

PCI in Severely Calcified Left Main in High Bleeding Risk Patient

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ABSTRACT

Coronary Artery Bypass Grafting (CABG) has long been considered the treatment of choice for unprotected left main coronary artery stenosis, particularly when the internal thoracic artery is used as a conduit. However, given the up-front risks of this procedure, coupled with improvements in Percutaneous Coronary Intervention (PCI) techniques and dramatic advances in stent technology, the primacy of CABG for ULMCA revascularization has been challenged. A calcified lesion requires either cutting balloons, Rotablation or IVL for good end results during PCI. Among patients with Left main PCI, those with high bleeding risk at increased risk for all cause death, MI and bleeding although rate of repeat intervention and stent thrombosis are comparable. Role of intracoronary imaging (IVUS or OCT) is important as proper stent expansion is vital to guide duration of antiplatelets. Transradialroute, choice of antiplatelet agent, multidisciplinary approach and teamwork helps in saving lives in such high-risk patients. We present a case of PCI in severely calcified Left Main disease in a octogenarian with high bleeding risk.

Keywords: Complex High Risk Indicated PCI (CHIP); IVUS (Intravascular Ultrasound); OCT (Optical Coherence Tomography); PCI(Percutaneous Coronary Intervention); HBR(High Bleeding Risk)

INTRODUCTION

Coronary Artery Bypass Grafting (CABG) Has Long Been Considered The Treatment Of Choice For Unprotected Left Main Coronary Artery (ULMCA) Stenosis. However, Given The Up-Front Risks Of This Procedure, Coupled With Improvements In Percutaneous Coronary Intervention (PCI) Techniques And Dramatic Advances In Stent Technology, The Primacy Of CABG For ULMCA Revascularization Has Been Challenged. The Totality Of The Available Evidence Suggests The Following Approach To The Treatment Of Patients With ULMCA Disease In Whom Revascularization Is Planned. In Patients With ULMCA Disease Amenable To PCI In Whom Prolonged Treatment With Dual Antiplatelet Therapy Is Feasible, PCI With A Drug-Eluting Stent Is Associated With A Rate Of Hard Clinical Endpoints Similar To That Of CABG. Patients Should Be Made Aware That The Likelihood Of Requiring A Repeat Revascularization Procedure (About 2% Per Year) Is Modestly Higher With This Strategy.

Severe Coronary Calcium Increases The Complexity Of Percutaneous Coronary Interventions. It May Affect The Adequate Preparation Of The Lesion, Proper Stent Expansion And Apposition And Increase The Risk Of Stent Thrombosis And Restenosis. The Techniques Available For The Management Of Severe Calcified Lesions Are Either Balloon Based Or Rotablation/Intravascular Lithotripsy. The Role Of Intravascular Imaging Is Essential To Select The Most Appropriate Plaque-Modification Device And Assess The Optimal Stent Result. Among Patients With Left Main PCI, Those With High Bleeding Risk At Increased Risk For All Cause Death, MI And Bleeding.

CASE REPORT

An 86 year old male normotensive, euglycemic known case of COPD with history of intermittent chest pain at rest for 1 week. On Evaluation his vitals were stable; systemic examination doesn't showed any abnormality. Routine investigations showed low hemoglobin (Hb 9.8), creatinine 1.5mg/dl. ECG showed st-t changes in anterior leads and Echo showed Global hypokinesia with LVEF of 45%. In View of unstable angina, CAG was done which revealed Left Main 50% with calcified bifurcation disease and calcified 80% stenosis in RCA. Heart team meeting done. As patient was high risk for CABG, planned for PTCA/Stent to left main bifurcation using Rotablation under IVUS guidance followed by staged PTCA to RCA.



Figure 1: Severely calcified left main bifurcation disease **Figure 2:** Rotablation using 1.5 burr

Left Coronary system hooked with 7F EBU catheter, guide wires crossed across LAD and LCX. Stepwise Rotablation to LCX and LAD done using 1.5 burr. Thereafter Left Main bifurcation done using 2 DES by mini crush technique. Final IVUS shots taken and TIMI 3 flow achieved. Two hours after the procedure patient had hematemesis and hypotension. Urgent GI consultation taken and UGI endoscopy done which revealed large Mallory Weiss tear for which hemoclipping done. Antiplatelets were stopped for 2 days and after 48 hrs clopidogrel was started. On sixth day of admission patient developed swelling in left lower limb which on venous Doppler came out to be deep venous thrombosis. Patient was put on unfractionated heparin. Patient was discharged on 10th day on single antiplatelet and apixaban (2.5mg twice a day).



Figure 3: Predilation in LCX



Figure 4: Predilation in LAD



Figure 5: Final result with TIMI III flow in LAD/LCX

DISCUSSION

Coronary Artery Bypass Grafting (CABG) has long been considered the treatment of choice for Unprotected Left Main Coronary Artery (ULMCA) stenosis, particularly when the internal thoracic artery is used as a conduit. However, given the up-front risks of this procedure, coupled with improvements in Percutaneous Coronary Intervention (PCI) techniques and dramatic advances in stent technology, the primacy of CABG for ULMCA revascularization has been challenged. Several randomized, controlled trials comparing Drug Eluting Stent (DES) implantation with CABG surgery for ULMCA stenosis have been published in recent years. These have demonstrated that the short-term results with PCI with respect to hard clinical endpoints are similar to those encountered with CABG. The totality of the available evidence suggests the following approach to the treatment of patients with ULMCA disease in whom revascularization is planned. In patients with ULMCA disease amenable to PCI in whom prolonged treatment with dual antiplatelet therapy is feasible, PCI with a drug-eluting stent is associated with a rate of hard clinical endpoints similar to that of CABG. Patients should be made aware that the likelihood of requiring a repeat revascularization procedure (about 2% per year) is modestly higher with this strategy. In this scenario, it is likely that most patients would choose to undergo PCI rather than CABG. As the severity of additional coronary stenosis becomes more extensive, and particularly in the presence of diabetes mellitus, CABG with the use of an internal thoracic artery conduit becomes the treatment of choice because of a reduced long-term risk of important clinical events. However, in patients with additional comorbidities associated with increased surgical risk (particularly in the frail elderly), PCI remains a reasonable alternative. As always, patient-centered, individualized decision-making by the patient and the heart team is the strategy most likely to result in the best outcomes. Severe coronary calcification increases the complexity of the PCI.^[1-4] It can affect the crossing of the lesion, the proper stent expansion and apposition, damage the drug-eluting polymer, increase the risk of stent thrombosis and restenosis, and have a negative impact on short and long-term results. The optimal approach for the management of SCCL requires being knowledgeable of a number of factors: the characteristics of the lesion, calcium distribution, intravascular imaging modalities, and the mechanism of action of every plaque-modification device.

Plaque-modification techniques can be divided into 2 groups based on the type of device used: with and without balloon. The procedures with devices based on technologies without balloon are rotational atherectomy, orbital atherectomy, and RA with excimer laser. Among the procedures with devices based on technologies with balloon we find the cutting balloon and the scoring balloon. The most important ones are Wolverine, Angio Sculpt, Score flex, ultra-high pressure Non-compliant (NC) balloon, OPN and the latest Intravascular lithotripsy (IVL). HBR is defined as a BARC 3 or 5 bleeding risk of $\geq 4\%$ at 1 year or a risk of an intracranial hemorrhage (ICH) of $\geq 1\%$ at 1 year. Thus, a major criterion for ARC-HBR is defined as any criterion that, in isolation, is considered to confer a BARC 3 or 5 bleeding risk of $\geq 4\%$ at 1 year or any criterion considered to be associated with a risk of ICH of $\geq 1\%$ at 1 year. A minor criterion for ARC-HBR is defined as any criterion that, in isolation, is considered to confer increased bleeding risk, with a BARC 3 or 5 bleeding rate of $< 4\%$ at 1 year. Twenty clinical criteria were identified as major or minor by consensus, supported by published evidence. Patients are considered to be at HBR if at least 1 major or 2 minor criteria are met. The definition is thus binary. Although it is recognized that the coexistence of increasing numbers of risk factors for bleeding is associated with a stepwise increase in risk of BARC 3 to 5 bleeding.^[4-8]

Our Patient illustrates that PCI is a viable option for Left Main disease if the patient is high risk for CABG or not willing. Plaque modification was done with Rotablation as lesion was severely calcified. Intracoronary imaging with IVUS showed well deployed stent. In studies evaluating bleeding and thrombotic risk in patients treated with DAPT after coronary stenting, clinically relevant bleeding occurred in up to 6.2% of patients and up to 4.8% patients had bleeding-related hospitalization. The most common site is gastrointestinal bleeding. Patients undergoing LM PCI, those with HBR are at increased risk of all cause death, MI and bleeding (4 fold). Frailty and comorbidities are primary cause of worse outcomes in patient at HBR. GI bleed which happened in the patient was timely managed with hemoclippping. Patient developed DVT for which he was put on NOAC (apixaban). Apixaban was a drug of choice in frail and CKD patients. He was discharged on single antiplatelet (clopidogrel) and apixaban.^[8-11]

CONCLUSION

Left Main PCI is a viable option in patients of unprotected Left main disease. Calcified lesion requires some sort of plaque modification. Intracoronary imaging tells about severity of calcification, helps in selecting plaque modification technique about the proper deployment of stent. Bleeding and bleeding-related hospitalization are common in patients receiving DAPT after PCI.

Use of intracoronary imaging, trans-radial route, and optimal selection of antiplatelet strategy has been shown to improve outcomes in these patients. Multidisciplinary approach and team work helps in saving lives in these high risk patients.

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