measurement the number of patients treated by provisional stenting was 24 for both groups (relatively equal to the QCA decision before starting the procedure). From them in 8 patients (group A Stentys DES) and in 10 (group B Stentys X-position) was placed. Patients treated just with SB stenting according to FFR after preparation of the SB lesion were 3 for any of both groups (150% increase respect the initial QCA decision in group A; 300%increase respect the initial QCA based decision in group B). Final complex treatment was performed in 8 patients from the both groups (20% reduction from the initial QCA based decision). Types of complex treatment for both group is demonstrated in table 2. No difficulties was found to cross both MB and SB with the Acist RXi system based on NAVVUS microcatheter in any of the 35 patients from group B. The mean procedure time, X-ray time and contrast usage in the both groups (table 3) shows reduction in the all variables using Acist RXi system based on NAVVUS microcatheter FFR measurement.

CONCLUSION Our result clearly confirmed:

1. That the treatment of a bifurcation based only on angiography leads to overestimation of the complexity and excessive usage of stents.
2. Performing fractional flow reserve measurement of the both bifurcation branches permits identifying of the significant lesion or at least excluding the vessel with not significant stenosis.
3. The pre-treatment FFR evaluation is of crucial importance to establish the PCI strategy (one, two or dedicated stent).
4. We demonstrate that in many cases the mid procedure FFR measurement permits to confirm or to change the strategy, in this setting shifting from one stent to more complex treatment including two stents or dedicated stent.
5. Using the new Acist RXi FFR measurement with NAVVUS microcatheter that can be carried on the existing coronary wires placed in MB and SB facilitates the evaluation of the FFR during the whole treatment process maintaining the wires in position.
6. Using the new Acist RXi FFR measurement with NAVVUS microcatheter that can be carried on the existing coronary wires placed in MB and SB reduce significantly the number of used wires, the procedure time, the X-ray time and the contrast usage.
7. Moreover, the new Acist RXi FFR measurement with NAVVUS microcatheter that can be carried on the existing coronary wires used to cross the struts of placed stents permits to evaluate the coronary reserve at the end of the procedure and to confirm the final result.

INVASIVE IMAGING (IVUS, OCT, SPECTROSCOPY, ETC.) (TCTAP A-087 TO TCTAP A-093)

TCTAP A-087

Small Caliber Coronary Arteries in Indian Female Diabetics Fact or Fiction? Insights from Intravascular Ultrasound Guided Percutaneous Coronary Intervention

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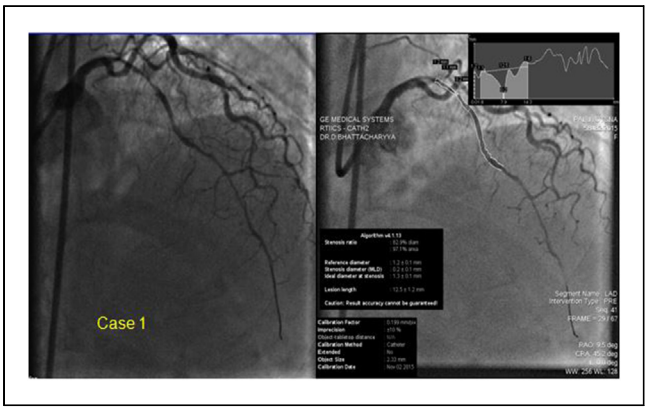
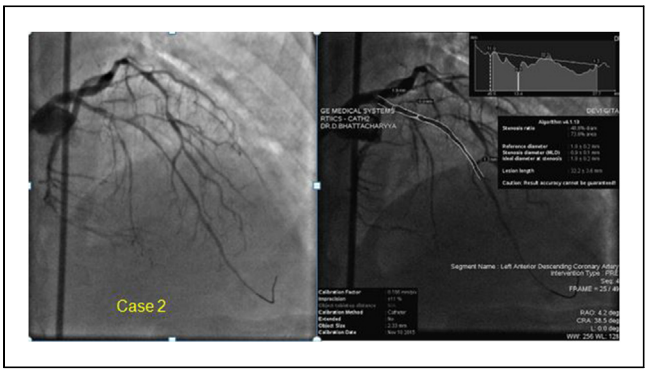
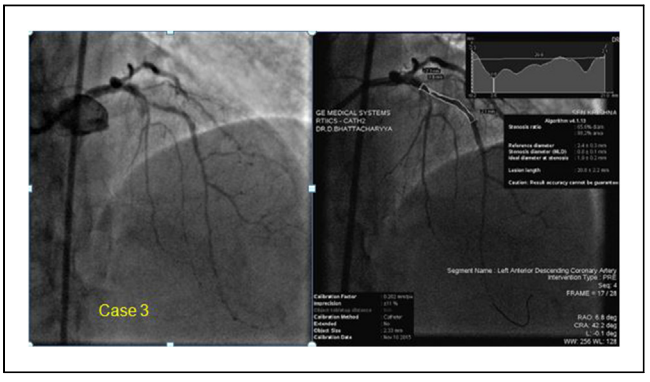
BACKGROUND It is a well known fact that the outcomes of PCI in diabetics with small vessel disease are poor. In this subset binary restenosis rates are high (>25%) despite the use of modern Drug Eluting Stents (DES) and optimal Dual Antiplatelet Therapy (DAPT). Successive trials have shown Coronary Artery Bypass Grafting (CABG) to be a superior compared to PCI in diabetics especially where the proximal LAD is involved. Indian women with an overall smaller body habitus are thought to have small caliber coronary arteries. Large studies like the Coronary Artery Surgery Study (CASS) have repeatedly shown that patients with "small vessels" present a higher risk for adverse outcomes after PCI with a higher incidence of restenosis and increased (Major Adverse Cardiovascular Events) MACE rates. In fact they show that perioperative mortality significantly increases when measured LAD diameters are smaller than 2.5mm. Based on our previous experience of Intravascular Ultrasound (IVUS) in PCI in proximal LAD where the proximal LAD appeared to be > 3.50mm in the majority of patients, we surmised that it was possible that due to the diffuse nature of atherosclerotic disease in diabetic patients we could be underestimating the LAD by Quantitative Coronary Angiography (QCA). Our hypothesis was that the LAD appeared to be small due to increased plaque burden and the vessels per se were of a larger caliber. We set out to test this idea by doing IVUS studies in a series of six diabetic female patients who presented with severe diffuse small vessel Coronary Artery Disease (CAD) involving the Left Anterior Descending Artery (LAD) with disease extending into the proximal segment.

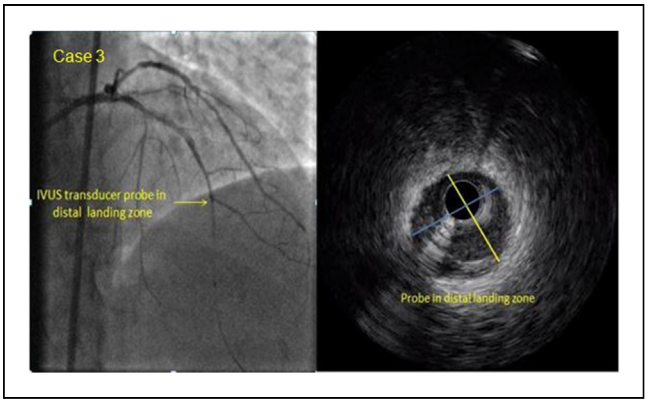


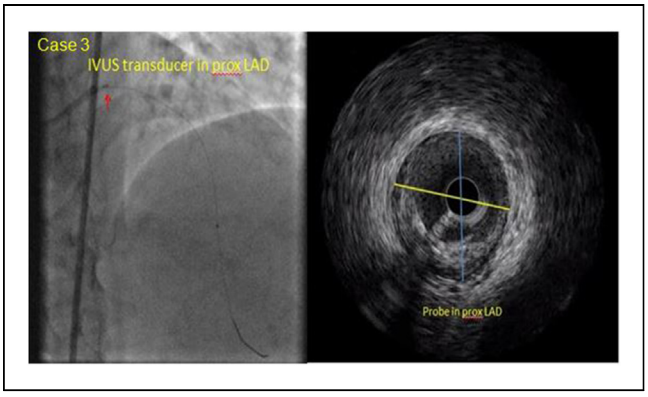


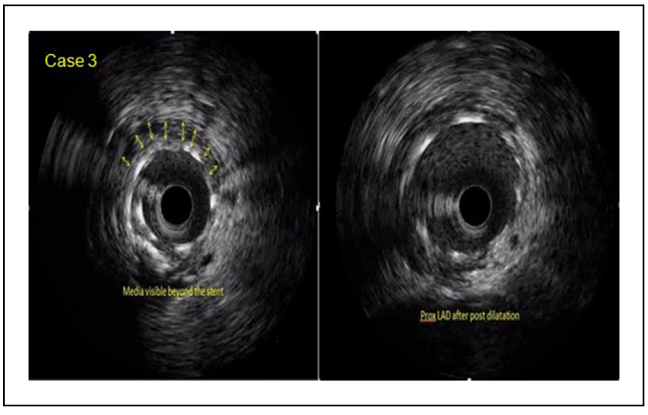


METHODS Six female diabetic patients with diffuse LAD disease who underwent IVUS guided PCI were included in the study. Routine demographic data, angiographic profile, quantitative coronary angiogram (QCA) and IVUS pullback studies with measurement of the internal diameter of the LAD (proximal mid and distal) pre and post stenting were recorded and compared. Here we present an illustrative case (Case 3) which may be regarded as typical of all the six cases done in this series. We performed IVUS to answer two crucial questions: (i) the diameter of the distal landing zone. We positioned the IVUS probe which by angiography appeared to us to be a suitable distal landing site and measured the lumen diameter by IVUS at this location. We determined this to be the diameter of our distal stent and (ii) To measure the diameter of the proximal LAD where we were going to land the proximal part of our stent. In three of our six cases the disease was right up to the ostium of the LAD and here we took the diameter of our stent to be media-to-media instead of the lumen diameter. We also took multiple measurements along the course of the LAD especially at branch points to optimize our strategy for

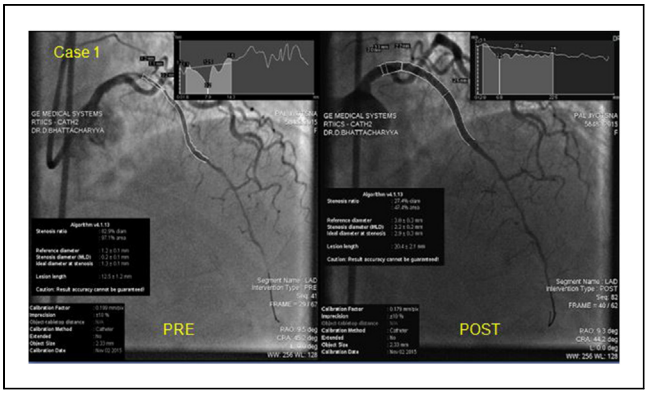
graded balloon dilatations. After initial deployment of those stents we repeated IVUS and optimized our results by IVUS guidance going for higher balloon diameters where media was visible circumferentially signifying that the artery could be stretched further.

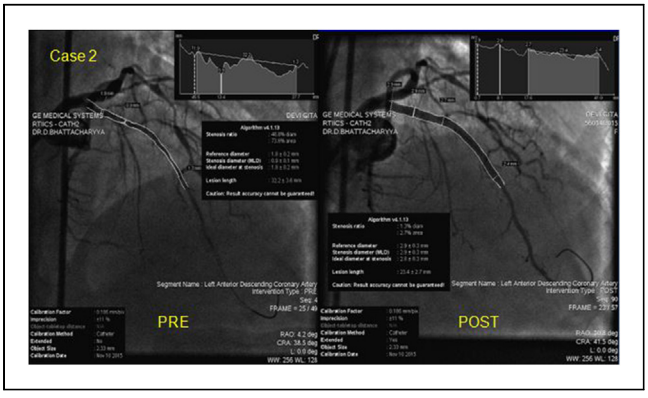


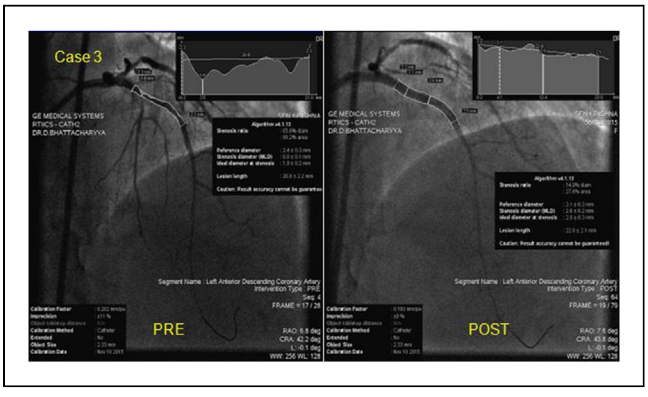




balloon dilatations 0.25mm or greater than the chosen stent. The proximal LAD in all cases required post dilatation with a 3.5mm balloon and withstood high pressure dilatation without any complication. We present side by side pre and post angiographic images of all the above three patients.



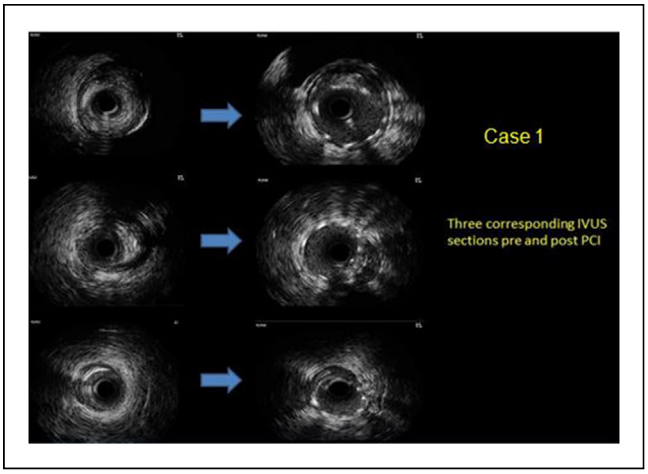




RESULTS Four of our six patients were above the age of 55 yrs and two were in their forties. Their average height was 152 cms with the tallest being 157 cms and shortest 148 cms. Body weight varied between 42 to 57 kgs with a mean of 49 kgs. Body surface area varied between 1.32 to 1.58 m^2 with a mean of 1.48m^2. Body mass Index ranged from 16.63 to 23.12 kg/m^2 with a mean of 19.5kg/m^2. All six were diabetic with three of them being insulin dependent. All patients had normal ejection fractions and hemoglobin and creatinine levels were within normal limits. In all of the above patients the proximal LAD as defined earlier measured 3.5mm or above when measured from media to media. The distal landing zone which at the time of stent implantation appeared between 2.25-2.5mm invariably required

CONCLUSION Quantitative Coronary Angiography dramatically underestimates the diameter of the proximal LAD in diabetic female patients with diffuse LAD disease. This is due to the fact that the distal reference diameter in this vessels (the landing zone) is often small (2.25mm) and due to the diffuse nature of disease the proximal LAD often appears angiographically between 2.5-2.75 mm. PCI guided by QCA invariably results in undersized stents being implanted in this situation with poor long term outcomes. In our series of six female diabetics we found the proximal LAD to be invariably 3.5mm and with a discrepancy of >1mm by QCA measurements. We invariably post dilated all our stents to 3.5mm or above as suggested by IVUS achieving MLA > 7mm^2 in all our cases. We present corresponding pre

and post IVUS cross sections of a typical case whose angiographic images (Case 1) we have shown above to illustrate our point. To conclude, in our experience, small vessel disease in Indian diabetic females is due to high plaque burden and the use of IVUS is beneficial in optimizing stent expansion and is likely to improve long term outcomes in this subset.



TCTAP A-088

In-Stent Restenosis: Insights and Outcomes Emerging from Intravascular Ultrasound Guided Percutaneous Coronary Intervention

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BACKGROUND Despite the use of newer generation drug eluting stents there is a relatively high rate of recurrence of luminal narrowing due to In-Stent Re-stenosis (ISR). Data regarding factors responsible for ISR in Indians remain scarce.

ISR remains one of the most annoying complications of contemporary Percutaneous Coronary Interventions (PCI) and is associated with significant morbidity and occasional mortality. The long term results of repeat percutaneous intervention in ISR has been disappointing with relatively high recurrence rates right from the days of balloon angioplasty, brachytherapy, repeat stenting (Bare Metal Stents initially and later Drug Eluting Stents in the DES era) as well as drug eluting balloon angioplasty. We used IVUS to try and detect the underlying causes of stent failure and to refine our second stenting procedure in order to achieve better long term results in these patients.

METHODS Over a period of two years between January 2013 and November 2015, we analyzed twelve cases of ISR. All patients were symptomatic with exertional angina and had angiographic diameter stenosis $>$ 50%. Their demographic, risk factor profile and compliance with Dual Antiplatelet Therapy (DAPT) were evaluated. Prior to any further stenting the culprit lesion was interrogated with motorized IVUS pullback (using Boston Scientific Atlantis Pro 40MHz probe). After Angiography we administered intracoronary nitroglycerin, passed the coronary guidewire and advanced the iVUS probe beyond the stent, and did a pullback study from a suitable distal landing zone across the length of the stent up to a suitable proximal landing zone for a possible second stent implantation if required. We based our strategy of further revascularization depending on the nature of the ISR and it was a combination of drug eluting stents, plain old balloon angioplasty, drug eluting balloon and cutting balloon angioplasty. The majority of our patients received a second drug eluting stent after adequate predilatation. We completed the procedure by doing a second IVUS study to ensure adequate expansion of the second stent. We followed up all our patients clinically with provision for repeat angiography if the patients were symptomatic.

Below we present two cases of ISR after a period of $>$ 5 years from the index procedure. Angiographically both looked like straight forward cases for re-PTCA. In Case 1 this was indeed the case where a grossly undersized stent could be easily pre-dilated and stented with a larger stent with excellent results. In Case 2 however, a focal re-stenosis was impossible to dilate by balloon angioplasty and IVUS revealed a concentric unbreakable ring of calcium.