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Comparative Study of The Safety and Efficacy of Different Anticoagulation Regimens in Patients with Atrial Fibrillation Undergoing Coronary Artery Bypass Grafting

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Abstract

Atrial fibrillation (AF) is common in patients after coronary artery bypass grafting (CABG), and anticoagulant treatment is crucial to avoiding thromboembolic consequences. to assess the efficacy and safety of several anticoagulation therapies, such as warfarin, low molecular weight heparin (LMWH), unfractionated heparin (UFH), and novel oral anticoagulants (NOACs), in AF patients undergoing CABG. Patients with AF receiving CABG at a tertiary care facility were included in this retrospective cohort research. Based on their anticoagulant protocol, the patients were split up into four groups. The groups were compared for safety outcomes (thromboembolic events, bleeding complications) and efficacy outcomes (myocardial infarction, stroke, and mortality). The study involved 100 patients in total. The findings demonstrated that, in comparison to warfarin, NOACs were linked to a decreased risk of bleeding problems ($p<0.01$). The safety profiles of UFH and LMWH were comparable. The four groups' efficacy results were comparable. According to this study, NOACs might be a safer option for AF patients having CABG than warfarin. To validate these results and assess the cost-effectiveness of various anticoagulation regimens, more research is required.

Keywords: Coronary Artery Bypass Grafting, Atrial Fibrillation, and Quality Enhancement.

1 BACKGROUND

Cardiovascular disease (CVD) is the world's largest cause of mortality, and it is most prevalent in low- and middle-income countries like China and India. Cardiovascular diseases are common in the cities of these nations and are quickly expanding to the rural areas as well, per a 2010 report from the Board for Global Health in Developing World. According to India's health strategy, there is little planning for the management of chronic illnesses (Gherli et al., 2016). As a result, cardiovascular diseases will unavoidably increase (Ullah et al., 2020). Normally, the arteries supply the heart with blood and oxygen. When it narrows or gets totally blocked, it causes coronary artery disease (CAD). It is also known as coronary heart disease, ischemic heart disease, arteriosclerotic heart disease, coronary atherosclerosis, and coronary arteriosclerosis. The pathological features of coronary heart disease include excessive accumulations of fat or lipid molecules and tissue in the vessel wall, changes to the arterial wall's physiology and structure, and a decrease in the blood flow to the myocardium. Atherosclerotic illness is most likely caused by alterations in lipid metabolism, blood clotting, and the biochemical and biophysical properties of the arterial wall.One of the main causes of acute heart attacks

is blockage that prevents blood flow to the heart (Golwala et al., 2018). The buildup of fatty deposits on the inside walls of the veins that provide blood to the heart is the most common cause of this illness. The term "acute coronary syndrome" refers to potential coronary artery disease side effects. Chronic stable angina, silent ischemia, non-ST segment elevation, myocardial infarction with ST segment elevation, and acute coronary syndrome. Myocardial infarction is one of the heart conditions. According to the American Heart Association's 2015 heart disease and Stroke Statistics Update Data, cardiovascular disease is the largest cause of mortality globally, accounting for 17.3 million deaths per year, and is predicted to increase to 23.6 million fatalities by 2030.6. The WHO estimates that early fatalities from CHD will occur in India for 20 years, till 2020. The number of men and women will also double from 7.7 and 5.5 million, respectively, according to the statement (Sembi et al., 2021).

Research Question

- How safe and effective are various anticoagulant regimes (warfarin, NOACs, LMWH, UFH) for atrial fibrillation patients having CABG?
- In patients with atrial fibrillation undergoing CABG, which anticoagulant regimen is linked to the lowest risk of thromboembolic events and bleeding complications?
- Does the CHA2DS2-VASc score of atrial fibrillation patients undergoing CABG affect the results of various anticoagulation regimens?

Objectives

- To evaluate the safety results (thromboembolic events, bleeding problems) of various anticoagulation treatments in atrial fibrillation patients undergoing CABG.
- To evaluate the effectiveness of various anticoagulant regimes in patients with atrial fibrillation undergoing CABG in terms of stroke, myocardial infarction, and death.
- To assess how various anticoagulant regimes affect readmission rates and hospital duration of stay for atrial fibrillation patients having CABG.
- To evaluate the cost-effectiveness of various anticoagulant treatments for atrial fibrillation patients having CABG.

2 METHODOLOGY

Study Design

Angina is treated by a surgical procedure known as a coronary artery bypass graft, which also reduces the chance of death from coronary artery disease. Arteries or veins from different areas of the patient's body are grafted to the coronary arteries in order to get around and enhance the blood supply to the coronary circulation supplying the myocardial (heart muscle) (Auer et al., 2004). For this study, one hundred individuals who had undergone coronary artery bypass graft surgery were selected. Interventions (Wang et al., 2019) include planned education on wound care, medication adherence,

dietary management, follow-up, sexual relationships, adherence, and the demonstration of stretching exercises, including the use of incentive spirometry, counting pulse rate, stress management techniques, abdominal breathing and coughing technique, calf and hamstring stretches, upper back and chest stretches, and lower back & waist mobility. The results of this study are the positive or unfavorable reactions to the cardiac rehabilitation course. In this study, good responses include improved exercise tolerance, physiological measures (e.g., heart rate, ECG), and improved quality of life. An assessment must be conducted and the treatment plan modified as necessary when a negative result becomes feedback (Ghavami et al., 2024; Chapin et al., 2020).

Data Analysis

An explanation of sample analysis, data collection analysis, and study goal achievement. Data were gathered from 50 CABG patients in the experimental group and 50 CABG patients in the control group in the Cardiothoracic Surgery ward of the Government Rajaji Hospital in order to determine the impact of a cardiac rehabilitation program on activity tolerance, physiological parameters (heart rate, electrocardiogram), and quality of life. The following sections present the tabulated data.

Table 1: Demographic Profile

Demographic Variable	**Experimental group**		**Control group**		**Chi -square test value**	**P-value**	**significance**
	No.	%	No.	%			
Age (Years)							Not significant
<= 50	16	32.0	25	50.0	4.195	0.124	
51-60	22	44.0	19	38.0			
>= 61	12	24.0	6	12.0			
Sex							Not significant
Male	46	92.0	45	90.0	0.122	0.727	
Female	4	4.0	5	10.0			
Religion							Not significant
Hindu	44	88.0	46	92	2.044	0.360	
Christian	2	4.0	3	6			
Muslim	4	8.0	1	2			
Education							
Illiterate	2	4	6	12	14.64	0.001**	Significant
Primary	25	50	38	76			
Secondary	23	46	6	12			
Diet							Not significant
Regular non-vegetarian	2	4	2	4	0.711	0.701	
Occasional non-vegetarian	2	4	4	8			
Pure Vegetarian	46	92	44	88			

Table 1 shows the distribution of CABG patients by the selected demographic variables for the experimental and control groups. In 44% and 38% of cases, respectively, patients in the experimental and control groups are between the ages of 51 and 60. The non-significant p-value of the chi-square test suggests that the age-wise distributions of the two groups have been similar.

Table 2: Clinical Profile

Clinical profile	experimental group		Control group		Chi-square test value	P-value	Significance
	No.	%	No	%			
Presence of comorbid condition							Not significant
Diabeties Mellitus	11	22	14	28	1.150	0.765	
Hypertension	6	12	4	8			
Both	14	28	16	32			
Nil	19	38	16	32			
Presence of Unhealthy habits							Not significant
Nil	20	40	18	36	0.740	0.946	
Smoker	5	10	4	8			
Alcoholic	4	8	3	6			
Both	19	38	21	42			
Pan Chewing	2	4	4	8			
No. of Vessels blocked							Not significant
Single	2	4.0	2	4.0	0.103	0.950	
Double	5	10	6	12			
Triple	4 3	8 6	42	84			

Table 2 shows the clinical features and behaviors of CABG patients by group. The prevalent morbidities linked to CABG, particularly diabetes mellitus and hypertension (known cases), have been studied. In that, the distribution of morbidity status is about equal. Furthermore, according to the chi-square test, the patients' morbidity status is equivalent across the two groups.

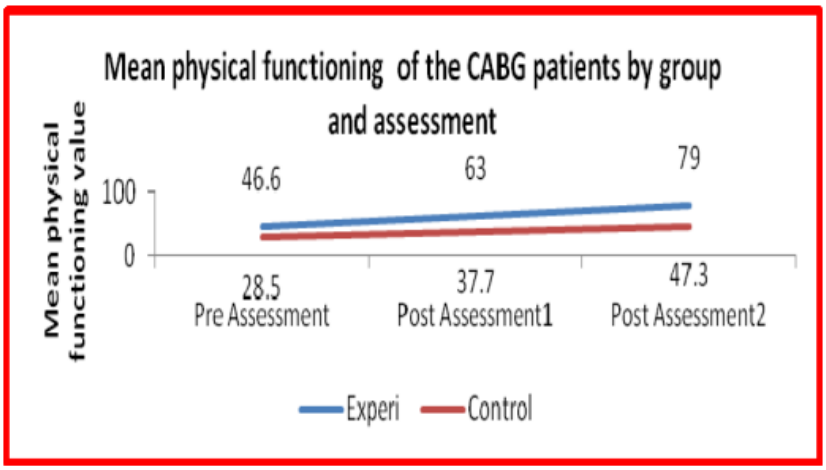

Figure 1: Mean Physical Functioning of CABG Patients by Group Wise and Assessment

Figure 1 shows the mean physical functional value of CABG patients at three assessments for both the experimental and control groups. It is clear from the line diagram that patients in the control group's physical function level has less of an impact on their daily activities than patients in the experimental group. The degree of the initial preassessment has been substantially different.

3 CONCLUSION

CVD is intimately associated with emotional stress, tobacco use, an imbalanced diet, and a sedentary lifestyle. The World Health Organization estimates that suitable lifestyle modifications can lower about 75% of CVD-related deaths. Preventing CVD remains a serious priority for the general public worldwide. Despite the fact that CABG surgery can save lives, patients and nurses deal with a number of challenges in the initial stages of recovery. Early and effective discharge planning, based on a comprehensive understanding of the post-discharge experience, can guarantee optimal recovery. People with heart issues are known to live better, more active lives because to cardiac rehabilitation. It lessens the possibility of another assault. It is a systematic process for getting back to your regular life after surgery. It's a thorough approach. It includes physical activity as well as a few intervention strategies. Numerous studies have shown how effective cardiac rehabilitation regimens are. As a result, after their cardiac rehabilitation program, it is crucial to help CABG patients live happy and healthy lives.

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