Original article:

Outcome and results of CABG following Percutaneous Transluminal Coronary Angioplasty (PTCA)

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Abstract:

Background

Conventional Coronary Artery Bypass Grafting (CABG) has been established as the treatment of choice for patient's undergone. Performing OFF pump CABG'S has not been easy in Post PTCA patients.

Methods

Between 2010 to 2013 , 40 patients of restenosis after PTCA were studied. Majority of patients had IN STENT STENOSIS .Diabetes was important factor. Patients having Post PTCA restenosis of both LAD and RCA are studied. Peri-operative course was considered as important criteria for study.

Results

40 patients could be successfully revascularised by off pump coronary artery bypass grafting. During perioperative course, 08 patients required IABP support out of which 06 patients were converted to ON PUMP .There was 3% perioperative mortality .

Conclusions

In Post PTCA patients off pump coronary artery bypass grafting can be successfully performed with acceptable mortality.

Introduction

Patients with ischemic heart disease who have symptoms unrelieved by medical management are generally referred for a myocardial revascularization procedure.Today, coronary artery bypass grafting is often performed in patients who have recurrent symptoms after previously successful PTCA. While the efficacy and outcomes for PTCA and CABG as the primary treatment for coronary disease are well documented, there is little recent data available that specifically focuses on those patients who ultimately receive a surgical graft after a supposedly initially successful angioplasty.The aim of this study was to analyze those patients who underwent initially successful PTCA and developed recurrent symptoms, and then ultimately required a CABG procedure.

Outcomes were studied for these patients. Patients with ischemic heart disease who have symptoms unrelieved by medical management are subjected to PTCA / CABG. Presently there is a trend of increase in number of PTCA. Coronary artery bypass grafting is often required in previously successful PTCA. This study focuses on those patients who underwent CABG after successful angioplasty.

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Patients and methods:

40 Post PTCA CABG procedures are taken. These patients who had undergone previously successful PTCA ultimately required subsequent CABG .

Causative factor for EARLY STENT STENOSIS following PTCA was identified.

Peri-operative Outcomes of all cases were studied. A successful PTCA was defined as dilatation of a targeted coronary stenosis (or stenoses) such that the residual luminal narrowing was less than 40%, and not associated with complications. Patients requiring emergency CABG (within 24 hours) following initial PTCA, or those who had unsuccessful angioplasty were excluded from the interval group and have been reported elsewhere.

Patient baseline characteristics analyzed included patient age, gender, features of clinical presentation,New York Heart Association (NYHA) class symptoms, time duration of angina, and left ventricular ejection fraction. Risk factors for ischemic heart disease, including

diabetes mellitus, smoking history, hypertension, hyperlipidemia, obesity, and family history of coronary disease were also compared. Pre-operative co-morbidities included valvular

heart disease, peripheral ischemic vascular disease, cerebrovascular disease, renal failure, and chronic airways limitation. The times of all procedures were recorded. The

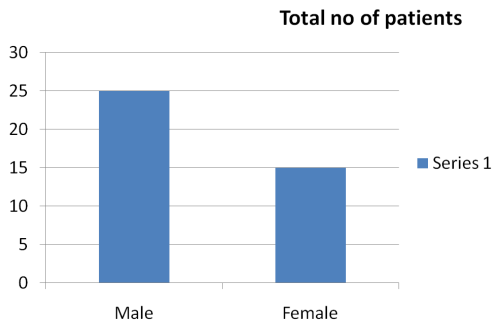
time interval between initial PTCA to CABG was determined.

Post-operative complications assessed included new onset Q wave acute myocardial infarction (AMI), significant arrhythmia, low cardiac output syndrome , respiratory failure (requiring ventilatory support for greater than 24 h), and requirement for renal dialysis and Intraaortic balloon pump(IABP). Other factors measured included catecholamine requirement, adverse neurological events, significant wound infection.

Thirty-day mortality, and primary cause of death were determined for all patients. Causative factors for death included low cardiac output, cardiac dysrhythmia, respiratory failure, renal failure. Initial outcome after CABG, and length of hospital stay were also recorded.

Results

Patient characteristics at baseline (before CABG):



In our series we had a male preponderance.

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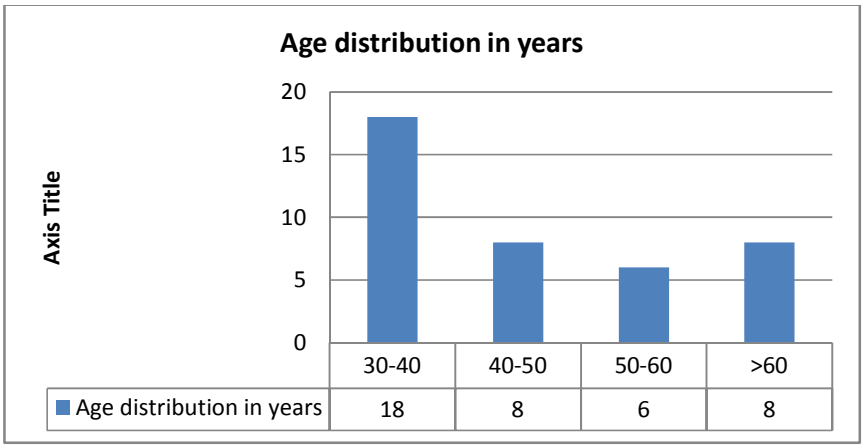
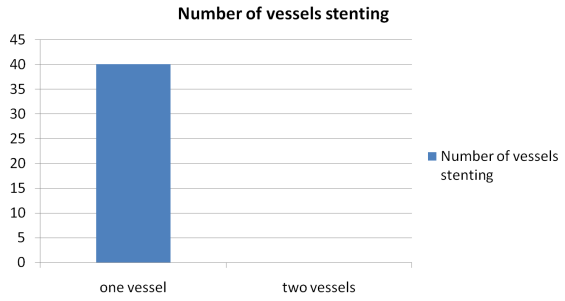
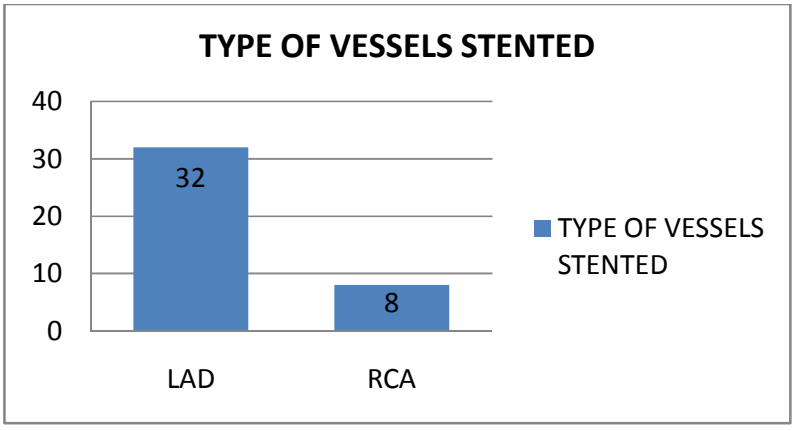


Patients age were 30-40 years.

Out of 40 patients 20 had more than one vessel disease at time of PTCA.



All patients had undergone single vessel stenting.



32 Patients had undergone LAD stenting.

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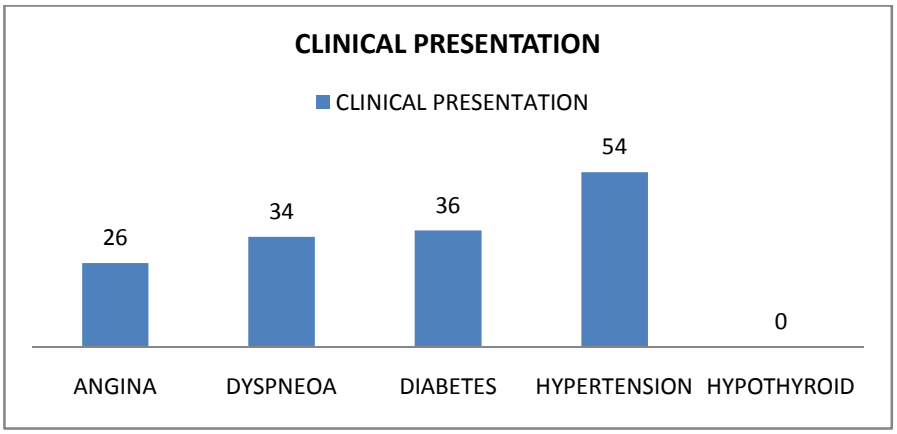
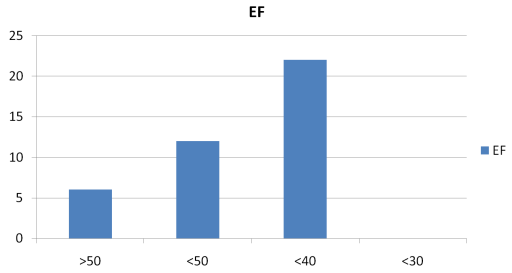
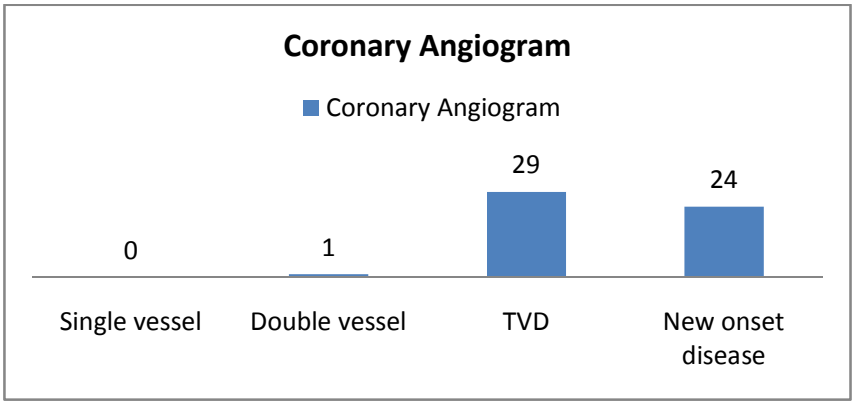


Most common symptom was dyspneoa with angina.

Diabetes mellitus was most important factor with 36 patients.



Ejection fraction for most patients were between 30-40%.



Coronary angiogram showed triple vessel disease in most of the patients.

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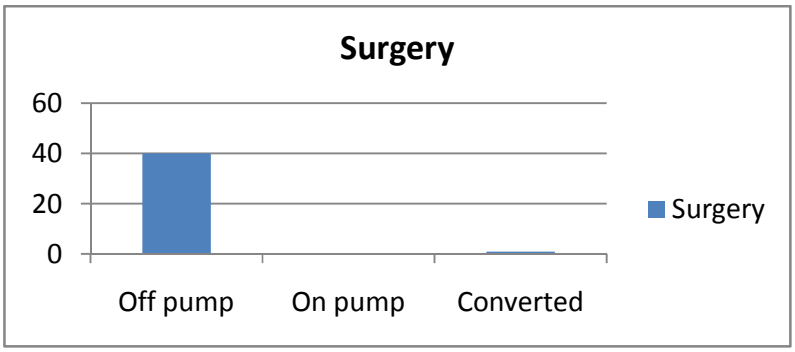
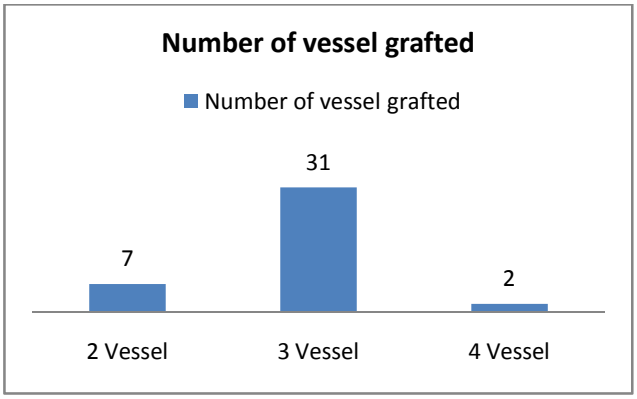
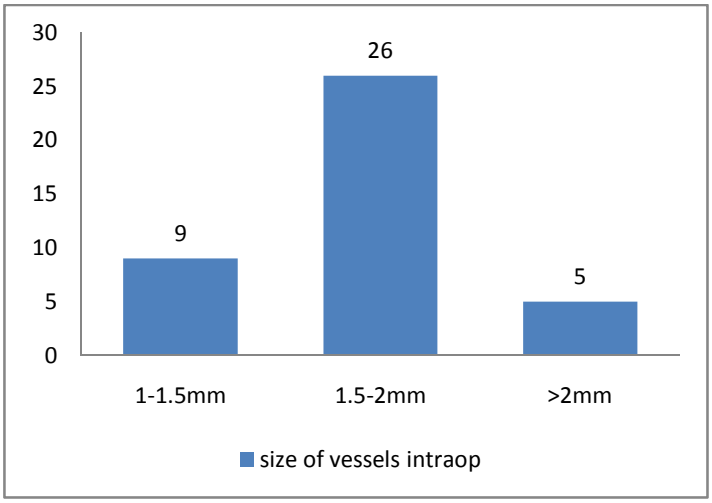
24patients had new onset disease in the form of additional vessels diseased than at the time of PTCA.



All patients had undergone off pump CABG surgery out of which one was converted to on pump CABG.



In 31 patients we grafted 3 vessels.



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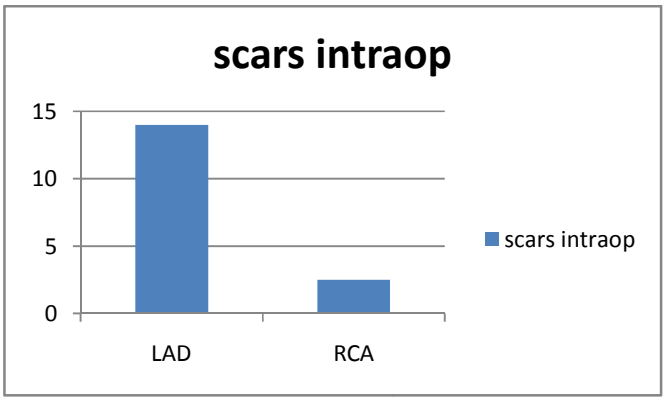
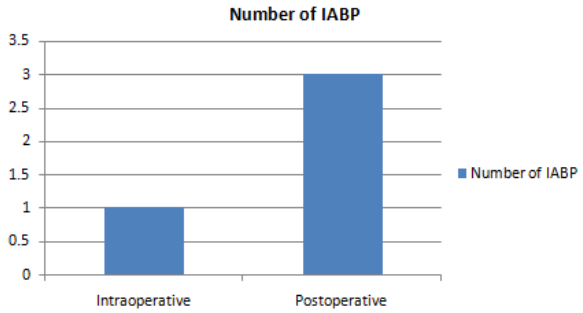
25 patients had plaques in coronaries in which stent was inserted.





IABP was used in just 3 cases.

Outcomes

Post-operative outcomes for the patient populations are shown .

Post operative MI	03
Ventricular arrythmias	03
Low cardiac output	05
Requirement of IABP	03
Respiratory failure post operative	03
Neurological events	03
Wound infection	01

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Late pericardial tamponade	nil
Hospital stay	8-14 days

The 30-day mortality rate was 2% .

Average in-hospital length of stay was 8 days

DISCUSSION:

The presence of stent makes surgeon to undertake coronary anastomosis more distal than the proximal site.Stent can reduce the heterolateral and normal coronary collaterals.mStents especially DES can reduce endothelial metabolism even from site distal from stent.

This could induce progression of native vessels and compromising graft patency. Since its introduction more than 20 years ago, Percutaneous Transluminal Coronary angioplasty has steadily grown in acceptance as a viable means of myocardial revascularization, such that it is now regularly advocated to patients with ischemic symptoms not responsive to medical therapy.

Although initially used in the setting of single vessel coronary disease, PTCA has now become accepted as an appropriate intervention for the patient with multiple vessels

Pathology. As a result of this broadened application of PTCA, there has been a substantial and significant change in the characteristics of patient populations undergoing angioplasty and coronary artery bypass surgery over the past two decades

There is a growing tendency for CABG to be reserved for those patients in whom PTCA has failed either in the emergent or long-term setting, or for those in whom PTCA was clearly contraindicated.

.The patients in our study who underwent CABG following PTCA, tended to have severe intrinsic coronary disease. These patients were more likely to present clinically with unstable angina pectoris and dyspnoea, this being the major mode of presentation.

Furthermore, a greater number of patients had NYHA class 3 symptoms, despite having undergone previous PTCA.

This was appropriate because recurrent stenosis of a coronary graft may be the result of a different disease process as compared to the atherosclerosis that occurs in a native coronary artery. In addition, it was not possible to accurately determine the pathological process

responsible for recurrent disease in the different types of conduit vessels used for the various coronary grafts.

Post-Stenting Cellular Response

Local acute inflammatory reaction:

0-3 days: Neutrophil recruitment to the injury site, followed by prolonged macrophage accumulation

.**2-4 weeks:** Chronic inflammatory cells, along with proliferating smooth muscle cells associated with organizing thrombus and a thin provisional extracellular

Matrix.

>30 days: Fibrin and chronic inflammation persist, and smooth muscle cells and extracellular matrix further enrich the expanding neointima.

Systemic inflammatory reaction: Leukocyte and Platelet activation. It also increases the expression of adhesion molecules, and formation of platelet–leukocyte complexes. Atherosclerosis is a chronic inflammatory disease characterized by migration of

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monocytes and T lymphocytes to the area of arterial wall injury.

In addition to promoting plaque development, inflammation increases plaque instability,

Leading to plaque rupture and thrombosis, endothelial dysfunction (Graft patency).

The culprit lesion Vulnerable Plaques (Only 37.5% of plaque ruptures were on the culprit lesion therefore the rest are remote to the site of stent deployment)

Antiplatelet agents, platelet and neutrophil adhesion along the entire vessel reducing graft patency Compromise protective collateralization and more acute presentation of disease.

This data suggests that the patient population currently being offered primary CABG, as opposed to PTCA as primary treatment for coronary disease, is skewed towards a higher baseline risk for adverse outcomes, given their higher inherent rate of more advanced pathology at baseline. Our finding opposes this data.

Despite this shift in patient demographics, however, numerous studies have reported similar prognostic outcomes in patients randomized to either PTCA or CABG for their initial myocardial revascularization procedure.

This is with the notable exception of improved 5-year survival amongst patients with diabetes

Treated by CABG rather than PTCA.

Similarly, our data demonstrated that the incidence of major perioperative

complications are not significant. This supports the assertion that, although the primary

Overall reintervention rates of greater than 30% have been reported for those patients receiving an initial PTCA. The Bypass Angioplasty Revascularization Investigation (BARI) described an even more impressive difference in reintervention rates between these two patient populations. BARI reported a 5-year reintervention rate of 8% for the CABG group, in

comparison to 54% for the PTCA population.

Further research needs to be performed to determine the rate of myocardial infarction as a result of repeated percutaneous coronary interventions in those patients who require CABG following initially successful PTCA.

PTCA may be initially advocated in the hope that the need for CABG may be avoided completely, or at least delayed by a significant period of time but the 40 patients

who initially received a PTCA procedure were all classified as having had a successful outcome, as the residual luminal narrowing of the vessel post-dilatation

Was less than 40%.

Despite this perceived success these procedures only served to delay coronary graft surgery by a mean of 13.7 months, and median time of 4 months

. Johnson et al. reported a mean time interval of 16.7 months between initially successful PTCA and CABG.

The data in the present study suggested an even shorter duration of benefit conferred by angioplasty in those patients who required CABG following initially successful

PTCA.

The reported literature suggests that CABG is a definitively more cost-effective treatment option for patients with triple-vessel disease, as well as for diabetic patients, particularly in light of the significant survival advantage conferred by surgery to this latter patient cohort.

Based on this published literature and the findings in our own study we believe that the quality of life advantage conferred by CABG is even more significant when one

Considers that the mean time interval between initial PTCA and subsequent CABG in our interval

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patient cohort was only approximately 1 year . There is little doubt that PTCA remains a successful revascularization procedure for the patient with coronary disease not responsive to medical therapy. The primary method of myocardial revascularization needs to be carefully selected to obtain durable symptom control for patients with coronary artery disease.

PTCA procedures often need to be repeated over time and may serve only to delay

Coronary surgery, at substantial financial and personal cost.

CONCLUSSION

CABG Following Stents May Not Be the Same Operation Should have CABG been performed earlier? Most of the patients present with MI. Early CABG instead of PCI for the patients who are young and diabetics and small vessels will help in long term results.

Patients who present for CABG after previous PCI should at the very least be classified to be

at a higher perioperative risk. Therefore, earlier referral of patients with unsuccessful PCI for CABG may prevent the transition of patients to a higher risk class and avoid disadvantageous results at subsequent

CABG. Stenting of patients who ultimately may need CABG, such as younger patients or diabetic patients, not only denies them definitive management but will also result in worse long term outcomes. Think wisely about the initial strategy CABG might provide equivalent outcomes like

in patients with previous stenting.

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