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Research

A Prospective Observational Study On The Quadruple Therapy Of Post Cabg And Ptca Patients In A Tertiary Care Hospital

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Abstract

This study presents a prospective observational study on the efficacy of quadruple therapy in post-percutaneous transluminal coronary angioplasty (PTCA) and coronary artery bypass grafting (CABG) patients at a tertiary care hospital. The study involved 250 patients and focused on evaluating the impact of comprehensive treatment involving dual antiplatelet therapy (DAPT), statins, beta-blockers, and ACE inhibitors/ARBs on the secondary prevention of cardiovascular events. The findings suggest that quadruple therapy is highly effective in reducing adverse cardiovascular outcomes and promoting recovery in post-revascularization patients. The study emphasizes the importance of comprehensive post-operative care, integrating medication management with lifestyle and dietary modifications to improve long-term health outcomes in patients with coronary artery disease (CAD).

Keywords: Quadruple Therapy, PTCA, CABG (Coronary Artery Bypass Grafting) Dual Antiplatelet Therapy (DAPT), Secondary Prevention of Cardiovascular Disease.

INTRODUCTION

CAD is a chronic persistent illness. It has an impact on the vessels that carry blood to your heart. It is additionally known as coronary artery disease. Under the circumstances of CAD, cardiac muscle des not get enough blood and oxygen. It causes disparity between the availability and demand of oxygen further causes coronary blockage. Myocardial necrosis is the standard definition of AMI, supporting the diagnosis. Evidence shows the patient's symptoms, ECG results interpretations, anomaly in the myocardial segment. An abrupt imbalance between the hearts myocardial supply of blood and oxygen demand is what leads to MI. The CKD increases the chance of developing CAD. For CKD patients, the results are worse. Several biomarkers shown to be the indicators of cardiac prognosis in CKD patients. In individuals with CKD, the symptoms might not be

typical. Nephropathy caused by the contrast during coronary angiography is a possibility. A significant portion of the morbidity, death and expensive associated with diabetes are caused by CAD. Clinical study outcomes in the following years did not back up their suggestions. Newer imaging techniques, including noninvasive angiography with CT techniques and Ca++ scoring, have become popular since the previous consensus declaration.

CAD are typically categorized into different risk groups

- High risk, with cardiac mortality risk of > 3% per year.
- Initially low risk, with cardiac mortality risk of less than one percent/year

The majority of type DM 2 individuals who are asymptomatic are considered to have intermediate risk. According to the research, untreated people with HTN have increased hyperinsulinemia and hyper triglyceridemic profiles compared to similar groups with normal BP, and resistance to insulin stimulated glucose uptake. Additionally, rats that spontaneously develop HTN and Sprague and Dawley rats on a fructose- rich diet both exhibit insulin resistance, hypertriglyceridemia and hyperinsulinemia. The impairment in the insulin-stimulated glucose absorption in these experimental animals can also be demonstrated at the cellular level. Researchers have found that preventing the onset of insulin resistance and other parameters in fructose-fed rats significantly reduces the rise in HTN as well. It is believed that CAD is more common in HTN patients because endogenous hyperinsulinemia and hypertriglyceridemia have been identified as variables that rise the chances of developing CAD. It is difficult to demonstrate that reducing BP reduces the chance of developing CAD if these metabolic abnormalities were aggravated by antihypertensive therapy.

THE FOLLOWING ARE SOME OF THE TREATMENT OPTIONS FOR THE CORONARY ARTERY ATHEROSCLEROSIS

o CABG PTCA

STRUCTURE AND FUNCTIONS OF CORONARY ARTERIES

The LMCA and the RCA are the 2 primary coronary arteries. These 2 emerge from the aortas root

BLOOD SUPPLY AND LYMPHATICS

From the aortic root, the RCA and LMCA branch out to nourish various parts of the heart. The posterior descending arterial branch of the RCA, the marginal branch, all originates from the RCA. The circumflex and the LAD are formed by the branches of the LMCA. The PDA and the LMA both originate from the circumflex artery. The diagonal branches emerge from the LADA. The ventricles on the lateral portion are supplied with blood by the RCAs marginal branch. Blood is supplied to the heart's inferior region through the posterior descending artery branch. The LMCA transports blood to the heart's left side. The major portion of the left ventricle's anterior region, including the anterior ventricular septum, receives blood from the LAD. When the left heart is dominant, the LCx occasionally supplies the blood to the posteroinferior portion of the heart as well as the lateral wall of the left ventricle. Like, every other organ in the body, the heart is equipped with the lymphatic system, which includes lymphatic veins, lymph nodes and lymphoid organs. The myocardial, sub endocardium, and the sub-epicardium are all perforated by the lymphatic system.

The lymph capillaries in the sub- endocardial layer absorb interstitial fluid, which is then transported to the lymphatic vessels in the sub-epicardial layer where it is collected. There are 2 primary veins for collecting lymph. The first one that carries alongside the conal vein before turning towards the left pulmonary trunk and finally the mediastinum in order to empty into the right and left ventricles. The left marginal vein, coronary sinus, and the left atrium are all routes taken by the second primary collecting lymphatic veins to reach the mediastinum.

CABG

Improved blood supply to the heart is achieved by coronary artery bypass grafting. It is given for severe.

CHD

In coronary arteries a material called as plague accumulates, causing CHD. Heart receives blood containing oxygen from these arteries. Calcium, cholesterol, fat and other elements present in blood are among the components of the plague. The arteries are narrowed by the plague, reducing the flow of blood to the cardiac muscle. Angina, SOB and in rare instances. One method of treating CHD is CABG. In a CABG procedure, a healthy bodily vein or artery is transplanted into the coronary artery blockage. The artery blockage is bypassed by the grafted artery or vein.

TYPES OF CABG : TRADITIONAL CABG

In this procedure, the chest bone must be opened. By administering a medication, the heart is forced to stop, and the heart-lung machine helps to retain the body's circulation. The heart begins pumping again when a blocked artery is surgically repaired, restoring BF to the heart. To restart the heart's function, electric shocks are occasionally employed.

OFF-PUMP CABG: MIDCAB

PROCEDURES BEFORE CABG

The patient must go through a few tests, including an EKG, a chest X-ray, and blood work, before the operation can begin. Before the procedure, recommendations are given regarding what can be administered and what should be avoided. The following tests must be completed by the patient before the procedure to determine healthy arteries. The likelihood of an individual being hospitalized right away increases if they exhibit several blocks on the day of a standard examination. Either today or tomorrow can be used for CABG. The patient is asleep throughout the lengthy procedure. Monitoring of the respiration, blood pressure, oxygen levels, and heartbeat is ongoing. The lung is hooked to a tube that is attached to a ventilator in order to help with breathing.

The ribcage is then opened after a cut in the chest's center is made to reach the heart. Using a medication to stop the heart causes it to cease beating, at which point surgery can start. Moreover, medications are provided that keep the heart from stopping. Blood circulation in the body is facilitated by the heart-lung bypass. A healthy leg vein or artery is frequently used as a transplant for the bypass.

NON-TRADITIONAL CABG

OFF-PUMP CABG

The heart is not halted during this form of grafting. heart-lung bypass is not necessary because the heart is not halted. A mechanical apparatus is used to study the topic of grafting.

MIDCAB

Direct CABG grafting with minimally invasive techniques (MIDCAB) can take several different forms. The classic CABG is not the same as those. Instead of opening up the entire chest, they only require little incisions to be made. Nonetheless, there may occasionally be a need for heart-lung bypass.

POST- ACCESS CABG PROCEDURE

In order to execute artery or vein transplants during this procedure, a small incision must be made in the patient's chest. No heart-lung bypass equipment is required.

INDICATIONS

- more than 50% have left major disease.
- > 70% of TVD- CAD with or without proximal LAD involvement.
- TVD the LAD and another significant artery.
- In a patient who has substantial anginal symptoms despite receiving the most amount of medical treatment, one or more major stenosis >70%.

POST THERAPEUTIC MANAGEMENT OF PTCA AND CABG

All the three of the therapeutic options for the individuals with coronary artery disease- medical therapy, surgical revascularization, PTCA -have changed over time. If not contraindicated the medical therapy must include intensive risk factor reduction with treatment with statins, ASA, and ACE inhibitors. The development of minimally invasive, beating heart surgery has also altered surgical therapy. With concomitant therapy, including glycoprotein 2b/3a inhibitors, thienopyridines and dependence on stent placement.

- Antiplatelet therapy is used to prevent the blood clots that would obstruct the grafts.
- Clopidogrel and aspirin are 2 medications that are given.
- Beta blockers are the drugs which decrease BP, slow down the heart, and reduce the need of oxygen by the heart.
- Nitrates come in the form of nitroglycerin. These medications widen coronary vessels, supplying the heart muscle with additional blood.
- ACE inhibitors can lower the frequency of ischemic events following CABG. Ischemic episodes include mortality, need for additional bypass surgery, angioplasty or stent installation, heart attack, TIA, or return of angina.
- Cholesterol lowering therapy is given to almost all patients to reduce their lipid levels.

PATIENTS RECEIVING QUADRUPLE THERAPY AFTER REVASCULARIZATION

Aggressive secondary preventative actions must be taken by patients undergoing coronary revascularization., such as changing their lifestyles, taking drugs to regulate their BP, DM and cholesterol and using antiplatelet treatments. The current recommendation does not go into great detail regarding the lifestyle changes that can be made to improve heart health or the pharmacotherapies used for the secondary prevention following the revascularization.

DAPT IN PATIENTS AFTER PCI

DAPT (1-3 months) is appropriate for some patients having PCI, and this should be followed by a switch, to decrease the bleeding episodes with P2Y12 inhibitor monotherapy. Collected data shows that the shorter term DAPT results in reduced bleeding and longer term DAPT results in fewer ischemic events.

METHODOLOGY

STUDY SITE: The study site was KIMS-SUNSHINE HOSPITAL, Secunderabad.
STUDY PERIOD: The study was observed for a period of 6 months.
SAMPLE SIZE: A total of 250 prescriptions were involved in the study were followed for the project.
STUDY DESIGN: This type of design was a prospective observational study.

STUDY CRITERIA: INCLUSION CRITERIA

- All the patients who underwent PTCA and CABG are taken in this study.
- All patients aged 30 years and above are included.
- Both males and females.
- Patients with all kind of comorbidities.
- In-patients.
- Patients with the history of narrow or blocked coronary artery.

EXCLUSION CRITERIA

- Pediatrics
- Pregnant and lactating women.
- Psychiatric patients.

STUDY MATERIALS

- Patient consent forms.
- Patient data collection forms.
- Patient profile forms.

PATIENT CONSENT FORMS

It includes details of the patient, details of the study and consent data. The patient who wants to enroll in the study should sign this form

PATIENT DATA COLLECTION FORM

It contains the demographic details, admission and discharge date, chief medical complaints with various past histories, cardiac history, laboratory finding and other cardiac tests, provisional diagnosis, final diagnosis, progress chart, quadruple therapy and finally the discharge medications.

STUDY PROCEDURE

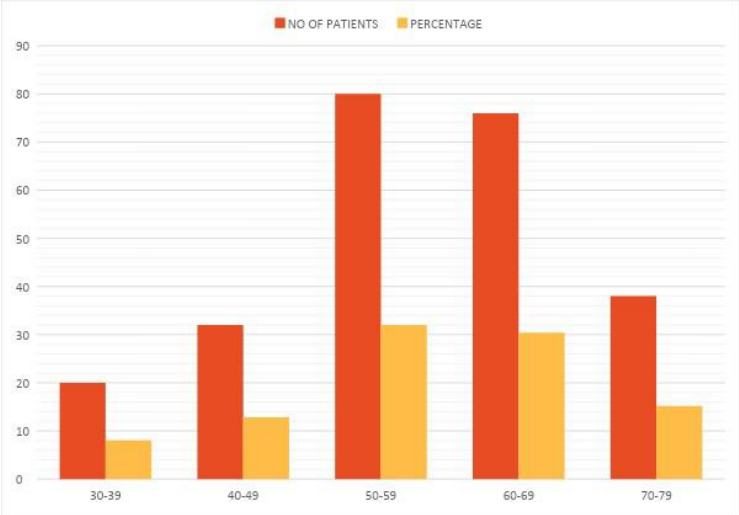
Patient enrolment in the study depends on getting their agreement, making this a prospective observational study. No inquiry or patient involvement was necessary for the study. The conduct of the study has received permission from Sunshine Hospital's ethical committee. 250 participants from both genders data are included through data collecting forms. When approaching patients who are a part of study inclusion criteria, we properly discussed our study's details to them and only asked for their agreement once we were sure they fully understood it. A cardiology department is considered.

RESULT

Table 1: Distribution Based On Age

AGE	N	n (%)
30-39	20	8
40-49	32	12.8
50-59	80	32

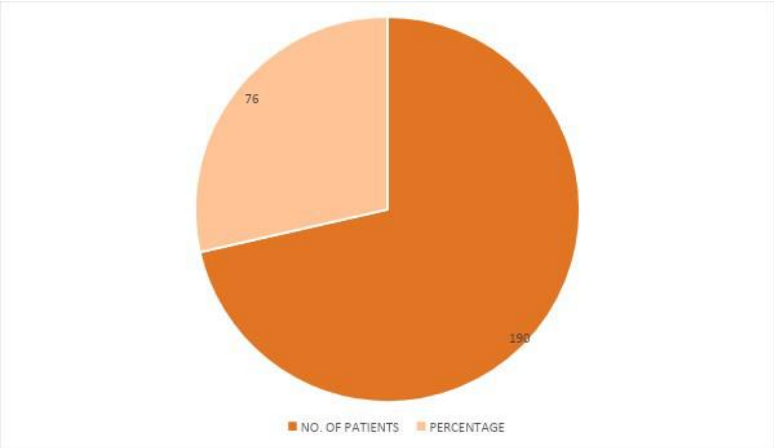
60-69	76	30.4
70-79	38	15.2
80-89	4	1.6
TOTAL	250	100



From the above data it is estimated that 250 subjects were enrolled. Individuals of 50-59 years represented by the greatest percentage of hospitalized patients were 80 (32%) and 60-69 years were 76 (30.4%) followed by 70-79 years were 38 (15.2%) and 40-49 years were 32 (12.8%). The least was observed to be in 30-39 were 20 (8%).

Table 2: Gender Wise Data Distribution

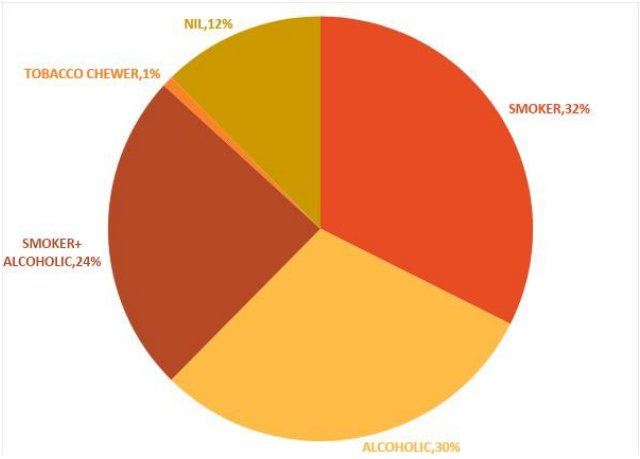
GENDER	N	N (%)
MALE	190	76
FEMALE	60	24
TOTAL	**250**	**100**



From the graph, it is inferred that 250 subjects including 190 males and 60 females were taken. Males 76% are admitted in hospital with CAD when compared to females 24%.

Table 3: Distribution Based On Social History

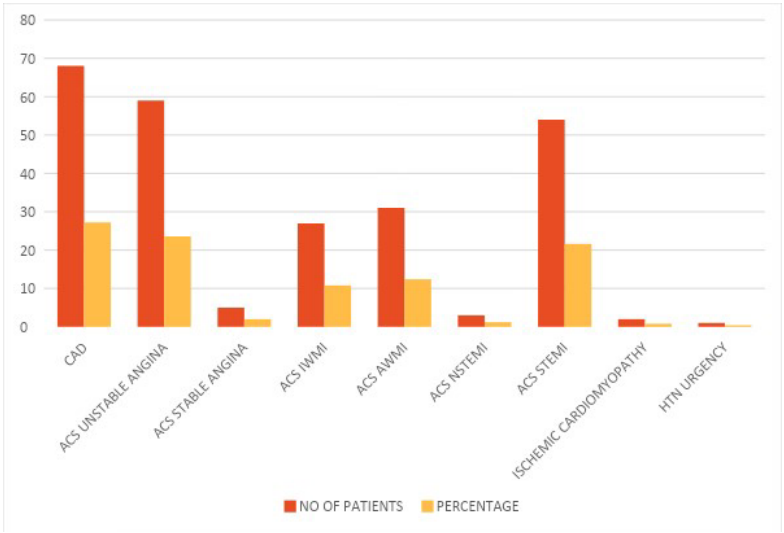
SOCIAL HISTORY	N	n (%)
SMOKER	81	32.4
ALCOHOLIC	75	30
SMOKER+ ALCOHOLIC	61	24.4
TOBACCO CHEWER	2	0.8
NIL	31	12.4
TOTAL	250	100



Out of 250 patients were taken, Majority of them are smokers 81(32.4%) and alcohol were 75 (30%) and followed by smoking and alcohol consumption were 61(24.4%) and tobacco chewers were 2(0.8%). The non-alcoholic and non-smokers were 31 (12.4%).

Table 4: Distribution Of Patients Based On Diagnosis

DIAGNOSIS	N	n (%)
CAD	68	27.2
ACS UNSTABLE ANGINA	59	23.6
ACS STABLE ANGINA	5	2
ACS IWMI	27	10.8
ACS AWMI	31	12.4
ACS NSTEMI	3	1.2
ACS STEMI	54	21.6
ISCHEMIC CARDIOMYOPATHY	2	0.8
HTN URGENCY	1	0.4
TOTAL	250	100

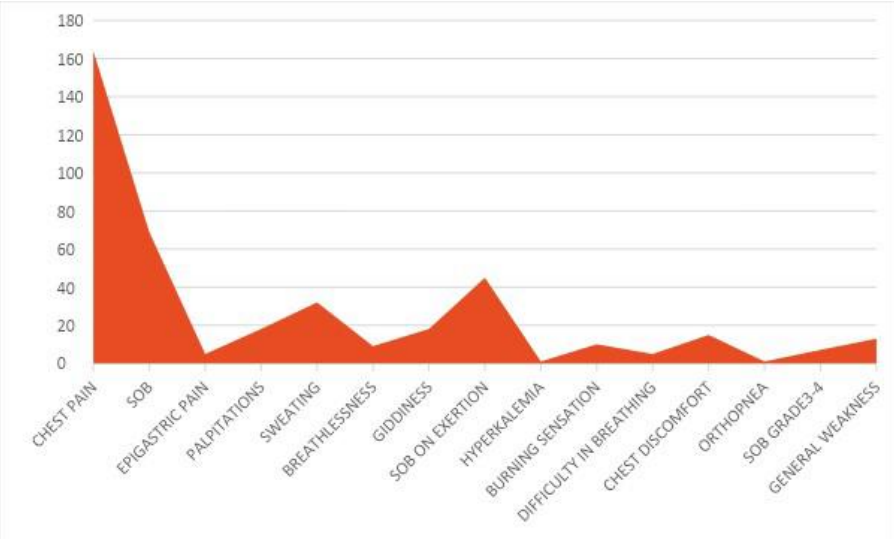


In a sample of 250 patients the following types of diagnosis observed.

Table 5: Distribution Based On Complaints

COMPLAINTS	N	n (%)
CHEST PAIN	164	65.6
SOB	69	27.6
EPIGASTRIC PAIN	5	2
PALPITATIONS	18	7.2

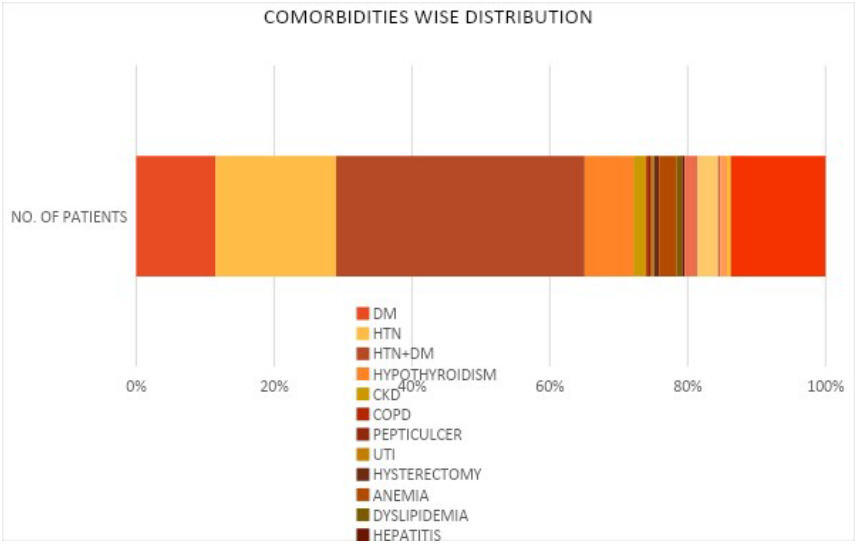
SWEATING	32	12.8
BREATHLESSNESS	9	3.6
GIDDINESS	18	7.2
SOB ON EXERTION	45	18
HYPERKALEMIA	1	0.4
BURNING SENSATION	10	4
DIFFICULTY IN BREATHING	5	2
CHEST DISCOMFORT	15	6
ORTHOPNEA	1	0.4
SOB GRADE3-4	7	2.8
GENERAL WEAKNESS	13	5.2



250 people were recruited for the study. Most of the patients admitted with the complaints of chest pain were 164(65.6%) and the least were admitted with complaints of hyperkalemia and orthopnea 1(0.4%).

Table 6: Distribution On The Basis Of Comorbidities

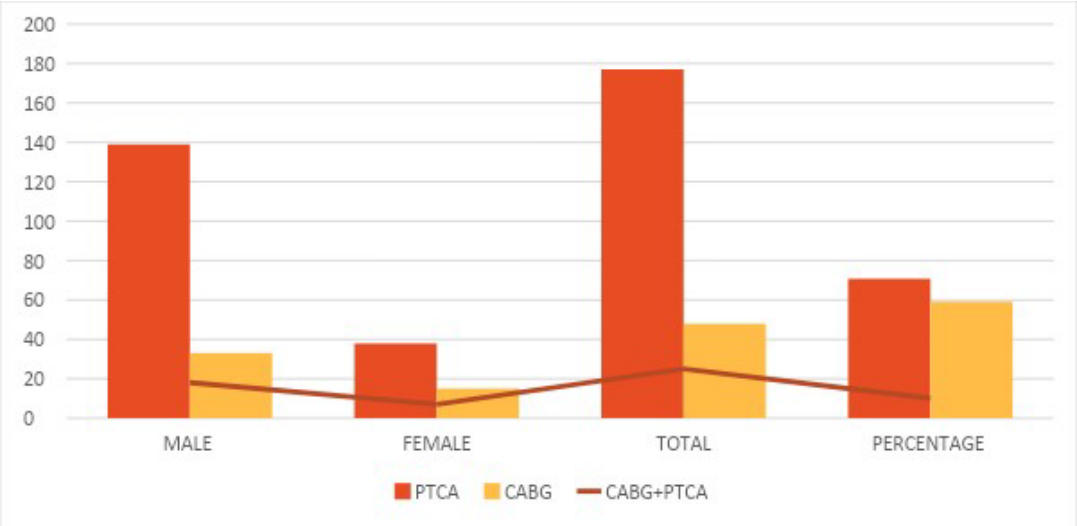
COMORBIDITIES	N	n (%)
DM	31	12.4
HTN	47	18.8
HTN+DM	97	38.8
HYPOTHYROIDISM	19	7.6
CKD	5	2
COPD	1	0.4
PEPTICULCER	1	0.4
UTI	1	0.4
HYSTERECTOMY	2	0.8
ANEMIA	7	2.8
DYSLIPIDEMIA	2	0.8
HEPATITIS	1	0.4
AKI	5	2
CVA	8	3.2
SEIZURES	1	0.4
ASTHMA	3	1.2
GI-REFLUX	1	0.4
NONE	37	14.8



From the data observed that, out of 250 patients with CAD undergoing surgery, 97 individuals exhibited hypertension with diabetes.

Table 7: Gender Wise Distribution Of Surgeries

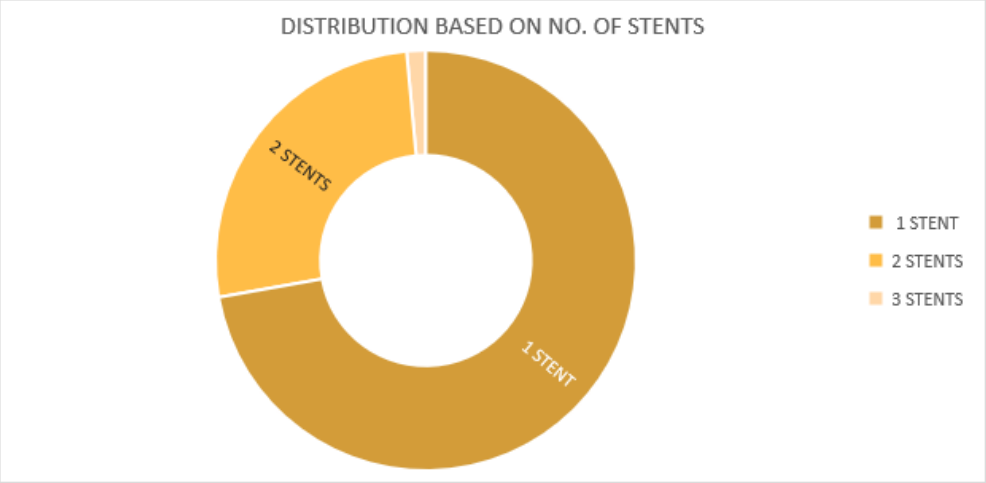
SURGERY	MALE	FEMALE	TOTAL	PERCENTAGE
PTCA	139	38	177	70.8
CABG	33	15	48	19.2
CABG+PTCA	18	7	25	10



From the above table and graph the majority of male (139) and females (39) patients. PTCA were 177(70.8%) and followed by CABG surgery were 48(19.2%) and the least number of male and female patients were 25(10%).

Table 8: Distribution Based On Number Of Graphs

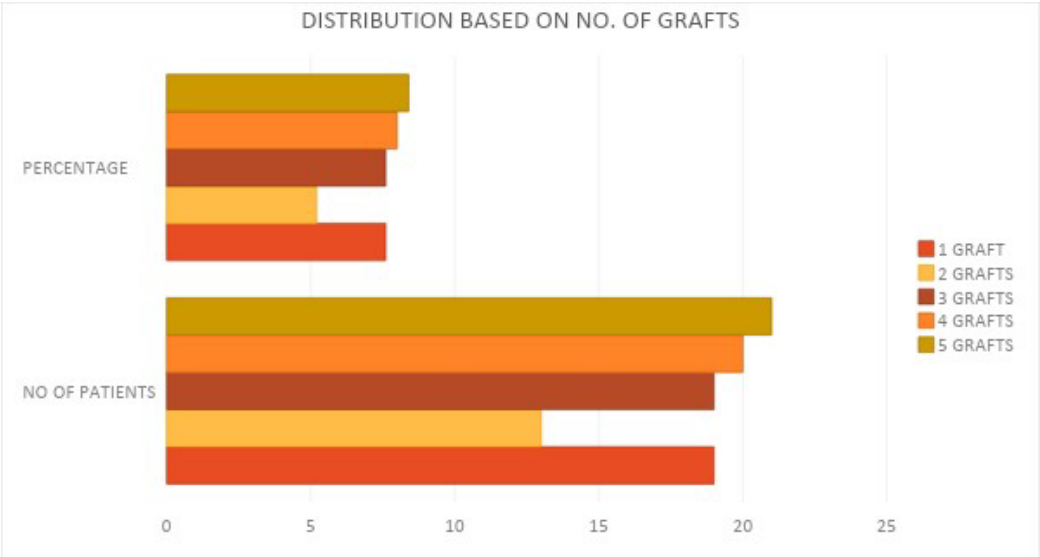
NO. OF STENTS	N	n (%)
1 STENT	148	59.2
2 STENTS	54	21.6
3 STENTS	3	1.2



From the above table and graph, the majority patients with PTCA surgery are with single stent 148(59.2%) and the least number were with three stents (1.2%).

Table 9: Grafts Wise Distribution Of Data

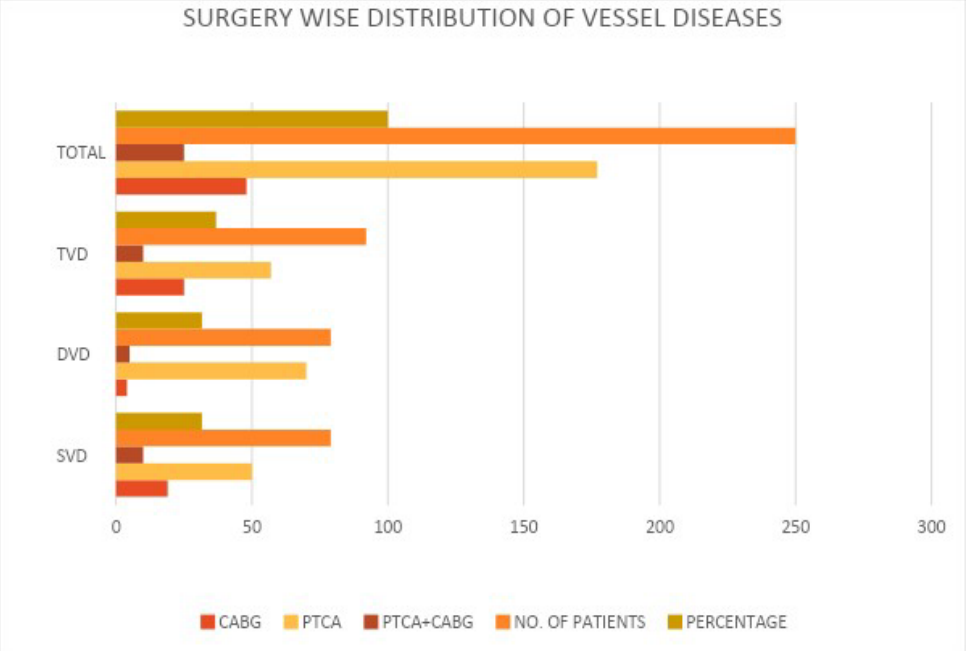
NO. OF GRAFTS	N	n (%)
1 GRAFT	19	7.6
2 GRAFTS	13	5.2
3 GRAFTS	19	7.6
4 GRAFTS	20	8
5 GRAFTS	21	8.4



From the above graph and table, CABG surgery with 5 grafts were 21(8.4%) and followed by 4 grafts were 20(8%) and the patients with 1 and 3 grafts were 19(7.6%) and the least number of patients who underwent CABG surgery with 2 grafts were 13(5.2%).

Table 10: Surgery Wise Distribution Of Vessel Diseases

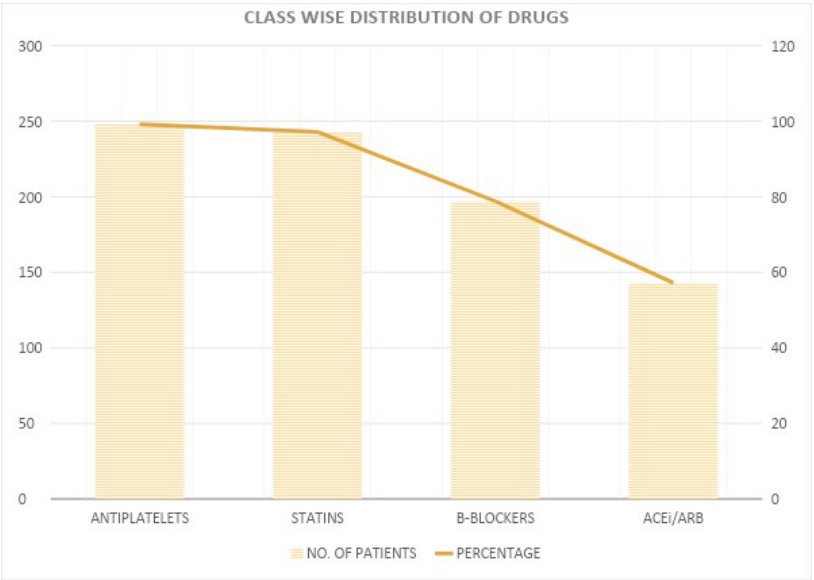
VESSEL DISEASES	CABG	PTCA	PTCA+CABG	N	n (%)
SVD	19	50	10	79	31.6
DVD	4	70	5	79	31.6
TVD	25	57	10	92	36.8
TOTAL	48	177	25	250	100



From the above table and graph, the majority of the patients admitted with TVD (92) underwent PTCA when compared to CABG and PTCA+CABG followed by the patients with DVD (79) and SVD (79).

Table 11: Class Wise Distribution Of Drugs

DRUG CLASS	N	n (%)
ANTIPLATELETS	248	99.2
STATINS	243	97.2
B-BLOCKERS	197	78.8
ACEi/ARB	143	57.2

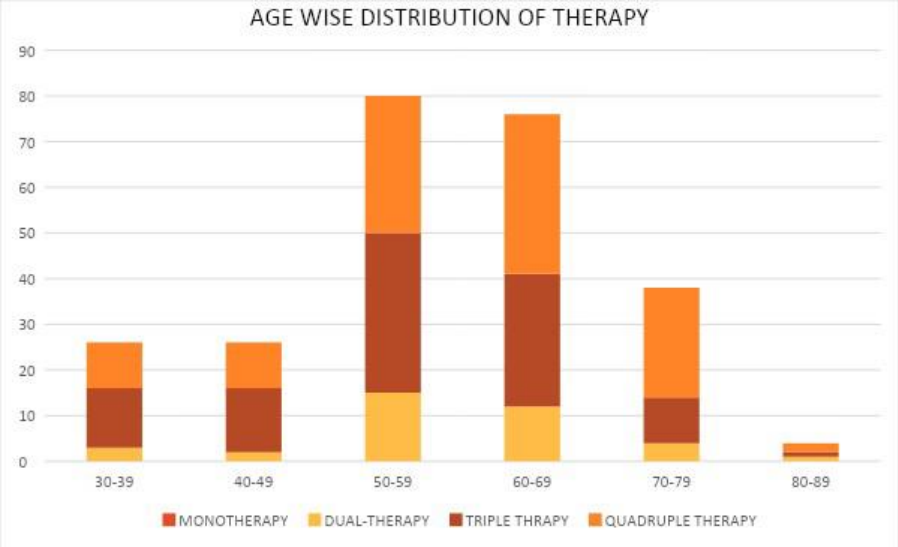


From the above table and graph, it was noticed that antiplatelets, statins, B-Blockers and ACE inhibitors / ARB are prescribed to almost all the patients the majority of the patients are taking antiplatelets were 248(99.2%).

Table 12: Age Wise Distribution Of Therapy

AGE	MONO THERAPY	DUAL-THERAPY	TRIPLE THRAPY	QUADRUPLE THERAPY
30-39	0	3	13	10
40-49	0	2	14	10

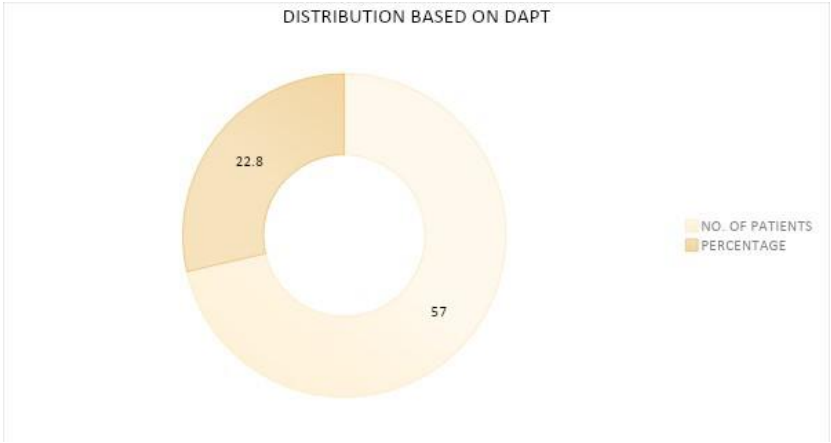
50-59	0	15	35	30
60-69	0	12	29	35
70-79	0	4	10	24
80-89	0	1	1	2



According to the above table and graph 250 subjects were recruited for the study quadruple therapy is followed in almost all the patients mainly in the age of 60-69 years and followed by triple and dual therapy. Mono therapy was seen to be never the choice of treatment.

Table 13: Distribution Based On Dapt

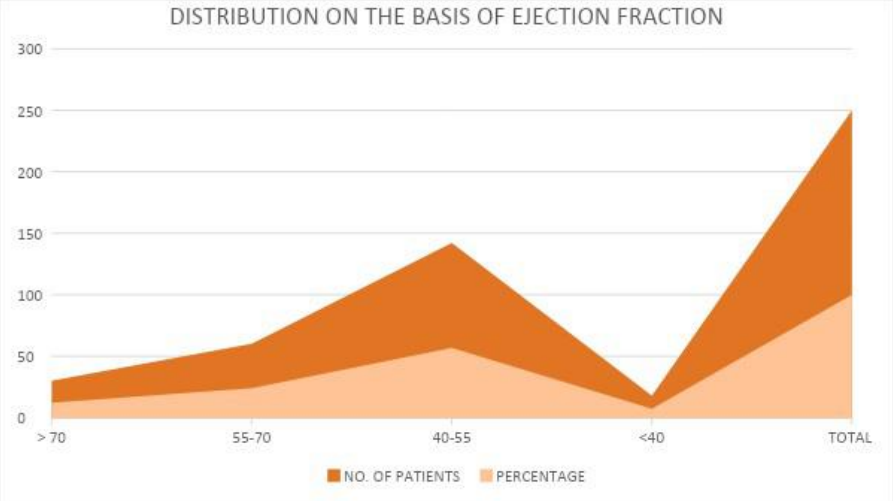
DAPT	NO. OF PATIENTS	PERCENTAGE
ASPIRIN + CLOPIDOGREL	57	22.8
ASPIRIN + TICAGRELOR	193	77.2
TOTAL	250	100



From the above table and graph, the many patients taking the combination of aspirin+ ticagrelor were considered to be high when compared to the combination of aspirin+ clopidogrel.

Table 14: Distribution Based On Ejection Fraction

EJECTION FRACTION	N	n (%)
> 70%(high)	30	12
55-70%(normal)	60	24
40-55%(low)	142	56.8
<40% (possible heart failure)	18	7.2
TOTAL	50	100



In 250 patients, 18 were categorized under high risk of possible HFEF <40%.

DISCUSSION

This study was prospective and observational where quadruple therapy as the secondary prevention of post CABG and PTCA patients in tertiary care hospitals. Among them most of the patients admitted in hospital between the ages 50-59 years were 80 (32%) followed by 60-69 years were 77 (30.7%) and age group of 70-79 years were 38 (15.2). The least number of patients of 30-39 years were 20 (8%). We have observed that, out of total study population, 190 were male and 60 were female. Individuals admitted with unstable angina, ACS AWMI, ACS NSTEMI, ACS IWMI, ACS stable angina, ACS STEMI, CAD ischemic cardiomyopathy and hypertension urgency.

Among the total CAD-ACS patients, majority of the patients admitted with complaints of chest pain were 164 (65.6%), followed by SOB 69 (27.6%), SOB on exertion were 45 (18%) and sweating were 32 (12.8%), palpitations and giddiness were 18 (7.2%) followed by chest discomfort were 15 (6%), general weakness were 13 (5.2%) and least number of patients admitted with the complaints of hyperkalemia and orthopnea were found to be 1 (0.4%).

The comorbidities in patients who underwent CABG and PTCA surgery were DM+HTN were found to be 97 (38.8%) and the least exhibited seizures, GI reflux and COPD. In our study, the majority of male (139) and female patients (39) underwent PTCA were 177 (70.8%) followed by CABG surgery were 48 (19.2%). A study done by Talal Almas et'al found that PTCA can be considered as a safe alternative over CABG.

In our study, the majority of patients who underwent PTCA surgery with single stent were 148 (59.2%). The drug classes used in the post-operative care for CABG and PTCA involving the quadruple therapy were antiplatelets, statins, beta blockers and ACE inhibitors/ARB. The more dual therapy was prescribed between the age group of 50-59 years I.e.,15 and the least are prescribed for 80-89 years I.e.,1. More triple therapy was prescribed between the age group of 50-59 years I.e., 35 and the least were prescribed for 80-89 years I.e., 1. The majority of quadruple therapy is prescribed for 60-69 years I.e., 35 and least between the age group of 80-89 years I.e.,2. Monotherapy was never considered the choice of treatment.

Two antiplatelet treatments for patients with CAD. DAPT is the abbreviation for the usage of two antiplatelet medications. It has shown that combining DAPT with aspirin and P2Y12 receptor inhibitor lowers the risk of recurrent MACE in CAD patients.DAPT (100%) was most referred by the physicians in the clinical setting which is similar to the other research studies. Among this combination of aspirin and ticagrelor (79.2%) prescribed rate was comparatively higher than combination with aspirin and clopidogrel (22.4%). In the current study the risk of developing heart failure in patients according to their left ventricular ejection fraction. Out of 250 patients, high risk of possible HF is with LVEF <40%.

CONCLUSION

In the current clinical study, it is concluded that secondary prevention of post CABG and PTCA patients include quadruple therapy I.e., DAPT, statins, beta blockers and ACE inhibitors/ARB. The primary course of post-CABG and PTCA treatment, or the mainstay of care is the dual antiplatelet therapy which includes Aspirin and an antiplatelet probably ticagrelor and at times clopidogrel. DAPT is most preferred after revascularization procedures like CABG and PTCA with lesser incidence of complications and further recurrence of ischemic events. In this study, it is found that majority of patients admitted with triple vessel disease underwent PTCA when compared to CABG+PTCA. Patients with complicated CAD who need PCI or

CABG coronary intervention continue to receive quadruple treatment at a poor rate. A negative clinical outcome, including MI, stroke, and mortality, will result from a lack of triple therapy. Out of 250, 18 patients were under increased risk of possible HFEF. It follows that in order to get the desired therapeutic results, lifestyle, dietary, and behavior changes are very crucial in addition to medicine.

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