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TO ASSESS THE EFFECTIVENESS OF ANTIHYPERTENSIVE AGENTS IN CORONARY ARTERY DISEASE PATIENTS

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ABSTRACT

Introduction: Coronary artery disease (CAD) is significantly influenced by hypertension in all age and gender categories. High blood pressure is treated using antihypertensive drugs, some of which aid in the body's elimination of extra fluid and salt. Beta-blockers, statins, diuretics, ACE inhibitors, and blockers of angiotensin receptors should all be used in suitable therapy. The study's purpose was to determine which antihypertensives are used most frequently, while simultaneously monitoring patient heart rate and ECG changes, as well as the efficacy of antihypertensive drugs in patients with coronary artery disease.

Materials and Methods: It is a prospective observational research conducted at Apollo Hospital. Patients were identified using exclusion and inclusion criteria. The effectiveness of antihypertensive medicine provided to CAD patients was studied.

Results: The study included 260 patients, with 190 (73%) males and 70 (27%) females. The Heart rate of the patients varied by 2.809%, indicating that the drug is having the desired effect and that the person has undergone noticeable alterations. The study indicates that statins, beta-blockers, and aspirin are administered to the patient in the highest quantities. The most often given antihypertensive medicine

combinations comprise, beta blocker, statin, and diuretics. They have been considered to be an essential aspect of treatment for those with coronary artery disease.

Conclusion: In the management of people with CAD, selecting the right drug combination and taking antihypertensive drugs correctly can be critical.

INTRODUCTION:

Hypertension is a significant independent risk factor for CAD across all age, ethnic, and sex groups. Traditionally, hypertension was defined as a higher or equal of SBP of 140 mm Hg or a DBP of 90 mm Hg and the administration of antihypertensive medication at the time of diagnosis [1]. CAD is mostly available in two formats: The first type is a chronic form known as stable ischemic heart disease, in which the heart gradually receives less oxygen-rich blood over time as a result of the coronary arteries gradually becoming tighter. Even if certain symptoms could appear, the condition is manageable on a daily basis. The second kind of acute coronary syndrome that necessitates immediate medical attention [2]. When the plaque in your coronary artery suddenly ruptures, preventing blood flow to your heart, a blood clot is formed. This unexpected obstruction is what causes a heart attack [3].

A heart-healthy lifestyle that includes modifications to diet, sodium consumption, alcohol reduction, regular exercise, weight loss, quitting smoking, management of lipid, and medication of antiplatelet are essential [4]. Medications that have been found to enhance outcomes for people with heart failure with a decreased ejection fraction also lower blood pressure [5]. β-blockers are the first-line medications for the treatment of hypertension in people with CAD, which produces angina [6]. If blood pressure is high or angina persists while taking beta-blocker therapy, longer acting calcium channel blockers (CCB), Nifedipine, and amlodipine, might be added to the standard treatment plan [7]. Hence, a longer acting CCB should be used if a CCB is required in addition to α-blocker to treat angina or blood pressure [8]. Aldosterone receptor antagonists, β-blockers, and ACE inhibitors (also known as ARBs) should be used in the treatment of patients [9]. The cardiac α1A adrenergic receptor can offer cardiovascular protection in ischemic cardiomyopathy [10]. Alpha-blockers modify the sympathetic nervous system to achieve their pharmaceutical effects. Phenoxybenzamine and phentolamine are examples of nonselective alpha-blockers [11].

The main objectives of CAD therapy are to increase coronary artery blood flow while limiting myocardial oxygen demand [12]. Nonetheless, the main objectives of "modern" CAD treatment are to improve quality of life (QoL), minimize myocardial necrosis and left ventricular remodeling, increase survival, and slow down the atherosclerotic process in the coronary arteries in order to prevent left ventricular dysfunction [13].

The most recent ACC Foundation/AHA guidelines advise using ACE inhibitors and/or β-blockers along with additional medications such as thiazide diuretics or CCBs to treat patients with excessive blood pressure. [14] Beta-blockers are frequently prescribed drugs that have long been regarded as "cardio-protective." The evidence that supports their significance in cardio protection is not as strong as their clinical use would indicate. Beta-blockers, antiplatelets, and statins are frequently prescribed to those who have CAD and angina.[15]

Pregnancy-related hypertensive problems are linked to valvular heart disease and a wider range of cardiovascular illnesses than was previously recognized [16]. The development of persistent hypertension is a major but not complete mediator of cardiovascular risk after HDP [17]. Many cardiovascular diseases are often treated with beta-blockers during pregnancy.

Labetalol, Nifedipine, and methyldopa are first-line treatments for pregnant hypertension and persistent hypertension [18]. Diuretics, direct renin inhibitors, blockers of angiotensin receptors, and ACE inhibitors are not advised. But there is a lot of anecdotal evidence that salicylates, nitro-glycerine, beta-blockers, calcium antagonists, and heparin are effective [19].

To prevent vasoconstriction (the narrowing of blood vessels), aldosterone secretion, and salt and water retention, ARBs specifically block the angiotensin II receptor. This helps to lower blood pressure [20]. The body may become fluid-overloaded and experience a rise in blood pressure if it retains too much salt. Diuretics lower blood pressure by increasing urine flow, which removes salt and chloride from the body (and subsequently water). ACE inhibitors prevent the hormone angiotensin from changing from its inactive to active state [21].

As discussed above, many anti-hypertensive agents used in CAD patients with as per its mechanism of action on blood vessels and improve the patient's health. Therefore, objective of the study was assessing the effectiveness of anti-hypertensive drug in CAD patients.

MATERIALS & METHODS:

Study design and location

This prospective study was conducted at the Apollo Hospital, a tertiary care center in Bhat, Gandhinagar, Gujart, India, from

February 2023 to May 2023. The Institutional Review Board of Apollo Hospital reviewed and approved the study protocol.

Study population

All coronary artery patients have age more than 18 year with or without co-morbid condition have included in the study and Pregnant and lactating women and Patient who didn't give consent were excluded from the study. According to the exclusion and inclusion criteria, total 260 patients were enrolled in the study after approval from ethics committee.

Data Collection Procedure

According to the requirements of case report form, we reviewed the prescription and treatment chart of the enrolled patient. Data was collected using a data collection form, which included four parts. The first part included demographic details, second part consists of clinical diagnosis and vital signs of the patient, third part consists of a treatment chart of the patient, fourth part consists of follow-up data on the patient's ECG abnormality and Heart rate.

Data analysis

Data analysis was carried out by finding the mean and determining the percentage. The data was entered in excel sheet. P value will be calculated to assess the difference between pre admission heart rate and on follow up heart rate, p ≤0.05 considered as significant.

RESULTS

After the scrutiny, using the enrolment criteria 260 patients were enrolled into the study. Among the total patients 190 (73%) were males and 70 (27%) were females. The result showed that there were 32% of patients belonged to the 60-70 years of range, 27% of patients belong to the 50-60 years of range, 18% belongs to the 40-50 years of range, 15% belongs to 70-80 years of range, and other percentages were comparatively less. The average of heart rate at the time of admitted in hospital was 83.01 ± 2.01 and after treatment was 80.21 ± 2.01. This indicated the prescribed drug treatment decrease the heart rate of patients. The average systolic pressure was 134 mmHg and diastolic pressure was 79 mmHg. Out of 260 patients, 41% patient has Unstable Angina, 36% has ST Elevation Myocardial Infarction, 20% has Non-ST Elevation Myocardial Infarction.

Study data revealed that 21.6 % had Single vessel disease, 37.5% had Double vessel disease, and 38.6% had Triple vessel disease.

ECG Abnormalities:

Figure 1 indicated that T wave's inversion was the main abnormality observed in coronary artery patients (83 patients out of 260) which is associated with unstable angina. The next highest was ST segment elevation seen in 47 patients which was associated with STEMI.

Drug treatment chart given to the patient:

Table 1 shows the drug treatments given to the patients. Data indicated that patients received statins followed by beta-blocers, Aspirin, ADP receptor antagonist.

The most widely used class of antihypertensive medication is β blockers, which are followed by diuretics, ARB, CCB, and ACE inhibitors, which are administered least frequently.

Drug combinations given to the patient: (Table 2)

Table 2 data showed that aspirin, ADP antagonist, β blocker, statin, diuretics combination were mostly given in patients. They are regarded as an essential therapy strategy for people with CAD. The second significant medication combination for the treatment of CAD is Aspirin, ADP antagonist, β-blockers, and statins.
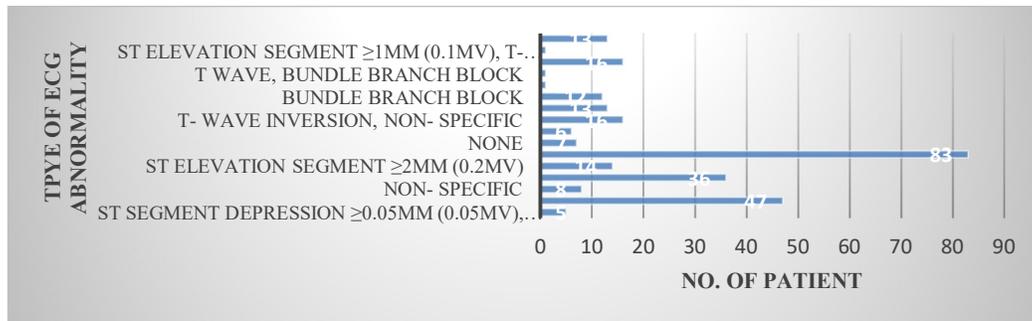

Figure 1: Type of ECG abnormalities in patients

Table 1: Drug treatment chart

Drug Name	No. of Patients	Percentage (%)
Statins	213	81.92
β-blocker	211	81.15
Aspirin	205	78.84
ADP (Adenosine-Diphosphate) receptor antagonist	164	63.07
Diuretics	136	52.3
ARBs (Angiotensin Receptor Blocker)	64	24.61
CCB (Calcium Channel Blocker)	52	20
LMWH (Low Molecular Weight Heparin)	27	10.38
ACE (Angiotensin Converting Enzyme) inhibitors	17	6.53

Table 2: Drug combinations given to patients

Drug combinations	Percentage
Aspirin+ ADP antagonist+ β blocker+ Statin	29.61%
CCB + ACE inhibitor	8.84%
Aspirin+ ADP antagonist+ β blocker	4.61%
Aspirin+ ADP antagonist+ β blocker+ Statin + Diuretic	41.15%
β blocker + Statin+ Diuretic	4.61%
β blocker+ Statin+ Diuretic+ ARBs	5.76%
Miscellaneous	5.38%

DISCUSSION:

Similar to the study by Steg PG *et al*.,[22] we included 260 participants in our study and compared the patient's heart rate at the presentation and on a 3-month follow-up. Our study employed a logistic regression model to analyze independent factors of HR≥80 beats per minute (bpm). The only treatment predictor included in the analysis was the usage of HR-lowering medicines, which was regarded as the most significant treatment variable.

We identified the drug combination therapy that was most frequently administered to patients among all the instances which was similar to Lee J *et al*., [23] where the commonly used drug combination is Aspirin, ADP Antagonist, β blocker, Statin, Diuretics. They are considered to be a crucial component of treatment for those with coronary artery disease. We noted the drug type, dosage, date of distribution, and term of prescription. Our research assists in comparing the long-term advantages of ACEIs, ARBs, and other antihypertensive agents in terms of reducing all-cause mortality and enhancing the health-related quality of life.

Similar to Perreault *et al*., [1] all subjects aged 40 to 95 years who were newly treated or previously treated with diuretics, β-blockers, blockers of angiotensin receptors, CCBs, ACE inhibitors, or combination therapy are included in the study. All patients were included with a diagnosis of myocardial infarction or angina and underwent a medical procedure and the record helped in finding the result with no. of the diseased vessel and culprit artery along the major finding of ECG abnormality.

Differences in the knowledge of participant heart rate at the presentation and post-follow survey are (Mean ± SD) 83.02±2.012 to 80.17±2.012 respectively. Baseline variables for continuous data are summarized as means, SDs, medians, and ranges; for categorical data, they are counted and expressed as a percentage, as in the study by Steg PG *et al*., [24] the use of HR-lowering drugs was then forced into the multivariable model using a stepwise selection procedure applied to the remaining relevant univariate factors.

Based on Grassi G. [25] and the available evidence, beta-blockers have been shown to be effective in treating atrial fibrillation, heart failure, and ischemic artery disease. Still, metoprolol seems to be a good pharmaceutical choice for a variety of cardiovascular diseases. Research on this chemical is still ongoing, and new, intriguing applications are being investigated. These efforts could yield pertinent findings in the years to come [25].

CONCLUSION

The study highlight the treatment of individuals with coronary artery disease,

picking the appropriate drug combination and taking antihypertensive medications correctly can be essential. Calculations were made to track the patient's Heart Rate as well as changes in the ECG. Beta blockers are the most commonly used class of antihypertensive, followed by diuretics, then ARB, then CCB, and least frequently prescribed is ACE inhibitors in the study which indicated that anti-hypertensive drug treatment useful in the coronary artery disease patients.

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