heart rates and ventricular systolic function. Length of stay in ICU and hospital stay, and incidence of intra- and postoperative arrhythmias were all measured in both groups. Preoperative beta-blockers were found to reduce the incidence of intraoperative and postoperative arrhythmias. In the absence of contraindications, the authors concluded that

perioperative beta-blockers should be given to CABG patients because they improve systolic ventricular function, reduce the incidence ofintra- and postoperative arrhythmias, and shorten hospital and ICU stays.

Wang et al. (2018) published a meta-analysis of six observational studies to assess the impact of beta-blocker medication prior to CABG surgery. Beta-blocker medication did not significantly improve perioperative mortality or complication rates, according to Wang. The question of whether preoperative beta-blocker treatment can alter perioperative outcomes was raised in this study. The authors speculated that perhaps surgical coronary revascularization outcomes have been improved to the point where no additional benefit from preoperative beta-blocker medication passes the statistical significance criteria.

A study was conducted by Abdel-Salam & Nammas, (2016) on the efficacy of preoperative ivabradine, bisoprolol, or both for the prevention of postoperative AF in patients after CABG. Seven hundred and forty individuals were enrolled in the study, all of them were scheduled for elective CABG with or without valve surgery. Patients were randomly assigned to one of three protocols: ivabradine 5 mg bid for 24 hours, then 7.5 mg bid thereafter in patients who could tolerate it (group 1, n = 212); bisoprolol 5 mg bid (group 2, n = 288); or both drugs given perioperatively (ivabradine as before + bisoprolol 5 mg once daily) (group 3, n = 240).An ambulatory event recorder was used to continually monitor cardiac rhythm for 15 days after surgery. For the next 15 days, clinical follow-up was undertaken to see if any arrhythmias developed. The incidence of AF at 30-day follow-up was the primary outcome. The 30-day follow-up was completed by all patients. In 10.4 percent of cases, AF occurred. Most baseline features, echocardiograph, and angiographic data were matched amongst the three groups. When compared to group 1 (15.5%) and group 2 (12.2%), the incidence of AF was considerably lower in group 3 (4.2%) (P= 0.001) compared to group one and two. The time spent in the intensive care unit was shorter in group 3 compared to groups 1 and 2 (P= 0.001). The authors concluded that adding ivabradine to -blockers during the perioperative phase was linked with a lower incidence of AF at 30-day follow-up inpatients following elective CABG.

Sezai, et al,. (2011) assessed the efficacy of Land iololand administration time for preventing postoperative AF, as well as the effect of oral bisoprololinonthe early postoperative phase. A total of 105 patients who underwent coronary artery bypass grafting were randomly assigned to one of three groups: group L, which received in travenous landiolol at a rate of 5 mg/kg/min for three days perioperatively (group L), groupLB, which received oral bisoprolol along with landiolol postoperatively (group LB), andgroup C, which received no beta-blocker therapy (group C). The occurrence or absence of postoperative AF was the key end point. Early clinical outcome, hemodynamic, cardiac enzymes (creatinekinas'isoenzyme MB, troponin-I, and human heart fatty acid-bindingprotein), high-sensitivity C-reactive protein (hs-CRP), and pentraxin-3 were the secondaryend points. The findings of the research after surgery, 14.5 percent of group L, 9.1 percent ofgroup LB, and 35.3 percent of group C developed AF. There was a substantial differencebetween groups LB and C. Troponin-I, human cardiac fatty acid-binding protein, hs-CRP, pentraxin-3, were found to be significantly greater in group C than in groups Land LB. The authors came up to conclude that Landiolol and bisoprolol were effective in preventing postoperative AF. These beta-blockers; anti-ischemic, anti-inflammatory, andanti-oxidant properties are thought to have prevented the start of AF.

The efficacy of bisoprolol plus magnesium (Mg) in the prophylaxis of AF aftercoronary artery bypass graft (CABG) surgery was investigated by Behmanesh, et al (2006).A total of 100 patients with no prior AF history who underwent elective on pump CABG were randomly assigned to either the prophylaxis group (n = 50)receiving bisoprolol (5mg/day) plus Mg (intravenous infusion of 2g of Mg on arrival in theintensive care unit, followed by oral Mg at 1800mg/day for 1 week) or the control group (n =50) receiving nothing. All of the patients were constantly monitored in order to detect thedevelopment of AF. According to the findings, the incidence of postoperative AF wasconsiderably lower in the prophylaxis group, with 20% (10/50) compared to 42% (21/50) inthe controls (p = 0.030, 95 percent confidence interval [CI]. Bisoprolol with Mg was successful in preventing AF, especially in the elderly; in the prophylaxis group, only six of36 (17%) patients under 65 years of age experienced AF, compared to 13 of 20 (65%) in the control group. In the prophylaxis group, this was linked to considerably (p = 0.022) shorter hospital stays (median of 7 vs. 9 days, 95 percent CI for difference

in medians, 0–3 days).The authors came to the conclusion that combining bisoprolol with magnesium efficiently reduces the incidence of AF.

In a randomized, multicenter trial conducted in 1999, Poldermans et al,.(1999) evaluated the effect of preoperative beta-adrenergic receptor blockade on the incidence of death from cardiac causes and nonfatal myocardial infarction within 30 days ofmajor vascular surgery in patients at high risk for these events. Both clinical risk factors and positive obutamine echocardiography results were used to identify patients at high risk. Standard perioperative care or standard care + perioperative beta-blockade with Bisoprololwere randomly assigned to eligible patients. A total of 1351 patients were tested, with 846having one or more cardiac risk factors, according to the findings. Dobutamineechocardiography revealed 173 of the 846 patients obtained favorable outcomes. Bisoprololwas given to 59 of the patients at random 53 people received standard care. Fifty-threepatients were ruled out of the study because they were already taking a beta-blocker, andeight others were ruled out because they showed severe wall-motion anomalies during rest or stress testing. Two patients died of cardiac reasons in the bisoprolol group (3.4%), compared to nine patients in the standard-care group (17%), P=0.02. Nonfatal myocardial infarction occurred in nine patients (17%) who received only standard care, but not in any of thepatients who had standard care with bisoprolol (P=0.001). Thus, the primary study end pointof death from cardiac causes or nonfatal myocardial infarction occurred in two patients (3.4%) in the Bisoprolol group and 18 patients (34%) in the standard-care.

Chapter Two

Methodology

2.1 Introduction

This chapter covers the study design, hypothesis, setting, period, population and sampling, sampling techniques, and exclusion and inclusion standards. This component is important because it offers a good understanding of the technique used.

2.2 Study Design

A prospective observational study to evaluate the effect of perioperative oral beta blockers (bisoprolol) on patients undergoing CABG surgery to prevent postoperative atrial fibrillation.

2.3 Study Period

Data collection lasted from March to September 2021.

2.4 Site and Setting

This study was conducted at NNUH, a non-profit academic medical institution established in 2013 in partnership with the Faculty of Medicine and Health Sciences at An-Najah National University (NNU). The hospital consists of 5 beds in coronary wards and 10 beds in the intermediate ward, which receives patients from all over the country: West Bank and the Gaza Strip

2.5 Study Population

One hundred and fifty participants undergoing coronary artery bypass grafting surgery giving preoperative (n=54) and postoperative beta- blockers (n=150) participated the study

2.6 Sample Size Calculation

The sample size calculation was consistent with the subsequent examination and the minimal sample size was to be considered. The incidence of postoperative atrial fibrillation (POAF) stages was 10% to 65% (Patti, et al. 2006, Alqahtani, et al. (2010) in patients present process cardiac surgery. One hundred and thirty nine patients were

needed: 10% turned into supply to cover dropout, corresponding to 14 patients.Sample Size: 139

This means that 139 or more measurements/surveys were needed to have a confidence level of 95%. The real value was within ±5% of the measured/surveyed value. To account for the dropout patients, 150 patients were participated in the current trial.

Confidence Level:	95%	
Margin of Error:	5	
Population Proportion:	10	Use 50% if not sure
Population Size:	139	Leave blank if unlimited population size.

2.7 Inclusion Criteria

- Patients eligible for CABG
- Patients with normal sinus rhythm on admission
- No history of AF.
- Ages were 40-85.
- Weight wasbetween 50-120 kg.

2.8 Exclusion Criteria

- Patients with significant resting sinus bradycardia.
- Exclusion of patients who showed an allergic or toxic reaction to the drug.
- Patients undergoing valve surgery;
- Pacemaker implantation;
- RedoCABG operation;
- Kidney failure

2.9 Study Variables

Dependent variables:

- Length of stay in hospital
- Length of stay in CCU
- Heart rate
- Electrocardiogram (ECG) pattern (Atrial fibrillation).
- Systolic BP
- Diastolic BP
- MAP
- SPO2
- Pain

Independent Variables:

- Demographic characteristics (age and gender);
- Bypass time.
- Aortic cross clamp time on cardiopulmonary bypass.
- History of treatment with β-blockers
- Other factors such as hypertension, coronary artery disease, previous myocardial infarction, congestive heart failure, COPD and cerebrovascular accident.

2.10 Data Collection

Upon receiving formal approval from An-Najah National University IRB and NNUH, data collection using a clinical-field specific criteria datasheet began at the selected hospital in March 2021and ended in September 2021. The tool was created after reviewing the relevant literature and with the guidance of the cardiologist and ICU nurses. :

Part I: Demographics and Co morbidities.

Part II: Observational Checklist for Assessment of Cardiac Status, Vital Signs and Operative Time.

Part III: Observational Checklist for ECG Results (12-Lead)

Part IV: Observational Checklist for Length of Stay.

Part V: Observational Checklist for Pain Assessment

Part VI: Observational Checklist for Postoperative Signs and Symptoms.

Part VII: Observational Checklist for Morbidities Associated with Duration ofBeta-blockers CABG Patients

The patients were divided into two groups:

First group: Patients diagnosed with ischemic heart disease who are currently taking beta-blockers. The medication from this group (bisoprolol) was continued up to the day before surgery and then continued postoperatively after the patient was extubated and fully conscious and able to take his prescriptions. Patients received bisoprolol adjusted for heart rate and blood pressure. Over the course of this observational study which is three days after the operation including the day of surgery, vital signs were monitored, with a focus on heart rate and blood pressure.

The second group were patients who had undergone CABG but had no beta-blockers in their preoperative medication, the patients referred to in our study as (newly administered beta-blockers), this group was started on beta-blockers (bisoprolol) on post-operatively afterextubation. When the patient is fully awake and able to take their

prescriptions. Patients starting bisoprolol adjusted for heart rate and blood pressure. Vital signs were monitored over the course of three days after surgery, with a focus on heart rate and blood pressure.

Surgical Protocol of An-Najah National University Hospital

Preoperative Preparation for CABG at Ward

The day before the operation, the patient was admitted to the ward, laboratory tests were performed (ABG, CBC, PT, PTT, INR, lever enzymes, kidney function test, blood group, cross match and cardiac enzymes), chest X-ray, ECG (12 leads).

2.10.1 Intra-operative

All operations were performed with assistance of cardiopulmonary bypass (CPB) machine, using antegrade and in some cases retrograde cold(4 °C) rich potassium (crystalloid'scardioplagia, A double stage right Atrial cannula was used for venous cannulation and aortic cannula for arterial line . A left internal mammary artery graft was used in all patients saphenous vein proximal coronary anastomoses were done under side aortic cross-clamping.

2.10.2 Anesthesia Protocol

A 20-gauge intra-arterial catheter was placed for invasive blood pressure monitoring, a wide-bore 16-gauge intravenous cannula and a triple-lumen central venous catheter, as well as a pulseoximeter and electrocardiogram.

Propofol 2 mg/kg (dose titration), fentanyl 2-10 µ/kg (dose titration), and atracuronium 1 mg/kg were used to induce general anesthesia followed by endotracheal intubation, which was confirmed by capnography, and equality was verified by auscultation. Pulse oximetry, invasive blood pressure, Transesophageal echocardiography (TEE), and urinary catheters were used for intraoperative monitoring.

The patients were then maintained on 60 percent oxygen and sevoflurane. All myocardial preservation measures were followed, cold cardioplegia was used, and the temperature was maintained between 30 and 32 degrees Celsius. The following criteria were used to assess patients: The occurrence of postoperative arrhythmias, with emphasis on AF, was the primary endpoint (AF). Measured as secondary endpoints:

length of stay in the cardiac unit and length of hospital stay. The patients had been ventilated with positive pressure. A tidal quantity of 8 ml/kg and a breathing rate of 10-12/min, which become decided the use of arterial blood gases, had been set as ventilation parameters

2.10.3 Beta-blockers Administration Protocol

Beta blockers should be given to patients already taking beta blockers the night before surgery and should continue to be taken after they are extubated and fully conscious. For patients new to receiving beta-blockers postoperatively, the dose is adjusted according to heart rate, starting from 1.25mgbisoprolol (oral) and titrating up till suitable dose for the patient and continuing for the rest of their lives.

2.10.4 Procedures

The current study was carried out at An-Najah National University Hospital. After approval by the Institutional Review Board of An-Najah National University, a consent wasobtained from every affected person at some point of the preoperative interview. Overall of one hundred fifty consecutive sufferers (36 women and 114 men) have been scheduled for optionally available CABG surgical treatment on this potential observational study. CPB management from March to September 2021. Patients were excluded from the study because of concurrent valve surgical treatment, previous CABG surgical treatment, and renal impairment.

The study sample consisted oftwo groups, 54 (36%) have been in the organization (already on beta-blockers) and 96 (64%) patients in the organization (re-management of beta-blockers with bisoprolol). Patients in the organization already taking beta-blockers acquired the study's drug (bisoprolol) till the day earlier than surgical treatment. After the operation, every affected person turned into was admitted to the intensive care unit after which transferred to the ward. Patients were monitored constantly for the primary seventy-two hours after surgical treatment.

Atrial fibrillation turned into described as a loss of regular P waves earlier than every QRS complicated and lasting greater than 1 minute. The number one endpoint of the study had been the incidence of postoperative AF. Secondary endpoints were therate of side effects related to the study drugs and length of CCU and hospital stay. For this prospective observational study, data were prospectively collected from the

cardiovascular surgery operating room and cardiac unit (CCU). Age, gender, BMI, history of COPD, heart disease, stroke, TIA, diabetes, heart failure and hypertension were among the demographics collected. Respiration rate, heart rate, systolic blood pressure, diastolic blood pressure, mean arterial pressure, temperature, ECG rhythm including Atrial fibrillation, Atrial flutter, ventricular tachycardia, pain, bradycardia less than 60 beats per minute, hypotension, dyspnea, ejection fraction, aortic cross-clamp time , pumping time, length of surgery, length of stay in ICU, length of hospital stay were major factors

In addition, anxiety, dizziness, nausea, hyperglycemia, vomiting, constipation, insomnia, and mortality are factors.

2.11 Validity of the Data Sheet

Validity refers to whether the data sheet measures what it purports to measure. The technical data sheet was prepared by the researcher, and it was based on the information from the records used in the ICU and by study variables. It was reviewed by a panel of experts composed of a cardiac surgeon, an anesthesiologist, three CCU nurses, two researchers and a statistician.

2.12 Statistical Procedures

SPSS version 20 was used for statistics analysis. Descriptive statistics (frequency, percentage, suggest, and trendy deviation) were used. The following assessments and strategies were used to investigate the effects assuming that P value which of0.05 taken into consideration was significant:

Chi-square test: assessments the share variations among affected person corporations on qualitative variables such as affected person type, gender, scientific history, crucial signs (ECG rhythm), cardiac status, postoperative signs and symptoms, morbidities related to the use of beta blockers, consequences of beta blockers and duration of beta blocker prescription.

T-test of independent samples (adjusted for unequal variances) and Mann-Whitney test for quantitative variables such asage, weight, height, BMI, crucial signs, operative time, duration of stay in CCu and hospital, and pain assessment (VAS).

2.13 Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (IRB) of An-Najah National University. Informed consent was obtained from every affected person for the duration of the preoperative interview. The An Najah National University Hospital's Research Committee granted permission for the study to proceed.

Chapter Three

Results

3.1 Overview

This chapter presents the study results. These results were obtained from analyzing the data sheet, which contained five sections:

Section one includes demographic data and history, vital signs (ECG rhythm), cardiac status, postoperative signs and symptoms, morbidities associated with Beta-blocker's intake, Beta-Blockers side effects, and time of the Beta-blocker prescription.

3.2 Description of Demographic Characteristics

Table3.1

Demographic characteristics of study sample (n=150)

Demographic data	N (%) / Mean ± S.D
Patient Type	
Already on Beta-Blockers	54(36%)
Newly administration of Beta-blockers	96(64%)
Age (year)	62.16 ± 9.49
Sex:	
Male	114.0(76.00%)
Female	036.0(24.00%)
Weight (kg)	077.90 ± 12.94
Height (cm)	169.77 ± 09.04
BMI	027.04 ± 04.34
History of Pulmonary Disorders (COPD)	067(044.70%)
History of Cardiac Disorders	150(100.00%)
History of CVA or TIA	008(005.30%)
History of Diabetes	074(049.30%)
History of Heart Failure	033(022.00%)
History of Hypertension	063(042.00%)
Other	001(000.70%)

The study sample consisted of 150 patients: 114(76%) males and 36(24%) females, and the average of ages in the study sample was 62.16 years. The average of weights was 77.9 k.g. and the average of heights was 169.77 cm and the average of BMI was 27.04. (Table 3.1)

The study sample contained 67 (44.7%) cases with history of pulmonary disorders (COPD).All studied cases in the sample had history of cardiac disorders, and only 8(5.3%) of the cases in the study sample had history of CVA or TIA. The study sample also contained 74(49.3%) cases with history of diabetes, 33(22%) of the sample had history of heart failure, and 63(42%) of the cases in the study sample had history of hypertension and only one case in the sample had history of other disease. (Table 3.1).

3.3 Description of Vital Signs

Table 3.2

Means and Standard Deviations of Vital Signs of the Study Sample (N=150)

Vital Signs	Mean ± S.D
Respiratory Rate:	
Day 0	21.75 ± 04.12
Day 1	21.97 ± 04.31
Day 2	22.07 ± 04.56
Day 3	22.37 ± 04.67
Total	22.01 ± 03.23
Heart Rate:	
Day 0	84.66 ± 24.81
Day 1	83.34 ± 25.08
Day 2	83.32 ± 26.24
Day 3	82.55 ± 25.90
Total	84.30 ± 26.40
Blood Pressure-Systole:	
Day 0	115.05 ± 13.38
Day 1	115.82 ± 14.79
Day 2	118.04 ± 14.96
Day 3	117.62 ± 13.46
Total	116.50 ± 12.80
Blood Pressure- Diastole:	
Day 0	62.73 ± 08.93
Day 1	63.65 ± 09.50
Day 2	64.81 ± 10.03
Day 3	65.76 ± 09.12
Total	64.20 ± 06.80
MAP:	
Day 0	80.03 ± 09.08
Day 1	81.02 ± 09.69
Day 2	82.55 ± 09.90
Day 3	83.03 ± 09.40
Total	81.70 ± 07.90
Temperature:	
Day 0	36.60 ± 0.45
Day 1	36.70 ± 0.43
Day 2	36.70 ± 0.46
Day 3	36.59 ± 0.96
Total	36.50 ± 1.01

Table 3.2 above shows that the averages of respiratory rate between Day0 and Day3 ranged between 21.75-22.37 and the total average of respiratory rate was 22.01.

The results also show that the averages of heart rate between Day 0 and Day 3 were ranged between 84.66 -82.55 and the total average of heart rate was 84.3.The results show that the averages of Systolic Blood Pressure between Day0 and Day 3was between 115.05 -117.62 and the total average of Systolic Blood Pressure was 116.5.The results also show that the averages of Diastolic Blood Pressure between Day0 and Day 3 was between 62.73 -65.76 and the total average of Diastolic Blood Pressure was 64.2.The results show that the averages of MAP between Day0 and Day 3 were between 80.03 -83.03 and the total average of MAP was 81.7.Finally, the results show that the averages of temperature between Day0 and Day 3 ranged between 36.6 -36.59 and the total average of temperature was 36.5. (Table 3.2).

3.4 Comparisons between Already on Beta-Blockers and Newly Administeed Beta-Blockers regarding AF_ECG rhythm.

Table 3.3 shows analysis of comparison between already on Beta-Blockers and newly administered Beta-Blockers regarding AF_ECG rhythm:

Table 3.3

Comparisons between (Already on Beta-Blockers) group and (Newly ADMINISTERED BETA-blockers) group regarding AF_ECG rhythm

(AF_ECG Rhythm)/Other	Already on Beta-Blockers (N=54)	Newly Administered Beta-blockers (N=96)	Total (N=150)	*P-value**
Day 0:				
AF	2(3.7%)	15(15.6%)	17(11.3%)	0.027
Other	52(96.3%)	81(84.4%)	133(88.7%)	
Day 1:				
AF	2(3.7%)	15(15.6%)	17(11.3%)	0.027
Other	52(96.3%)	81(84.4%)	133(88.7%)	
Day 2:				
AF	2(3.7%)	15(15.6%)	17(11.3%)	0.027
Other	52(96.3%)	81(84.4%)	133(88.7%)	
Day 3:				
AF	2(3.7%)	15(15.6%)	17(11.3%)	0.027
Other	52(96.3%)	81(84.4%)	133(88.7%)	
Total:				
AF	2(3.7%)	15(15.6%)	17(11.3%)	0.027
Other	52(96.3%)	81(84.4%)	133(88.7%)	

Table 3.3 shows that AF was lower in the Already on beta-blockers) group compared to the Newly Administered Beta-blockers group in AF_ECG rhythm in all time periods (all *P-values*were less than 0.05).The results also show that the percentages of AF cases in the Already on Beta-Blockers group (n=2, (3.7%) were lower than that in the Newly Administered Beta-blockers group (n=15, (15.6%) in all days, and in the total, the *P-values* of the tests were 0.027. (Table 3.3).

3.5 Description of Cardiac and Respiratory Status

Table 3.4

Frequencies and Percentages of the Cardiac and RESPIRATORY STATUS of the Study Sample (N=150)

Cardiac Status	N(%)
Incisional Pain:	
Day 0	92(61.3%)
Day 1	54(36%)
Day 2	27(18%)
Day 3	13(8.7%)
Total	97(64.7%)
Bradycardia<60:	
Day 0	11(7.3%)
Day 1	17(11.3%)
Day 2	22(14.7%)
Day 3	23(15.3%)
Total	43(28.7%)
Hypotension:	
Day 0	47(31.3%)
Day 1	43(28.7%)
Day 2	35(23.3%)
Day 3	30(20%)
Total	52(34.7%)
Dyspnea:	
Day 0	91(60.7%)
Day 1	51(34%)
Day 2	34(22.7%)
Day 3	23(15.3%)
Total	97(64.7%)

The results show that the percentage of incisional pain cases decreased from 92(p=61.3%) on Day0 stage to 13(p=8.7%) on Day3; the total number and percentage of incisional pain cases in the whole testing period were 97(p=64.7%). (Table 3.4)

The results also show that the percentage of Bradycardia<60cases was11(p=7.3%) on Day0 stage to 23(p=15.3%) on Day3; the total number and percentage of bradycardia<60cases in the whole testing period were 43(p=28.7%). (Table 3.4)

The results, moreover, show that the percentage of hypotension cases decreased from 47(p=31.3%) on Day0 stage to 30(p=20%) on Day3; the total number and percentage of hypotension cases in the whole testing period were 52(p=34.7%). (Table 3.4)

The results show that the percentage of dyspnea cases decreased from 91(p=60.7%) onDay0 stage to 23(p=15.3%) on Day3; the total number and percentage of Dyspnea cases in the whole testing period were 97(p=64.7%). (Table 3.4)

3.6 Description of Operational Time

Table 3.5

Means and Standard Deviations of the Operational Time of the Study Sample (N=150)

Operational Time	Mean ± S.D
Cross Clamp Time (min)	125.65 ± 34.22
Pumping Time (min)	178.57 ± 34.37
Duration of surgery (hr.)	6.53 ± 1.04

The results of Operational Time in the table above show that the average of Cross Clamp Time was 125.65 minutes, the average of Pumping Time was 178.57 minutes and the average of Duration of surgery was 6.53 minutes. (Table 3.5)

3.7 Description of the Length of Stay in CCU and Hospital

Table 3.6

Means and Standard Deviations of the Length Of Stay of the Study Sample (N=150)

Length Of Stay	Mean ± S.D
CCU Length of Stay(day)	3.73 ± 1.26
Hospital length of stay (day)	5.83 ± 3.11

The results in the table above show that the average of CCU length of stay was 3.73 days, and the average of hospital length of stay was 5.83 days. (Table 3.6).

3.8 Description of Pain Assessment

Table 3.7

Means and Standard Deviations of Pain Assessment of the Study Sample (N=150)

Pain Assessment (VAS)	Mean ± S.D
Day 0	6.14 ± 1.22
Day 1	3.92 ± 1.39
Day 2	3.28 ± 1.26
Day 3	2.54 ± 1.18
Total	3.97 ± 1.08

The results of pain assessment show that the averages of pain (VAS) decreased from 6.14 on Day 0 to 2.54 on Day 3; the total average of pain (VAS) in the whole testing period was 3.97.(Table 3.7)

3.9 Description of Postoperative Signs and Symptoms

Table 3.8

Frequencies and Percentages of postoperative Signs and Symptoms Sample (N=150)

Postoperative Signs and Symptoms	N(%)
Palpitation:	
Day 0	22(14.7%)
Day 1	20(13.3%)
Day 2	20(13.3%)
Day 3	19(12.7%)
Total	24(16%)
Anxiety and Discomfort:	
Day 0	104(69.3%)
Day 1	68(45.3%)
Day 2	36(24%)
Day 3	31(20.7%)
Total	114(76%)
Fatigue:	
Day 0	101(67.3%)
Day 1	72(48%)
Day 2	49(32.7%)
Day 3	30(20%)
Total	110(73.3%)
Dizziness:	
Day 0	61(40.7%)
Day 1	38(25.3%)
Day 2	26(17.3%)
Day 3	21(14%)
Total	66(44%)
Lightheadedness:	
Day 0	47(31.3%)
Day 1	31(20.7%)
Day 2	25(16.7%)
Day 3	16(10.7%)
Total	56(37.3%)
Other:	
Day 0	3(2%)
Day 1	2(1.3%)
Day 2	3(2%)
Day 3	2(1.3%)
Total	6(4%)

The results in the table above show that the percentages of the heart palpitation cases decreased from 22 (p=14.7%) on Day 0 to 19(p=12.7%) on Day3; the total number and percentage of heart palpitation cases in the whole testing period were 24(16%). (Table 3.8)

Also, the results show that the percentages of the anxiety and discomfort cases decreased from 104(69.3%) on Day 0 to 31(20.7%) on Day3; the total number and percentage of anxiety and discomfort cases in the whole testing period were 114(76%). (Table 3.8)

The results show that the percentages of the fatigue cases decreased from 101(67.3%) on Day0 to 30(20%) on Day3; thetotal number and percentage of fatigue cases in the whole testing period were 110(73.3%). (Table 3.8)

The results show that the percentages of the dizziness cases decreased from 61(40.7%) on Day 0 to 21(14%) on Day3, the total number and percentage of dizziness cases in the whole testing period were 66(44%).The results show that the percentages of the lightheadedness cases decreased from 47(31.3%) on Day 0 to 16(10.7%) on Day3, the total number and percentage of lightheadedness cases in the whole testing period were 56 (p=37.3%).The results show that the percentages of the cases of the other atrial fibrillation signs and symptoms decreased from 3(2%) on Day 0 to 2(1.3%) on Day 3; the total number and percentage of other cases in the whole testing period were 6(4%).(Table 3.8).

3.10 Description of the Morbidities Associated with Beta-Blockers Intake

Table 3.9

Frequencies and Percentages of the Morbidities associated with Beta-Blockers intake in the Study Sample (N=150)

Morbidities associated with Beta-blockers intake	N (%)
Hypotension	39(26%)
Heart Failure	18(12%)
Thromboembolic Disorder	4(2.7%)
Stroke	2(1.3%)

The results of morbidities associated with Beta-blocker's intake show that there were 39(26%) Post-operative Hypotension cases. The results also show that there were 18(12%) post-operative heart failure cases. The results, further, show that there were 4(2.7%) post-operative thromboembolic disorder cases. And the results show that there were 2(1.3%) post-operative stroke cases. (Table 3.9).

3.11 Description of the Beta-Blockers Side Effects

Table 3.10

Frequencies and Percentages of the Beta-Blockers Side Effects of the Study Sample (N=150)

Beta-Blockers Side Effects	N(%)
Nausea:	
Day 0	024(16.0%)
Day 1	017(11.3%)
Day 2	006(04.0%)
Day 3	007(04.7%)
Total	033(22.0%)
Hyperglycemia:	
Day 0	030(20.0%)
Day 1	022(14.7%)
Day 2	017(11.3%)
Day 3	014(09.3%)
Total	043(28.7%)
Vomiting:	
Day 0	009(06.0%)
Day 1	008(05.3%)
Day 2	005(03.3%)
Day 3	002(01.3%)
Total	14(9.3%)
Constipation:	
Day 0	015(10.0%)
Day 1	011(07.3%)
Day 2	011(07.3%)
Day 3	013(08.7%)
Total	024(16.0%)
Insomnia:	
Day 0	054(36.0%)
Day 1	039(26.0%)
Day 2	022(14.7%)
Day 3	019(12.7%)
Total	063(42.0%)

The results show that the percentages of nausea cases decreased from 24(16%) on Day0 to 7(4.7%) on Day3, and the total number and percentage of nausea cases in the whole testing period were 33(22%). (Table 3.10)

The results show that the percentages of hyperglycemia cases decreased from 30(20%) on Day0 to 14(9.3%) on Day3, and the total number and percentage of hyperglycemia cases in the whole testing period were 43(28.7%). The results show that the percentages of vomiting cases decreased from 9(6%) onDay0 to 2(1.3%) on Day3, and the total number and percentage of vomiting cases in the whole testing period were 14 (9.3%).The results show that the percentages of constipation cases decreased from 15 (10%) on Day0 to 13(8.7%) on Day3, and the total number and percentage of constipation cases in the whole testing period were 24(16%).The results show that the percentages of insomnia cases decreased from 54 (36%) on Day0 to 19(12.7%) on Day3, and the total number and percentage of insomnia cases in the whole testing period were 63(42%). (Table 3.10)

Description of Time of the Beta-blocker Prescription

The following frequencies and percentages for the time of the Beta-blocker prescription of the study sample:

The results of Time of the Beta-blocker prescription show that there were 96(64%) newly administered case 54(36%) lifelong cases and 149(p=99.3%) alive cases. Appendix D, Table D.1.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-blockers Regarding Demographic Data

The comparison analysis between already on Beta-Blockers and newly administered Beta-Blockers regarding demographic data:

The results in Appendix D Table D.2, , show that there were significant differences at 0.05 level between the Already on Beta-Blockers group and the (Newly Administered Beta-blockers) group in weight, history of pulmonary disorders, history of heart failure, and history of hypertension. The P-values corresponding to these indicators and measurements were less than 0.05. Regarding weight, the results show that the mean of

the Already on Beta-Blockers) group (Mean=74.74) was significantly lower than the mean of the Newly Administered Beta-blockers) group (Mean=79.68), the P-value of the test was 0.024.

Regarding history of pulmonary disorders the results show that the percentage of cases in the Already on Beta-Blockers group (n=13, p=24.1%) was significantly lower than the percentage of cases in the Newly Administered Beta-Blockers) group (n=54, 56.3%), the P-value of the test was 0.000. (Table 2, Appendix D).

Regarding the history of heart failure, the results show that the percentage of cases in the Already on Beta-Blockers group (n=4, p=7.4%) was lower than the percentage of cases in the Newly Administered Beta-Blockers) group (n=29, 30.2%), the P-value of the test was 0.001. (Table D.2, Appendix D).

Regarding the history of hypertension, the results show that the percentage of cases in the Already on Beta-Blockers group (n=16, p=29.6%) was significantly lower than the percentage of cases in the Newly Administered Beta-Blockers) group (n=47, 49%), the P-value of the test was 0.021. (Table D.2, Appendix D.)

On the other hand, the results in the table above show that there were no significant differences at 0.05 level between the Already on Beta-Blockers group and the Newly Administered Beta-Blockers) group in the remaining demographic data studied and shown in the table (P-values were higher than 0.05). (Table 2, Appendix D).

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Vital Signs.

Table D3 shows differences between the already on Beta-Blockers and newly administered Beta-Blockers regarding vital signs:

The results in Appendix D, Table D.3 show that there were significant differences at 0.05 level between the Already on Beta-Blockers group and the Newly Administered Beta-Blockers group in heart rate, blood pressure-systole, blood pressure- diastole, and MAP. The P-values corresponding to these indicators and measurements of vital signs were less than 0.05.

Regarding heart rate, the results show that the mean values of heart rate for the Already on Beta-Blockers group were significantly less than the mean values of heart rate for the Newly Administered Beta-blockers) group from Day0 up to Day3, and the results show that the total mean of heart rate for the Already on Beta-Blockers group (Mean=67.78) was significantly less than the total mean of the heart rate for the Newly Administered Beta-Blockers) group (Mean=93.52), the P-value of the test was <0.001. The results show that the mean of heart rate for Already on Beta-Blockers group in Day0 (Mean=70) was significantly less than the mean of heart rate for the Newly Administered Beta-Blockers) group (Mean=92.91), the P-value of the test was 0.000, and also the mean of heart rate for the Already on Beta-Blockers group on Day1 (Mean=68.65) was significantly less than the mean of heart rate for the Newly Administered Beta-Blockers group (Mean=91.6), the P-value of the test was 0.000, and the mean of heart rate for the Already on Beta-Blockers group on Day2 (Mean=66.09)was significantly less than the mean of heart rate for the Newly Administered Beta-Blockers) group (Mean=93.01), the P-value of the test was 0.000, and the mean of heart rate for the Already on Beta-Blockers group on Day3 (Mean=66.93) was significantly less than the mean of the Newly Administered Beta-Blockers group (Mean=91.33), the P-value of the test was 0.000. Appendix D, Table D.3.

Regarding Systolic Blood Pressure, the results show that the mean values of Systolic Blood Pressure for the (Already on Beta-Blockers) group are significantly less than the mean values of Systolic Blood Pressure for the (Newly Administration of Beta-Blockers) group from Day1 up to Day3 only, and the results show that the total mean of the Systolic Blood Pressure for the (Already on Beta-Blockers) group (Mean=113.41) is significantly less than the mean of the Systolic Blood Pressure for the (Newly Administration of Beta-Blockers) group (Mean=118.26), the P-value of the test is 0.025. The results show that the mean of Systolic Blood Pressure for the (Already on Beta-Blockers) group in Day1 (Mean=112.83) is significantly less than the mean of Systolic Blood Pressure for the (Newly Administration of Beta-blockers) group (Mean=117.5), the P-value of the test is 0.038, and the mean of Systolic Blood Pressure for the (Already on Beta-Blockers) group in Day2 (Mean=113.69) was significantly less than the mean of Systolic Blood Pressure for the (Newly Administration of Beta-Blockers) group (Mean=120.49), the P-value of the test was 0.007, and the mean of

Systolic Blood Pressure for the (Already on Beta-Blockers) group in Day3 (Mean=113.3) was significantly less than the mean of the (Newly Administration of Beta-blockers) group (Mean=120.05), the P-value of the test was 0.003. (Table D.3) Appendix D.

Regarding Diastolic Blood Pressure, the results show that the mean values of Diastolic Blood Pressure for the (Already on Beta-Blockers) group were significantly different from the mean values of Diastolic Blood Pressure for the (Newly Administration of Beta-blockers) group only in DAY0 and in Day3, and the results show that the total mean value of Diastolic Blood Pressure for the (Already on Beta-Blockers) group (Mean=62.55) was significantly less than the mean of the Diastolic Blood Pressure for the (Newly Administered Beta-blockers) group (Mean=65.19), the P-value of the test was 0.022. The results show that the mean of Diastolic Blood Pressure for the (Already on Beta-Blockers) group in Day0 (Mean=60.94) was significantly less than the mean of Diastolic Blood Pressure for the (Newly Administered Beta-blockers) group (Mean=63.74), the P-value of the test was 0.043, and the mean of Diastolic Blood Pressure for the (Already on Beta-Blockers) group in Day3 (Mean=62.94) is significantly less than the mean of the (Newly Administered Beta-blockers) group (Mean=67.34), the P-value of the test was 0.004.(Table D.3) in Appendix D.

Regarding MAP, the results show that the mean values of MAP for the (Already on Beta-Blockers) group were significantly less than the mean values of MAP for the (Newly Administered Beta-blockers) group only in Day2 and Day3, and the results show that the total mean of MAP for the (Already on Beta-Blockers) group (Mean=79.47) was significantly less than the mean of the MAP for the (Newly Administered Beta-blockers) group (Mean=82.89), the P-value of the test was 0.011. The results show that the mean of MAP for the (Already on Beta-Blockers) group onDay2 (Mean=80.28) was significantly less than the mean of MAP for the (Newly Administered of Beta-blockers) group (Mean=83.82), the P-value of the test was 0.035, and the mean of MAP for the (Already on Beta-Blockers) group onDay3 (Mean=79.7) was significantly less than the mean of MAP for the (Newly administration of Beta-blockers) group (Mean=84.91), the P-value of the test was 0.001. (Table D.3) on (Appendix D).

On the other hand, the results in the table (Table D.3) show that there were no significant differences at 0.05 level between the Already on Beta-Blockers group and the Newly Administered Beta-blockers) group in the remaining vital signs indicators and measurements studied and shown in the table (P-values were higher than 0.05). (Table D.3) in Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administration of Beta-Blockers Regarding Cardiac Status

Comparison analysis between Already on Beta-Blockers and Newly Administered Beta-Blockers regarding the cardiac status:

The results in (Table D.4) in Appendix D show that there awere significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in Incisional pain, Bradycardia<60, Hypotension, and Dyspnea. The P-values corresponding to these indicators and measurements of cardiac status were less than 0.05.

Regarding incisional pain, the results show that the percentages of incisional pain cases in the Already on Beta-Blockers group were significantly differentfrom that of incisional pain cases in the Newly Administered Beta-blockers group only on Day1. The results show that the percentage of incisional pain cases onDAY1 in the (Already on Beta-Blockers) group (n=25, p=46.3%) was significantly higher than the percentage of incisional pain in the (Newly Administration of Beta-blockers) group (n=29, p=30.2%), the P-value was 0.049. (Table D.4) in Appendix D.

Regarding Bradycardia<60, the results show that the percentages of Bradycardia<60 cases in the (Already on Beta-Blockers) group were significantly higher than those of Bradycardia<60 cases in the (Newly Administered Beta-blockers) group from Day0 up to Day3 and the results show that the total percentage of Bradycardia<60 in the (Already on Beta-Blockers) group (n=33, p=61.1%) was significantly higher than the total percentage of Bradycardia<60 in the (Newly Administered Beta-blockers) group (n=10, p=10.4%), the P-value of the test was <0.001. Also the results show that onDay0 the percentage of the Bradycardia<60 cases in the (Already on Beta-Blockers) group (n=9, p=16.7%) was higher than thoseof Bradycardia<60 in the (Newly Administered Beta-blockers) group (n=2, p=2.1%), the P-value of the test is< 0.001. On DAY1, the

results show that the percentage of the Bradycardia<60 cases in the (Already on Beta-Blockers) group (n=12, p=22.2%) was higherthan the percentage of Bradycardia<60 in the (Newly Administered Beta-blockers) group (n=5, p=5.2%), the P-value of the test was < 0.002. OnDAY2, the results show that the percentage of the Bradycardia<60 cases in the (Already on Beta-Blockers) group (n=18, p=33.3%) was higher than the percentage of Bradycardia<60 in the (Newly Administered Beta-blockers) group (n=4, p=4.4%), the P-value of the test is <0.001. And onDay3, the results show that the percentage of the Bradycardia<60 cases in the (Already on Beta-Blockers) group (n=17, p=31.5%) was higher than the percentage of Bradycardia<60 in the (Newly Administered Beta-blockers) group (n=6, p=6.3%), the P-value of the test was < 0.001. (Table D.4) in Appendix D.

Regarding Hypotension, the results show that the percentages of Hypotension cases in the (Already on Beta-Blockers) group were significantly more than the thoseof Hypotension cases in the (Newly Administration of Beta-blockers) group from Day0 up to Day2 only and the results show that the total percentage of hypotension in the (Already on Beta-Blockers) group (n=31, p=57.4%) was significantly more than the percentage of total Hypotension in the (Newly Administered Beta-blockers) group (n=21, p=21.9%), the P-value of the test was<0.001. Also, the results show that the percentage of the hypotension cases on Day0 in the (Already on Beta-Blockers) group (n=30, p=55.6%) was significantly more than the percentage of hypotension in the (Newly Administered Beta-blockers) group (n=17, p=17.7%), the P-value of the test was 0.000. OnDay1, the results show that the percentage of the Hypotension cases in the (Already on Beta-Blockers) group (n=29, p=53.7%) is significantly more than the percentage of hypotension in the (Newly Administered Beta-blockers) group (n=14, p=14.6%), the P-value of the test was 0.000 and in Day2, the results show that the percentage of the Hypotension cases in the (Already on Beta-Blockers) group (n=21, p=38.9%) was significantly more than the percentage of hypotension in the (Newly Administered Beta-blockers) group (n=14, p=14.6%), the P-value of the test was 0.001.(Table D.4) in Appendix D.

Regarding dyspnea, the results show that the percentages of dyspnea cases in the (Already on Beta-Blockers) group were significantly different from those of dyspnea cases in the (Newly Administered Beta-blockers) group only onDay1, Day2 and Day3. The results show that the percentage of the dyspnea cases in DAY1 in the (Already on Beta-Blockers) group (n=31, p=57.4%) was significantly more than the percentage of Dyspnea cases in the (Newly Administered Beta-blockers) group (n=20, p=20.8%), the P-value of the test was 0.000. In DAY2, the results show that the percentage of the dyspnea cases in the (Already on Beta-Blockers) group (n=18, p=33.3%) is significantly more than the percentage of Dyspnea in the (Newly Administered Beta-Blockers) group (n=16, p=16.7%), the P-value of the test was0.019. And also, in Day3, the results show that the percentage of the dyspnea cases in the (Already on Beta-Blockers) group (n=14, p=25.9%) was significantly higher than the percentage of Dyspnea in the (Newly Administered Beta-blockers) group (n=9, p=9.4%), the P-value of the test was 0.007. (Table D.4) in Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Operational Time

Comparison between Already on Beta-Blockers and newly administered Beta-Blockers regarding operational time:

The results in the table above (Table D.5) in Appendix Dshow that there were significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in the Cross Clamp Time and in the pumping time. The results show that the mean of Cross Clamp Time for the (Already on Beta-Blockers) group (Mean=133.26 minutes) was significantlymore than the mean of Cross clamp time for the (Newly Administered Beta-blockers) group (Mean=121.38 minutes), the P-value of the test is 0.041. (Table D.5) in Appendix D.

The results also show that the mean of pumping time for the (Already on Beta-Blockers) group (Mean=186.22 minutes) was significantly more than the mean of Cross Clamp Time for the (Newly Administered Beta-blockers) group (Mean=174.26 minutes), the P-value of the test was 0.022. On the other hand, the results show that there were no significant differences at 0.05 level between the (Already on Beta-

Blockers) group and the (Newly Administered Beta-blockers) group in the duration of surgery (P-value 0.232 is higher than 0.05). (Table D.5) in Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers regarding Length of Stay

comparison betweenalready on Beta-Blockers and Newly Administered Beta-Blockers regarding length of stay:

The results show that there were significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in CCU Length of Stay(days).Also, the results show that the mean of CCU Length of Stay in the (Already on Beta-Blockers) group (Mean=4 days) was significantly more than the mean of CCU Length of Stay in the (Newly Administered Beta-Blockers) group (Mean=3.57 days), the P-value of the test was 0.046.(Table D.6) in Appendix D.

The results also show that there were significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in hospital length of stay (days). Also, the results show that the mean of hospital length of stay in the (Already on Beta-Blockers) group (Mean=7.85 days) was significantly more than the mean of hospital length of stay in the (Newly Administered Beta-blockers) group (Mean=4.7 days), the P-value of the test was 0.000. (Table D.6) in Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Pain Assessment

Comparison analysis between Already on Beta-Blockers and Newly Administered Beta-Blockers regarding pain assessment:

The results show that there were significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in the pain (VAS). The results show that the mean values of Pain (VAS) for the (Already on Beta-Blockers) group were significantly less than the mean values of pain (VAS) for the (Newly Administered of Beta-blockers) group on Day0, Day2 and Day3, and the results show that the total mean of pain (VAS) for the (Already on Beta-

Blockers) group (Mean=3.65) was significantly less than the mean of the pain (VAS) for the (Newly Administered Beta-blockers) group (Mean=4.14), the P-value of the test was 0.007. The results show that the mean of pain (VAS) for the (Already on Beta-Blockers) group on Day 0 (Mean=5.65) was significantly less than the mean of pain (VAS) for the (Newly Administered Beta-blockers) group (Mean=6.42), the P-value of the test was 0.000; also the mean of pain (VAS) for (Already on Beta-Blockers) group onDay2 (Mean=3.02) was significantly less than the mean of pain (VAS) for the (Newly Administered Beta-blockers) group (Mean=3.43), the P-value of the test was 0.036, and also the mean of pain (VAS) for the (Already on Beta-Blockers) group onDay3 (Mean=2.24)was significantly lower than the mean of Pain (VAS) for the (Newly Administration of Beta-blockers) group (Mean=2.71), the P-value of the test was 0.019.(Table D.7) in Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Postoperative Signs and Symptoms

Comparison analysis between already on Beta-Blockers and Newly Administered Beta-Blockers regarding post-operative signs and symptoms:

The results show that there were significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in heart palpitation, anxiety and discomfort, and Lightheadedness. The P-values corresponding to these indicators and measurements of atrial fibrillation signs and symptoms were less than 0.05. (Table D.8) in Appendix D.

Regarding Heart Palpitation, the results show that the percentages of Heart Palpitation cases in the (Already on Beta-Blockers) group are significantly lower than the percentages of Heart Palpitation cases in the (Newly Administration of Beta-blockers) group from Day0 up to Day3, and the total percentage of Heart Palpitation cases in the (Already on Beta-Blockers) group (n=3, p=5.6%) is lower than the percentage of Heart Palpitation in the (Newly Administered Beta-blockers) group (n=21, p=21.9%), the P-value of the test was 0.009. The results show that the percentages of heart palpitation cases in Day 0 up to Day 3 in the (Already on Beta-Blockers) group (n=3, p=5.6%) were lower than the percentages of heart palpitation in the (Newly Administered Beta-

blockers) group (n= (16-19), p= (16.7%-19.8%), the P-values of the tests were from 0.018-0.05. (Table D.8, Appendix D.

Regarding anxiety and discomfort, the results show that the percentages of anxiety and discomfort cases in the (Already on Beta-Blockers) group were significantly higher than the percentages of anxiety and discomfort cases in the (Newly Administered Beta-blockers) group only onDay1, Day2, and Day3, while the results show that the total percentage of anxiety and discomfort in the (Already on Beta-Blockers) group (n=44, p=81.5%) was not significantly more than the percentage of total anxiety and discomfort in the (Newly Administered Beta-blockers) group (n=70, p=72.9%), the P-value of the test was 0.238. The results show that the percentage of the anxiety and discomfort cases in DAY1 in the (Already on Beta-Blockers) group (n=33, p=61.1%) was significantly more than the percentage of anxiety and discomfort in the (Newly Administered Beta-blockers) group (n=35, p=36.5%), the P-value of the test was 0.004. OnDay2, the results show that the percentage of the anxiety and discomfort cases in the (Already on Beta-Blockers) group (n=20, p=37%) was significantly more than the percentage of Anxiety and Discomfort in the (Newly Administered Beta-blockers) group (n=16, p=16.7%), the P-value of the test was 0.005. And onDay3, the results show that the percentage of the anxiety and discomfort cases in the (Already on Beta-Blockers) group (n=16, p=29.6%) was significantly more than the percentage of Anxiety and Discomfort in the (Newly Administered Beta-blockers) group (n=15, p=15.6%), the P-value of the test was 0.042. (Table D.8) in Appendix D.

Regarding lightheadedness, the results show that the percentages of lightheadedness cases in the (Already on Beta-Blockers) group were significantly more than the percentages of lightheadedness cases in the (Newly Administered Beta-blockers) group only on Day0 and Day 3. The results show that the percentage of lightheadedness on Day 0 in the (Already on Beta-Blockers) group (n=23, p=42.6%) was significantly more than the percentage of lightheadedness in the (Newly Administered Beta-blockers) group (n=24, p=25%), the P-value of the test was 0.026, and the percentage of the lightheadedness on Day 3 in the (Already on Beta-Blockers) group (n=11, p=20.4%) was higher than the percentage of Lightheadedness cases in the (Newly Administered Beta-blockers) group (n=5, p=5.2%), the P-value of the test was 0.004. On the other hand, the results show that there were no significant differences at 0.05

level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in fatigue, dizziness, and the other atrial Fibrillation signs and symptoms in all the studied time periods (P-values were higher than 0.05). (Table D.8, Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Morbidities Associated with Beta-Blockers Intake

Comparison between already on Beta-Blockers and Newly Administered Beta-Blockers regarding morbidities associated with Beta-Blockers Intake:

The results show no significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in hypotension, and heart failure, the P-values corresponding to these indicators and measurements of morbidities associated with Post-operative Beta-blockers intake were less than 0.05.(Table D.9, Appendix D.

The results show that the percentage of hypotension cases in the Already on Beta-Blockers) group (n=31, p=57.4%) was significantly more than the percentage of hypotension cases in the (Newly Administered Beta-blockers) group (n=8, p=8.3%), the P-value of the test was <0.001. The results also show that the percentage of heart failure cases in the (Already on Beta-Blockers) group (n=11, p=20.4%) was significantly more than the percentage of heart failure cases in the newly administered of Beta-blockers group (n=7, p=7.3%), the P-value of the test was 0.018. (Table D.9, in Appendix D.

On the other hand, the results show no significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in thromboembolic disorder, and stroke (P-values were higher than 0.05). (Table D.9, Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Beta-Blockers Side Effects.

The results show that there were significant differences at 0.05 level between the Already on Beta-Blockers group and the (Newly Administered Beta-blockers) group in

hyperglycemia, constipation, insomnia, the P-values corresponding to these indicators and measurements of Beta-Blockers Side Effects were less than 0.05.

Pertaining to constipation, the results show that the percentages of constipation cases in the Already on Beta-Blockers group were significantly higher than the percentages of constipation cases in the Newly Administered Beta-blockers group only in Day1; the percentage of the constipation cases onDay1 in the Already on Beta-Blockers group (n=7, p=13%) was higher than the percentage of constipation in the Newly Administered Beta-blockers group (n=4, p=4.2%), the P-value of the test was 0.047.(Table D.10, Appendix D).

Finally, regarding insomnia, the results show that the percentages of insomnia cases in the (Already on Beta-Blockers) group were significantly more than the percentages of Insomnia cases in the (Newly Administered Beta-blockers) group only from Day0 up to Day 3, and the total percentage of insomnia cases in the Already on Beta-Blockers group (n=32, p=59.3%) was significantly more than the percentage of insomnia in the (Newly Administered Beta-blockers) group (n=31, p=32.3%), the P-value of the test was 0.001. On Day0, the results show that the percentage of insomnia cases in the (Already on Beta-Blockers) group (n=28, p=51.9%) was significantlymore than the percentage of insomnia in the (Newly administered Beta-blockers) group (n=26, p=27.1%), the P-value of the test was 0.002. OnDay1, the results show that the percentage of insomnia cases in the (Already on Beta-Blockers) group (n=24, p=44.4%) was significantlymore than the percentage of insomnia in the (Newly Administered Beta-blockers) group (n=15, p=15.6%), the P-value of the test was <0.001. OnDay 2, the results show that the percentage of Insomnia cases in the (Already on Beta-Blockers) group (n=15, p=27.8%) was higher than the percentage of Insomnia in the (Newly Administered Beta-blockers) group (n=7, p=7.3%), the P-value of the test was 0.001. Also, on Day3, the results show that the percentage of insomnia cases in the (Already on Beta-Blockers) group (n=11, p=20.4%) was significantly more than the percentage of insomnia in the (Newly Administered Beta-blockers) group (n=8, p=8.3%), the P-value of the test was 0.033. On the other hand, the results in the table above show no significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group in nausea, and

vomiting in all the studied time periods (P-values was more than(0.05).(Table D.10, Appendix D).

Comparisons between Already on Beta-Blockers and Newly Administration of Beta-Blockers regarding Time of the Beta-blocker prescription.

The results showed no significant differences at 0.05 level between the (Already on Beta-Blockers) group and the (Newly Administered Beta-blockers) group regarding the alive cases. The results showed that all the study cases were alive except one case in the (Newly Administered Beta-blockers) group. (Table D.11, Appendix D).

A Comparisonsof Some Risk Factors between Atrial Fibrillation Beta-Blockers (AF Beta-Blockers) and Non-Atrial Fibrillation Beta-Blockers (NAF Beta-blockers).

Non-Atrial Fibrillation Beta-Blockers were all the other Beta-Blockers group including (Normal, VT, Afl, Sb). (Table D.12, Appendix D.

Comparisons between Already on Beta-Blockers and Newly Administered Beta-Blockers Regarding Some Risk Factors of AF.

The results show significant differences at 0.05 level between the AF Beta-Blockers group and the NAF Beta-blockers group in history of pulmonary disorders and history of heart failure, the P-values corresponding to these indicators and measurements of are less than 0.05.(Table D.12, Appendix D.

The results show that all AF Beta-Blockers have history of pulmonary disorders. The percentagewas (n=17, p=100%) while only 50(37.6%) of the NAF Beta-Blockers had history of pulmonary disorders (COPD), the P-value of the test was<0.001. Also, the results show that 9(52.9%) of AF Beta-Blockers had history of heart failure which was significantly more than the percentage of the NAF Beta-Blockers with history of heart failure 24(18%). Onthe other hand, the results in Table D.12 show no significant differences at 0.05 level between the AF Beta-Blockers group and the NAF Beta-blockers group regarding age, sex, history of CVA or TIA, history of diabetes, and cross clamp time.

Regarding history of hypertension, the results show that the percentage of cases in the Already on Beta-Blockers group (n=16, p=29.6%) waslower than the percentage of cases in the (Newly Administered Beta-Blockers) group (n=47, 49%), the P-value of the test was 0.021. (Table D.12, AppendixD).

3.12 Summary of Results

The incidence of POAF in this studystood at 17/150 (11.3%) post operatively, VT 2(1.3%), Afl 2(1.3%), bradycardia 47(31.3%). CCU length of stay (day) 3.73 ± 1.26, hospital length of stay (day) 5.83 ± 3.11.Hypotension 39(26%), heart failure 18(12%), thromboembolic disorder 4(2.7%) and stroke 2(1.3%)

As a beta blocker side effects nausea was48(32.0%), vomiting 18(12.0%), hyperglycemia 52(34.7%), constipation 31(20.7%), insomnia 83(55.3%) and death of one patient.

When a subgroup analysis was done and divided the whole group into two groups, group one Already on Beta-Blockers (n=54) and group two newly Administered Beta-blockers (n=96), there was a significant difference regarding heart rate 68.12 ± 12.1in group one and 92.85 ± 23.74 in group two, p= 0.000 in favor of group two. Systolic BP 112.88 ± 7.42 in group one and 117.12 ± 13.68 in group two, p=0.037, diastolic BP 62.57 ± 4.89 in group one and 64.45 ± 6.77, p=0.029, MAP 79.33 ± 5.13 in group one and 81.97 ± 8.34 in group two, p=0.037, AF 2(3.7%) In group one and 15(15.6%) in group two, P = 0.0061 in favor of group one, bradycardia 33(61.1%) in group one and 10(10.4%) in group two, p<0.001in favor of group two, hypotension 37(68.5%) in group one and 26(27.1%) in group two, p= 0.000 in favor of group two, aortic cross clamp time 172.19 ± 35.14 in group one and 145.68 ± 47.39 in group two, p=0.000, CCU Length of Stay4.00 ± 0.87 in group one and 3.57 ± 1.41 in group two, p= 0.046 for the favor of group two, Hospital length of stay7.85 ± 2.79 in group one and 4.70 ± 2.68 in group two, p=0.000 in favor of group two, Pain Assessment (VAS) 3.65 ± 0.84 in group one and 4.14 ± 1.16 in group two, p= 0.007 in favor of group one, Hypotension 31(57.4%) in group one and 8(8.3%) in group two, p=0.000 was in favor of group two, insomnia 40(74.1%) in group one and 43(44.8%) in group two, p= 0.001. One patient died in group two.

The results show significant differences at 0.05 level between the AF Beta-Blockers group and the NAF Beta-blockers) group in history of pulmonary disorders and history of heart failure, the P-values corresponding to these indicators and measurements were less than 0.05; also the results show that 9(52.9%) of AF patients had history of heart failure which was significantly higher than the percentage of the NAF with history of heart failure 24(18%). This indicates that COPD and heart failure were risk factors for postoperative AF. Pertaining to history of hypertension, the results show that the percentage of cases in the Already on Beta-Blockers group (n=16, p=29.6%) was lower than the percentage of cases in the Newly Administered Beta-Blockers group (n=47, 49%). Results show that the patients in group two had more AF. One can conclude that chronic beta blocker before surgery is a protective factor for postoperative AF.

Chapter Four

Discussion and Conclusions

The study was performed on 150 patients undergoing elective CABG. The patients included in the study were 40 to 85 years old; 76% were males and 24% were females. Atrial fibrillation in the postoperative period developed most commonly 2- to 3-days post operatively.

4.1 Incidence of post-operative Atrial Fibrillation (AF)

AF was one of the most common adverse events in the current study, occurring after heart surgery in 11.3% of patients. Bisoprolol was chosen for prophylaxis in this trial because it is the most cardio-selective 1-blocker, has minimal effects on glucose tolerance and plasma lipids, and is more tolerable by elderly and diabetic people, (Kendall, et al 1999, Broncel, et al 1998).Additionally, studies have demonstrated that bisoprolol is beneficial even at low plasma concentrations, which can result in a protracted therapeutic response (Kendall, et al 1999). This research was supported bya study that found that Atrial fibrillation, which affects 25% of patients after cardiac surgery, was the most common postoperative complication (D'Agostino, et al. 2018). The current study results, are consistent with those of Behmanesh et al. (2006), who demonstrated that the combination of bisoprolol and Mg effectively lowers the incidence of postoperative AF following on-pump CABG and is linked to a shorter hospital stay. Despite simultaneous reductions in cardiac surgery-related morbidity and mortality, the prevalence of AF has mostly remained steady (Shen et al. 2011, D'AGostino et al. 2016).

4.2 Subgroup Analysis

There were 150 patients in our study as a whole. A subgroup analysis was conducted. The patients were split into two groups. Patients in group one (already on beta-blockers) got oral B-blockers postoperatively after taking them preoperatively (n = 54). The second group (Newly Administered Beta-blockers) included patients who had never taken beta-blockers preoperatively and received them only postoperatively (n=96). It was determined that there were fewer patients with AF in group one—2 (3%) patients as opposed to 15 (15.6%) patients in group two. Our findings raise the question of whether individuals who were taking chronic beta blockers prior to surgery and had

them reintroduced postoperatively differed from those who only received beta blockers postoperatively in terms of the incidence of postoperative atrial fibrillation and other adverse effects. The National Quality Forum (NQF) has supported the use of beta-blockers 24 hours prior to isolated coronary artery bypass graft (CABG) surgery as a quality indicator since 2007. The American College of Cardiology Foundation/American Heart Association CABG guidelines classify this as a class I recommendation; however, the European Society of Cardiology/European Association for Cardio-Thoracic Surgery guidelines recommend -blockers to prevent postoperative Atrial fibrillation (AF) without putting a time limit on when this should be done. The current study's findings were consistent with previous research, which found that preoperative Beta- blocker (propranolol) significantly reduced the incidence of AF in the vast majority of patients (Mohr, Smolinsky, and Goor 1981).

4.3 Length of stay in CCU and hospital

The findings indicate that the mean CCU length of stay in the group of patients Already on Beta-Blockers (4 days) was considerably longer than the mean CCU length of stay in the group of patients Newly Administered Beta-Blockers (3.57 days).The results also show the mean of hospital length of stay in the Already on Beta-Blockers group (7.85 days) was significantly longer than the mean of hospital length of stay in the Newly Administered red Beta-blockers) group (4.7 days).Our findings were not in line up with a research on postoperative arrhythmias by Peretto et al. (2014) that focused on AF, a well-known side effect of cardiac surgery that prolongs hospital stays and is associated with an increased risk of postoperative heart failure, cerebrovascular stroke, and mortality.

The researcher hypothesizes that the group of patients who are already on beta-blockers have much longer hospital stays and CCU stays, which is associated with a higher risk of bradycardia and hypotension. Regarding Bradycardia, the results showed that the percentages of bradycardia in the Already on Beta-Blockers groupwere significantly higher than the percentages of bradycardia in the Newly Administered Beta-blockers) group in the total study period, p= <0.001. Regarding hypotension, the results showed that the percentages of hypotension in the Already on Beta-Blockers group were significantly higher than the percentages of hypotension cases in the Newly Administered Beta-blockers) group, p= <0.001. These findings are in line with those of

a research by Dennis et al., which revealed that beta blockers were associated with a 41% relative rise in the incidence of hypotension and associated with a significant relative increase in risk (RR, 3.62; 95% CI, 2.48-5.28) of bradycardia (Dennis, et al 2004).

4.4 Risk Factors of postoperative AF

The results show that there were significant differences between the Already on Beta-Blockers group and the Newly Administered Beta-blockers) group in history of pulmonary disorders 13(24.1%) versus 54(56.3%). History of heart failure was 4(7.4%) versus 29(30.2%), and history of hypertension was 16(29.6%) versus 47(49%). Our analysis of three preoperative risk factors for postoperative AF are COPD, hypertension, and heart failure—led us to this conclusion. The results show also that the mean of cross clamp time for the Already on Beta-Blockers group (133.26 minutes) was significantly higher than the mean of Cross Clamp Time for the Newly Administered Beta-blockers group (121.38 minutes) and the mean of pumping time for the Already on Beta-Blockers group (186.22 minutes) was significantly higher than the mean of cross clamp time for the Newly Administered Beta-blockers group (174.26 minutes). Cross clamp time and pumping time therefore did not contribute to risk of AF in the current investigation. These findings did not match those of a research by Mills, et al. (1983). Mills, et al studied 128 patients along with diabetes, smoking, hypertension, previous myocardial infarction, family records of coronary artery disease, and aortic cross-clamp times have all been identified as risk factors for the development of AF (Mills, et al. 1983), which is not the case with the aortic cross-clamp timings in the present investigation. Also, the results of the Ruffman and Fieldman's (1981) investigation were not consistent with the findings of the current study. Ruffman and Fieldman’s research on 225 patients looked at six variables: gender, age, aortic cross clamp time, wide variety of bypass grafts, previous myocardial infarction, and imply preoperative propranolol dose. They found that older age and a longer period spent in an aortic cross-clamp had been risk factors. Another study revealed that smoking and diabetes were AF risk factors (Silverman, et al, 1982).Along with the echo-cardio graphic predictors of exceptional left ventricular systolic and diastolic function, left ventricular hypertrophy, and increased left Atrial volume, a history of obesity, chronic obstructive pulmonary disease, chronic renal failure, rheumatic coronary heart disease, and male gender have all been identified as risk factors for the development of AF (Burrage et al, 2019). Only

in the area of COPD as a risk factor for postoperative AF does the current study's findings concurred with those of Burrage et al. (2019).

4.5 Pain Assessment

The results show that the mean ± of pain (VAS) for the Already on Beta-Blockers group in in the total period of the study (3.65 ± 0.84) was significantly lower than the mean± of pain (VAS) for the Newly Administered Beta-blockers group (4.14 ± 1.16), p=0.007. The question is "Do β-Blockers have analgesic properties"? Therefore, patients who were already using beta-blockers experienced less pain than the other group. Studies reveal that blockers have anti-nociceptive effects. Adrenergic neurotransmission is involved in pain pathways. In light of these findings, researchers from the United Kingdom looked at correlations between blocker use and pain in a cohort of 873 individuals who both had hypertension and hip or knee osteoarthritis; 40% of these patients were taking blockers. Users of blockers had a considerably lower likelihood of experiencing at least moderate joint pain than nonusers (34% vs. 42%). Users of blockers had a considerably lower likelihood of consuming opioid analgesics than nonusers (Valdes, 2017).

4.6 Limitation

This study was conducted in a single center. Single-center studies usually lack the external validity or scientific rigor needed to support widespread changes in practice, and their premature inclusion in guidelines may make it more difficult to conduct conclusive investigations.

The subgroup analysis sample size was modest. The planning of subgroup division in the current investigation was not based on a predetermined hypothesis or preset subpopulations. After the data gathering, subgroup analyses were conducted. Analyses of subgroups were data-driven and regarded as exploratory. A lack of statistical power and the impact of intervention could undermine their trustworthiness.

4.7 Recommendations

Beta-blockers, which could be given to individuals without contraindications before 24 hr. of CABG to lower the risk of POAF. Future research must concentrate on a more thorough, multifaceted preventive strategy, employing preoperative statins and beta-blockers, perioperative magnesium and steroids, and preoperative Amiodarone in high-risk patients.

Future studies have to focus on techniques for enhancing the control of surgical CCU patients after CABG surgical procedure and focus on techniques for decreasing the threat for AF. There is a need for further research on beta-blocker remedy in CABG such drug effects and side effects.

4.8 Conclusion

A perioperative beta blocker (Bisoprolol) could lower the risk of developing postoperative AF and lessen the intensity of pain following coronary bypass graft surgery. Patients on chronic beta blockers increase the likelihood of hospital and intensive care unit length of stay. Preoperative risk factors for AF include heart failure, and COPD.

List of Abbreviations

Abbreviation	Meaning
ABG	Arterial Blood Gas
AF	Atrial Fibrillation
BP	Blood Pressure
CABG	Coronary Artery Bypass Graft
CBC	Complete Blood Count
CCU	Coronary Care Unit
CPB	Cardiopulmonary Bypass
IMA	Internal Mammary Artery
IRB	Institutional Review Board
LAD	Left Anterior Descending
LIMA	Left Internal Mammary Artery
MAP	Mean Arterial Pressure
MOH	Palestinian Ministry of Health
PT	Prothrombin Time
SPO2	Spot Oxegen Saturation
SVG	Saphenous Vein Graft
VF	Ventricular Fibrillation
VT	Ventricular Tachycardia
POAF	Post OperativeArtial Fibrillation
VAS	Visual Analogue Scale
ICU	Intensive Care Unit

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Appendices

Appendix A

Data collection sheet

Part I:

OBSERATIONAL CHECKLIST FOR DEMOGRAPHIC DATA AND COMORBIDITIES

Part I: Demographic data	
Name	
Age (year)	
Sex	
Weight (kg)	
Height(cm)	
BMI	
History of pulmonary disorders (COPD)	
History of cardiac disorders	
Beta-Blocker	
History of CVA or TIA	
History of Diabetes	
History of Heart Failure	
History of Hypertension	
Other	

Part II: (A)

OBSERVATIONAL CHECK LIST TO ASSESS VITAL SIGNS

Part II: Vital Signs																
Observation	**Pre-op assessment**	**Post OP. Tests**														
		Day0				**Day1**				**Day2**				**Day3**		
Respiratory rate																
Heart rate																
Blood Pressure-Systole																
Blood Pressure-Diastole																
MAP																
Temperature																
ECG Rhythm																

Part II: (B)

- A **score of (0)** mark will be given for each ***normal*** (**Absent**) finding.
- A **score of (1)** marks will be given for each ***altered*** (**Present**) finding.

OBSERVATIONAL CHECK LIST TO ASSESS CARDIAC STATUS

Part II (B): Cardiac Status																	
Observation	**Pre-op assessment**	**Post OP. tests**															
		Day0				**Day1**				**Day2**				**Day3**			
Incisional pain																	
Bradycardia<60																	
Hypotension lower than 90 mm Hg systolic or 60 mm Hg diastolic																	
Dyspnea																	
Ejection Fraction<50																	

Part II: (C)

OBSERVATONAL CHECKLIST FOR OPERATIONAL TIME.

Part IV: Operational Time	
Observation	**Time/minute**
Cross Clamp Time	
Pumping Time	
Duration of Surgery	
Duration of Anesthesia	

Part III:

OBSERVATIONAL CHECK LIST TO ASSESS 12 LEADS ECG FINDINGS

Part III: 12leads ECG FINDINGS																	
FINDING	**Score Post Op**																
	Day0				**Day1**				**Day2**				**Day3**				
Presence of P Waves																	
Irregularity of Rhythm																	
Number of QRS/minute																	
Other																	

Part IV:

OBSERVATONAL CHECKLIST FOR LENGHTH OF STAY.

Consists of patient length of stay at coronary care unit and hospital length of stay.

Part IV: LENGHTH OF STAY	
Observation	**Number of Day's**
CCU Length of Stay	
Hospital Length of Stay	

Part V:

OBSERVATONAL CHECKLIST FOR PAIN ASSESSMENT

Part V: PAIN ASSESSMENT																
Pain (VAS)	**Day0**				**Day1**				**Day2**				**Day3**			
0-10 score																

Part VI:

OBSERVATONAL CHECKLIST FOR SIGNS AND SYMPTOMS OF **AF**.

Part III: Atrial Fibrillation Signs and Symptoms																
FINDING	**Score Post Op**															
	Day0				**Day1**				**Day2**				**Day3**			
Heart Palpitation																
Anxiety and Discomfort																
Shortness of Breath																
Fatigue																
Dizziness																
Lightheadedness																
Other																

Part VII: Observational Checklist of Morbidities associated with Beta-blocker's intake

VII: Observational Checklist of Morbidities associated with Beta-Blockers intake			
Morbidities	**Duration of Beta-Blockers Intake**		
	Patients already on Beta-Blockers	**Newly Administration of Beta-blockers**	**Post-operative Beta-Blockers**
Hypotension			
Heart Failure			
Thromboembolic Disorder			
Stroke			

Beta-Blocker's Side Effects Data Sheet

Beta-Blockers Side Effects					
Side Effect	**Pre-op assessment**	**Post OP. tests**			
		Day0	**Day1**	**Day2**	**Day3**
Nausea					
Breathing Difficulty					
Fatigue					
Hyperglycemia					
Vomiting					
Constipation					
Insomnia					
Poor circulation					

Mortality Checklist

Mortality Checklist				
Patients Number	Time of the Beta-blocker Prescription		Status after discharge	
	Newly	Lifelong	Alive	Dead

Appendix B

Consent form

جامعة النجاح الوطنية

كلية الدراسات العليا

موافقة للاشتراك بالبحث العلمي

الباحث: ضحى زكي محمد عويصي رقم الهاتف :0598022517

أخي /أختي الباحث/ة:

أنا الباحث الطالب ضحى زكي تخصص تمريض عناية مكثفه، جامعة النجاح الوطنية يسرني أن أدعوك/ي للمشاركة في بحثنا المتعلق بدراسة تأثير دواء Beta blocker على مرضى القلب المفتوح لتخفيف العرضة للإصابة بالارتجاف البطيني.

لك/ي كامل الحرية والإرادة في المشاركة في هذا البحث وسؤال الباحث عما تراه مناسب، والتحدث لأي شخص عن هذا البحث.

كما يمكنك الاستفسار عن أي جزء الآن أو فيما بعد.

نؤكد بان كافة المعلومات التي سوف يتم جمعها منك/ي سوف تكون سرية ولأغراض البحث العلمي فقط، ولن يتم استخدامها لأغراض أخرى.

الموافقة على المشاركة في الدراسة:

لقد قرأت الوصف أعلاه من هذه الدراسة، وقد تمت الإجابة على جميع أسئلتي، وأنا اعلم انه يمكنني أن ارفض المشاركة في و الانسحاب من الدراسة في أي وقت ،وعلى ذلك أعطي موافقتي بحرية تامة.

اسم المريض/ه:

ولي الأمر في حال عدم وعي المريض:

التاريخ:

Appendix C

Please provide the following information to apply for research data collection permission at the Palestinian Ministry of Health institutions:

Research Title **اسم البحث**	Incidence of Atrial fibrillation in patients undergoing cardiopulmonary artery bypass surgery after giving Beta blockers; prospective-observational study
University Name **اسم الجامعة**	An-Najah National University, Nablus- Palestine
Principal Investigator/ Supervisor's name **اسمالباحث/ المشرف**	Duha Zaki Dr. Aydah Alkaissi Dr. Muath Nierat
Students participating in the research **أسماء الطلاب المشاركين في البحث**	Duha Zaki
Specialty **التخصص**	MSC. In critical care nurse
Abstract **ملخص الدراسة**	Atrial fibrillation (AF) is the most common complication following coronary artery bypass graft surgery (CABG). Post-CABG AF occurs most commonly on the second postoperative day and declines in incidence thereafter., and our objectives will be: • To assess the use of oral beta blockers to reduce the incidence of postoperative atrial fibrillation. • To reduce the length of CCU and hospital length of stay for CABG surgery patients. • To reduce the risk of co-morbidity related to atrial fibrillation such as heart failure, hypotension, thromboembolic complications
Methodology **منهجية البحث**	Prospective, Observational study organized in favour of evaluating the effect of oral Beta-blocker's pre-operative and postoperative in patients undergoing CABG surgery to prevent arrythmias post-operatively focusing on atrial fibrillation. The study design chosen because it's the most suitable for the study objectives as well as the intervention given related to the intervention outcomes measures. This study is a retrospective analysis. This study will be conducted at NNUH which is an academic non-profit medical institution which was established in 2013 in cooperation with the faculty of medicine and health sciences at An-Najah National University (NNU), the hospital consists of 6 beds in coronary care units and 10 beds in the intermediate ward which is receiving patients from all over the nation – the West Bank and the Gaza. The Hospital is considered the only teaching hospital in Palestine that provides clinical education and training to current and future health professionals.
Data collection methods and tools **طرق جمع البيانات والأدوات**	The tool was prepared after going through related literature and with the guidance of intensivists doctor at CCU. The data collection tool consists of: Part I: Demographic data and comorbidities. Part II: Observational checklist for assessment of cardiac status, vital

	sign and Operational time. Part III: Observational checklist for ECG (12 leads) results. Part IV: Observational checklist for Length of stay. Part V: Observational checklist for pain assessment. Part VI: Observational checklist for signs and symptoms of AF. Part VII: Observational checklist for morbidities associated with the duration of Beta Blockers use.
Dates and time of data collection **تواريخ ووقت جمع البيانات**	October 2020 – December 2020
Sample size **حجم العينة**	The reported incidence of PoAF varies from 10%-60% depending on the type of cardiac surgery (coronary artery bypass graft [CABG], valvular or combined procedure) and underlying cardiac structural and functional abnormalities. The sample size is calculated using the calculator.net program The reported incidence of postoperative atrial fibrillation after cardiac surgery, which is 10%, was taken into account in the calculation of sample size as follows. 139 patients are needed to be recruited in the study.
Who will collect data or samples? **من سيجمع البيانات أو العينات**	Duha Zaki Ahmad AL-Aswad
Questionnaire or questions of the interview (copy) **استبيان أو أسئلة المقابلة (نسخة)**	The tool was prepared after going through related literature and with the guidance of intensivists doctor at CCU. The data collection tool consists of: Part I: Demographic data and comorbidities Part II: Observational checklist for assessment of cardiac status, vital sign and Operational time. Part III: Observational checklist for ECG (12 leads) results. Part IV: Observational checklist for Length of stay. Part V: Observational checklist for pain assessment Part VI: Observational checklist for signs and symptoms of AF. Part VII: Observational checklist for morbidities associated with the duration of Beta Blockers use.
Ethical considerations **الاعتبارات الاخلاقية**	The study is conducted in accordance with the Helsinki Declaration and will be approved by an –Najah National University institutional review board (IRB), the Director of An- Najah Hospital approval will be obtained to conduct the study.
Support the Ministry of Health with a copy of the final research **تزويد الوزارة بنسخة من نتائج البحث (في حال البحث للبكالوريوس يكتفى بنسخة الكترونية)**	
Contacts: Dr. Amal Abu Awad – Director General of Education in Health: **ibnsina99@yahoo.com** Mobile: 0562402187 Telefax: 09-2333901 BasimaJoudeh: basimamoh@gmail.com Mobile: 0562401397	

Appendix D

Tables of Study

Table D.1

Frequencies and Percentages of the Time of the Beta-blocker prescription of the Study Sample (N=150).

Time of the Beta-blocker prescription	N (%) / Mean ± S.D
Newly Administration of Beta-Blockers	096(64.0%)
Already on Beta-Blockers-Lifelong	054(36.0%)
Status after Discharge: Alive	149(99.3%)

Table D.2

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding Demographic data.

Variable	Already on Beta-Blockers (N=54)	Newly Administered of Beta-blockers (N=96)	Total (N=150)	*P-value**
Age (year)	63.48 ± 8.28	61.42 ± 10.07	62.16 ± 9.49	0.202
Sex:				
Male	37(68.5%)	77(80.2%)	114(76%)	0.108
Female	17(31.5%)	19(19.8%)	36(24%)	
Weight (kg)	74.74 ± 14.16	79.68 ± 11.92	77.9 ± 12.94	0.024
Height (cm)	168.17 ± 9.71	170.67 ± 8.56	169.77 ± 9.04	0.104
BMI	26.42 ± 4.54	27.38 ± 4.21	27.04 ± 4.34	0.195
History of Pulmonary Disorders (COPD)	13(24.1%)	54(56.3%)	67(44.7%)	0.000
History of Cardiac Disorders	54(100%)	96(100%)	150(100%)	-----
History of CVA or TIA	4(7.4%)	4(4.2%)	8(5.3%)	0.397
History of Diabetes	23(42.6%)	51(53.1%)	74(49.3%)	0.216
History of Heart Failure	4(7.4%)	29(30.2%)	33(22%)	0.001
History of Hypertension	16(29.6%)	47(49%)	63(42%)	0.021

*The *P*-values are related to the Two independent samples T-test or Mann-Whitney test for Quantitative variables and the Chi-square test for Qualitative variables.

Table D.3

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding Vital Signs.

Vital Signs	Already on Beta-Blockers (N=54)	Newly Administration of Beta-Blockers (N=96)	Total (N=150)	*P-value**
Respiratory Rate:				
Day 0	21.46 ± 3.92	21.92 ± 4.23	21.75 ± 4.12	0.519
Day 1	22.20 ± 4.17	21.84 ± 4.4	21.97 ± 4.31	0.625
Day 2	22.54 ± 4.12	21.8 ± 4.79	22.07 ± 4.56	0.345
Day 3	22.46 ± 3.91	22.31 ± 5.06	22.37 ± 4.67	0.850
Total	22.17 ± 2.69	21.92 ± 3.52	22.01 ± 3.23	0.657
Heart Rate:				
Day 0	70 ± 14.46	92.91 ± 25.65	84.66 ± 24.81	<0.001
Day 1	68.65 ± 12.76	91.6 ± 26.53	83.34 ± 25.08	<0.001
Day 2	66.09 ± 13.15	93.01 ± 26.83	83.32 ± 26.24	<0.001
Day 3	66.93 ± 14.58	91.33 ± 26.77	82.55 ± 25.9	<0.001
Total	67.78 ± 11.66	93.52 ± 27.88	84.25 ± 26.42	<0.001
Blood Pressure-Systole:				
Day 0	113.83 ± 09.35	115.73 ± 15.19	115.05 ± 13.38	0.407
Day 1	112.83 ± 10.86	117.5 ± 16.41	115.82 ± 14.79	0.038
Day 2	113.69 ± 11.45	120.49 ± 16.15	118.04 ± 14.96	0.007
Day 3	113.30 ± 10.61	120.05 ± 14.31	117.62 ± 13.46	0.003
Total	113.41 ± 08.02	118.26 ± 14.55	116.52 ± 12.78	0.025
Blood pressure- Diastole:				
Day 0	60.94 ± 6.83	63.74 ± 9.81	62.73 ± 8.93	0.043
Day 1	62.63 ± 8.19	64.22 ± 10.15	63.65 ± 9.5	0.327
Day 2	63.67 ± 8.2	65.45 ± 10.91	64.81 ± 10.03	0.298
Day 3	62.94 ± 7.9	67.34 ± 9.41	65.76 ± 9.12	0.004
Total	62.55 ± 5.51	65.19 ± 7.31	64.24 ± 6.82	0.022
MAP:				
Day 0	78.54 ± 5.96	80.86 ± 10.37	80.03 ± 9.08	0.132
Day 1	79.37 ± 8.1	81.95 ± 10.4	81.02 ± 9.69	0.118
Day 2	80.28 ± 8.32	83.82 ± 10.51	82.55 ± 9.9	0.035
Day 3	79.7 ± 8.04	84.91 ± 9.62	83.03 ± 9.4	0.001
Total	79.47 ± 5.76	82.89 ± 8.71	81.66 ± 7.93	0.011
Temperature:				
Day 0	36.58 ± 0.41	36.6 ± 0.48	36.6 ± 0.45	0.808
Day 1	36.69 ± 0.4	36.7 ± 0.46	36.7 ± 0.43	0.818
Day 2	36.7 ± 0.44	36.71 ± 0.48	36.7 ± 0.46	0.956
Day 3	36.44 ± 1.48	36.68 ± 0.45	36.59 ± 0.96	0.146
Total	36.46 ± 0.73	36.51 ± 1.14	36.5 ± 1.01	0.768

*The *P-values* are related to the two independent samples T-test or Mann-Whitney test.

Table D.4

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Cardiac Status.

Cardiac Status	Already on Beta-Blockers (N=54)	Newly Administered-ion of Beta-blockers (N=96)	Total (N=150)	*P-value**
Incisional Pain				
Day 0	28(51.9%)	64(66.7%)	92(61.3%)	0.074
Day 1	25(46.3%)	29(30.2%)	54(36%)	0.049
Day 2	8(14.8%)	19(19.8%)	27(18%)	0.446
Day 3	4(7.4%)	9(9.4%)	13(8.7%)	0.681
Total	32(59.3%)	65(67.7%)	97(64.7%)	0.299
Bradycardia<60:				
Day 0	9(16.7%)	2(2.1%)	11(7.3%)	0.001
Day 1	12(22.2%)	5(5.2%)	17(11.3%)	0.002
Day 2	18(33.3%)	4(4.2%)	22(14.7%)	<0.001
Day 3	17(31.5%)	6(6.3%)	23(15.3%)	<0.001
Total	33(61.1%)	10(10.4%)	43(28.7%)	<0.001
Hypotension:				
Day 0	30(55.6%)	17(17.7%)	47(31.3%)	<0.001
Day 1	29(53.7%)	14(14.6%)	43(28.7%)	<0.001
Day 2	21(38.9%)	14(14.6%)	35(23.3%)	0.001
Day 3	15(27.8%)	15(15.6%)	30(20%)	0.074
Total	31(57.4%)	21(21.9%)	52(34.7%)	<0.001
Dyspnea:				
Day 0	37(68.5%)	54(56.3%)	91(60.7%)	0.140
Day 1	31(57.4%)	20(20.8%)	51(34%)	<0.001
Day 2	18(33.3%)	16(16.7%)	34(22.7%)	0.019
Day 3	14(25.9%)	9(9.4%)	23(15.3%)	0.007
Total	38(70.4%)	59(61.5%)	97(64.7%)	0.273

*The *P-values* are related to the Chi-square test.

Table D.5

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Operational Time.

Operational Time(minute)	Already on Beta-Blockers (N=54)	Newly Administration of Beta-blockers (N=96)	Total (N=150)	*P-value**
Cross Clamp Time	133.26 ± 27.63	121.38 ± 36.87	125.65 ± 34.22	0.041
Pumping Time	186.22 ± 25.10	174.26 ± 38.07	178.57 ± 34.37	0.022
Duration of Surgery	6.4 ± 0.85	6.61 ± 1.12	6.53 ± 1.04	0.232

*The *P-values* are related to the Two independent samples T-test or Mann-Whitney test.

Table D.6

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Length of Stay**.**

Length of Stay	Already on Beta-Blockers (N=54)	Newly Administered of Beta-blockers (N=96)	Total (N=150)	*P-value**
CCU Length of Stay	4.00 ± 0.87	3.57 ± 1.41	3.73 ± 1.26	0.046
Hospital Length of Stay	7.85 ± 2.79	4.70 ± 2.68	5.83 ± 3.11	0.000

*The *P-values* are related to the two independent samples T-test or Mann-Whitney test.

Table D.7

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Pain Assessment.

Pain Assessment (VAS)	Already on Beta-Blockers (N=54)	Newly Administered of Beta-blockers (N=96)	Total (N=150)	*P-value**
Day 0	5.65 ± 0.89	6.42 ± 1.29	6.14 ± 1.22	0.000
Day 1	3.69 ± 1.16	4.05 ± 1.50	3.92 ± 1.39	0.122
Day 2	3.02 ± 0.96	3.43 ± 1.39	3.28 ± 1.26	0.036
Day 3	2.24 ± 0.93	2.71 ± 1.27	2.54 ± 1.18	0.019
Total	3.65 ± 0.84	4.14 ± 1.16	3.97 ± 1.08	0.007

*The *P-values* are related to the Two independent samples T-test or Mann-Whitney test.

Table D.8

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the postoperative Signs and Symptoms

Postoperative Signs and Symptoms	Already on Beta-Blockers (N=54)	Newly Administered of Beta-blockers (N=96)	Total (N=150)	*P-value**
Heart Palpitation:				
Day 0	3(5.6%)	19(19.8%)	22(14.7%)	0.018
Day 1	3(5.6%)	17(17.7%)	20(13.3%)	0.036
Day 2	3(5.6%)	17(17.7%)	20(13.3%)	0.036
Day 3	3(5.6%)	16(16.7%)	19(12.7%)	0.050
Total	3(5.6%)	21(21.9%)	24(16%)	0.009
Anxiety and Discomfort:				
Day 0	42(77.8%)	62(64.6%)	104(69.3%)	0.093
Day 1	33(61.1%)	35(36.5%)	68(45.3%)	0.004
Day 2	20(37%)	16(16.7%)	36(24%)	0.005
Day 3	16(29.6%)	15(15.6%)	31(20.7%)	0.042
Total	44(81.5%)	70(72.9%)	114(76%)	0.238
Fatigue:				
Day 0	38(70.4%)	63(65.6%)	101(67.3%)	0.552
Day 1	27(50%)	45(46.9%)	72(48%)	0.713
Day 2	22(40.7%)	27(28.1%)	49(32.7%)	0.114
Day 3	12(22.2%)	18(18.8%)	30(20%)	0.610
Total	40(74.1%)	70(72.9%)	110(73.3%)	0.878
Dizziness:				
Day 0	26(48.1%)	35(36.5%)	61(40.7%)	0.162
Day 1	17(31.5%)	21(21.9%)	38(25.3%)	0.194
Day 2	12(22.2%)	14(14.6%)	26(17.3%)	0.235
Day 3	11(20.4%)	10(10.4%)	21(14%)	0.092
Total	27(50%)	39(40.6%)	66(44%)	0.267
Lightheadedness:				
Day 0	23(42.6%)	24(25%)	47(31.3%)	0.026
Day 1	15(27.8%)	16(16.7%)	31(20.7%)	0.107
Day 2	12(22.2%)	13(13.5%)	25(16.7%)	0.171
Day 3	11(20.4%)	5(5.2%)	16(10.7%)	0.004
Total	24(44.4%)	32(33.3%)	56(37.3%)	0.177
Other:				
Day 0	0(0%)	3(3.1%)	3(2%)	0.189
Day 1	0(0%)	2(2.1%)	2(1.3%)	0.286
Day 2	0(0%)	3(3.1%)	3(2%)	0.189
Day 3	0(0%)	2(2.1%)	2(1.3%)	0.286
Total	0(0%)	6(6.3%)	6(4%)	0.061

*The *P-values* are related to the Chi-square test.

Table D.9

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Morbidities associated with Beta-Blockers intake.

Morbidities associated with Post-operative Beta-blocker's intake	Already on Beta-Blockers (N=54)	Newly Administered on of Beta-blockers (N=96)	Total (N=150)	*P-value**
Hypotension	31(57.4%)	8(8.3%)	39(26%)	<0.001
Heart Failure	11(20.4%)	7(7.3%)	18(12%)	0.018
Thromboembolic Disorder	0(0%)	4(4.2%)	4(2.7%)	0.128
Stroke	2(3.7%)	0(0%)	2(1.3%)	0.058

*The *P-values* are related to the Chi-square test.

Table D.10

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Beta-Blockers Side Effects.

Beta-Blockers Side Effects	Already on Beta-Blockers (N=54)	Newly Administered of Beta-blockers (N=96)	Total (N=150)	*P-value**
Nausea:				
Day 0	12(22.2%)	12(12.5%)	24(16%)	0.119
Day 1	6(11.1%)	11(11.5%)	17(11.3%)	0.949
Day 2	1(1.9%)	5(5.2%)	6(4%)	0.314
Day 3	1(1.9%)	6(6.3%)	7(4.7%)	0.220
Total	13(24.1%)	20(20.8%)	33(22%)	0.646
Hyperglycemia:				
Day 0	10(18.5%)	20(20.8%)	30(20%)	0.734
Day 1	11(20.4%)	11(11.5%)	22(14.7%)	0.139
Day 2	11(20.4%)	6(6.3%)	17(11.3%)	0.009
Day 3	10(18.5%)	4(4.2%)	14(9.3%)	0.004
Total	20(37%)	23(24%)	43(28.7%)	0.089
Vomiting:				
Day 0	1(1.9%)	8(8.3%)	9(6%)	0.109
Day 1	3(5.6%)	5(5.2%)	8(5.3%)	0.928
Day 2	2(3.7%)	3(3.1%)	5(3.3%)	0.850
Day 3	1(1.9%)	1(1%)	2(1.3%)	0.678
Total	4(7.4%)	10(10.4%)	14(9.3%)	0.543
Constipation:				
Day 0	8(14.8%)	7(7.3%)	15(10%)	0.140
Day 1	7(13%)	4(4.2%)	11(7.3%)	0.047
Day 2	6(11.1%)	5(5.2%)	11(7.3%)	0.183
Day 3	6(11.1%)	7(7.3%)	13(8.7%)	0.425
Total	11(20.4%)	13(13.5%)	24(16%)	0.274
Insomnia:				
Day 0	28(51.9%)	26(27.1%)	54(36%)	0.002
Day 1	24(44.4%)	15(15.6%)	39(26%)	0.000
Day 2	15(27.8%)	7(7.3%)	22(14.7%)	0.001
Day 3	11(20.4%)	8(8.3%)	19(12.7%)	0.033
Total	32(59.3%)	31(32.3%)	63(42%)	0.001

*The *P*-values are related to the Chi-square test.

Table D.11

Comparisons between (Already on Beta-Blockers) group and (Newly administration of Beta-blockers) group regarding the Time of the Beta-blocker prescription

Time of the Beta-blocker prescription	Already on Beta-Blockers (N=54)	Newly Administered of Beta-blockers (N=96)	Total (N=150)	*P*-value*
Alive	54(100%)	95(99%)	149(99.3%)	0.452

*The *P*-values are related to the Chi-square test.

Table D.12

Comparisons between (AF Beta-Blockers) group and (NAF Beta-blockers) group regarding some Risk Factors of AF

Risk Factors of AF	Category	AF Beta-Blockers (N=17)	NAF Beta-blockers (N=133)	Total (N=150)	*P*-value
Age (year)		61.53 ± 9.37	62.24 ± 9.53	62.16 ± 9.49	0.772
Sex	Male	10(58.8%)	104(78.2%)	114(76%)	0.078
	Female	7(41.2%)	29(21.8%)	36(24%)	
	Total	17(100%)	133(100%)	150(100%)	
History of Pulmonary Disorders (COPD)	No	0(0%)	83(62.4%)	83(55.3%)	0.000
	Yes	17(100%)	50(37.6%)	67(44.7%)	
	Total	17(100%)	133(100%)	150(100%)	
History of CVA or TIA	No	15(88.2%)	127(95.5%)	142(94.7%)	0.210
	Yes	2(11.8%)	6(4.5%)	8(5.3%)	
	Total	17(100%)	133(100%)	150(100%)	
History of Diabetes	No	6(35.3%)	70(52.6%)	76(50.7%)	0.178
	Yes	11(64.7%)	63(47.4%)	74(49.3%)	
	Total	17(100%)	133(100%)	150(100%)	
History of Heart Failure	No	8(47.1%)	109(82%)	117(78%)	0.001
	Yes	9(52.9%)	24(18%)	33(22%)	
	Total	17(100%)	133(100%)	150(100%)	
History of Hypertension		9(52.9%)	54(40.6%)	63(42%)	0.332
Cross Clamp Time		133.47 ± 36.85	124.65 ± 33.89	125.65 ± 34.22	0.319

*AF: Atrial Fibrillation Beta-Blockers group;

**NAF: All the other Beta-Blockers group including (Normal, VT, Afl, Sb)

***The *P*-values are related to the Chi-square test or the two independent samples T-test.

جـامعـــة النجاح الوطنية

كليـــة الدراســـات العليـــا

حدوث الرجفان الأذيني في فترة ما بعد الجراحة عند المرضى الذين يخضعون لجراحة الشريان التاجي بعد إعطاء حاصرات بيتا قبل الجراحة: دراسة رصدية مستقبلية

إعداد

ضحى زكي

إشراف

د. عائدة القيسي

د. معاذ نعيرات

قدمت هذه الرسالة استكمالا لمتطلبات الحصول على درجة الماجستير في تمريض العناية المكثفة، من كلية الدراسات العليا، في جامعة النجاح الوطنية، نابلس– فلسطين.

2022

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الملخص

الخلفية: يعتبر الرجفان الأذيني بعد العملية الجراحية هو أكثر أنواع عدم انتظام ضربات القلب شيوعًا، ويحدث في ما نسبته 30 إلى 50٪ من المرضى وهو عامل مهم لزيادة معدلات الإصابة بالأمراض وزيادة مدة المكوث وزيادة تكاليف المستشفى بشكل كبير. وقد تم ملاحظة عدد من عوامل الخطر المرتبطة بالتردد العالي للرجفان الأذيني بعد تطعيم مسار الشريان التاجي. تظهر حاصرات بيتا كدواء وقائي يُنظر إليه بالإجماع على أنه علاج يساعد في الحد من حدوث عملية الرجفان.

الهدف: تهدف هذه الدراسة إلى تقييم تأثير حاصرات بيتا المحيطة بالجراحة في الوقاية من الرجفان الأذيني بعد الجراحة عند المرضى الذين يخضعون لجراحة تحويل مسار الشريان التاجي.

الطريقة والإجراءات: أجريت الدراسة على المرضى المقرر إجراؤهم لجراحة تحويل مسار الشريان التاجي الاختيارية من خلال طريقة الملاحظة. وتم استبعاد المرضى الخاضعين جراحة الصمام المصاحبة وجراحة تحويل مسار الشريان التاجي السابقة والفشل الكلوي من الدراسة. وتكونت عينة الدراسة من مجموعتين، مجموعة (حاصرات بيتا بالفعل) ومجموعة (الإدارة الحديثة لحاصرات بيتا- بيسوبرولول). وقد توجب إعطاء حاصرات بيتا في المساء الذي يسبق الجراحة للمرضى الذين كانوا يتناولونها بالفعل، وتوجب أن يستمروا في تناول حاصرات بيتا بعد نزع الأنبوب وفي حالة الوعي التام. وبالنسبة للمرضى الذين كانوا

يتلقون حاصرات بيتا لأول مرة بعد الجراحة، يتم تعديل الجرعة وفقًا لمعدل ضربات القلب، بدءًا من 1.25 – 20 مجم بيزوبرولول (عن طريق الفم).

النتائج: أشارت النتائج إلى أم معدل حدوث الرجفان (11.3) 17/150٪) بعد العملية في المجموعة بأكملها، عندما تم إجراء تحليل للمجموعة الفرعية وتقسيم المجموعة بأكملها إلى مجموعتين: المجموعة الأولى(ن = 54) قد حصلت بالفعل على حاصرات بيتا والمجموعة الثانية (ن = 96) قد حصلت على حاصرات بيتا من الإدارة الجديدة كما أظهرت النتائج أن النسب المئوية لحالات الرجفان الأذيني في المجموعة التي حصلت (بالفعل على حاصرات بيتا) (ن = 2) هي (3.7٪) وهي أقل من ذلك في مجموعة (الإدارة الحديثة لحاصرات بيتا) (ن 15، (15.6٪) بمستوى دلالة p = 0.027، بطء القلب 54/37 (68.5٪) في المجموعة الأولى و96/47 (31.3٪) في المجموعة اثنان، وبمستوى دلالة p = 0.000 لصالح المجموعة الثانية، انخفاض ضغط الدم 54/37 (68.5٪) في المجموعة الأولى و96/26 (27.1٪) في المجموعة الثانية، وبمستوى دلالة p = 0.000 لصالح المجموعة الثانية، وقت تثبيت الأبهر المتقاطع في دقيقة 172.19 ± 35.14 في المجموعة الأولى و145.68 ± 47.39 في المجموعة الثانية، وبمستوى دلالة p = 0.000، وطول الإقامة في الأيام 4.00 ± 0.87 في المجموعة الأولى و 3.57 ± 1.41 في المجموعة الثانية ، وبمستوى دلالة p = 0.046 لصالح المجموعة الثانية، وطول الإقامة في المستشفى في الأيام 7.85 ± 2.79 في المجموعة الأولى و4.70 ± 2.68 في المجموعة الثانية، وبمستوى دلالة p = 0.000 لصالح المجموعة الثانية، وتقييم الألم (0.84 ± 3.65) في المجموعة الأولى و4.14 ± 1.16 في المجموعة الثانية، وبمستوى دلالة p = 0.007 لصالح المجموعة الأولى.

الخاتمة: المرضى الذين خضعوا لجراحة في الشريان التاجي، قللت حاصرات بيتا المحيطة بالجراحة من تطور الرجفان الأذيني وتخفيف الألم. حيث تحمي حاصرات بيتا المستمرة قبل الجراحة من الرجفان الأذيني بعد الجراحة. وتزداد فرصة الآثار الجانبية لحاصرات بيتا، مثل بطء القلب وانخفاض ضغط الدم،

التي تطيل الإقامة في المستشفى ووحدة العناية المركزة. تشمل عوامل الخطر قبل الجراحة للرجفان الأذيني قصور القلب وارتفاع ضغط الدم ومرض الانسداد الرئوي المزمن.

الكلمات المفتاحية: حاصرات مستقبلات بيتا، بيسوبرولول، الرجفان الاذيني بعد الجراحة، عملية تحويل مسالا الشريان التاجي، مدة الاقامة، حول الجراحة.