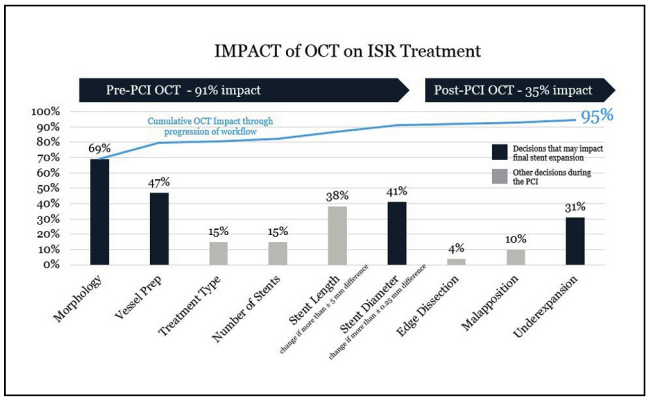
OCT-assessed lesion morphology and stent failure mechanism changed PCI vessel preparation strategy in 47% of ISR lesions versus 25% of non-ISR lesions. The median pre-PCI minimal stent area (MSA) (collected in n = 57 lesions) was 2.55 mm^2 (IQR: 1.75 to 3.58 mm^2). Application of the prescriptive OCT PCI workflow resulted in an MSA increase of 72% (final MSA = 4.40 mm^2 [IQR: 2.96 to 5.41 mm^2]). The MLDMAX workflow drove ISR treatment strategies that achieved 77.4% average initial stent expansion, and further OCT-guided optimization occurred in 42% of ISR lesions.



CONCLUSION The MLDMAX PCI workflow impacts PCI decision making in the majority of lesions, particularly in the setting of ISR. OCT assessment of morphology and stent failure mechanism changes vessel preparation strategy in 47% of lesions.

CATEGORIES IMAGING: Imaging: Intravascular

TCT CONNECT-407

Optical Coherence Tomography Influences Procedure and Vessel Preparation Decisions During Percutaneous Coronary Intervention: Insights From the LightLab Initiative

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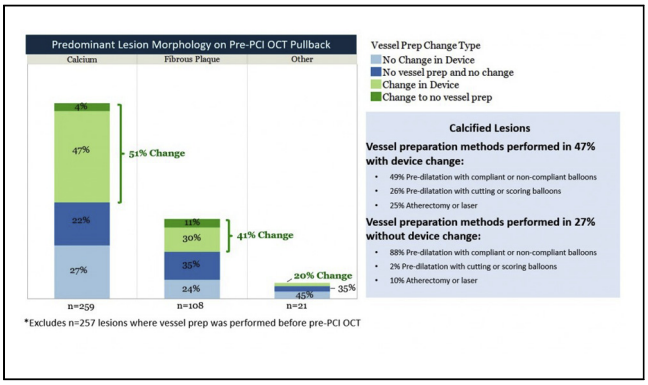
BACKGROUND This study evaluated a standardized optical coherence tomography (OCT) workflow on PCI decision making and pre-stent vessel preparation in a real-world population.

METHODS The LightLab Initiative collects real-time, prospective data from 41 physicians in 16 U.S. hospitals on the use of a prescribed "MLDMAX" (Morphology, Length, Diameter, Medial dissection, Apposition, eXpansion) OCT workflow in 4 phases of implementation. We present phase 1 data examining effects of the MLDMAX approach on PCI planning and vessel preparation compared with an angiography-guided strategy.

RESULTS Of an eligible 1,016 patients, the MLDMAX OCT workflow was used in 652 lesions. Compared with angiography, OCT impacted PCI decision making in 88% (571/652) of lesions (83% pre-PCI, 31% post-PCI). Morphological assessment from pre-PCI OCT changed in 48% of lesions, impacting case planning (28% vessel preparation, 36% stent diameter, and 38% stent length). In calcified lesions, vessel preparation device use changed 47%, escalating to scoring/cutting balloon or atherectomy 51% of the time (Figure). On average, the MLDMAX workflow drove a vessel preparation strategy that achieved 80% minimum initial stent expansion, and further OCT-guided optimization occurred in 38% of lesions.



CONCLUSION The MLDMAX workflow impacts pre-PCI procedural decision making in 83% of lesions where OCT morphology assessment drives changes in planned stent length and vessel preparation strategy, leading to a 51% vessel preparation device escalation for calcified lesions.

CATEGORIES IMAGING: Imaging: Intravascular

TCT CONNECT-408

Prediction of Vessel Rupture Assessed by Optical Coherence Tomography as a Function of Increasing Pressure and Balloon Size in Stent Post-Dilatation for Calcified Coronary Lesions in Ex Vivo and In Silico Experimental Model

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BACKGROUND Vessel rupture is a big concern when improving stent expansion in calcified lesions using post-dilation with a larger balloon or higher inflation pressure, but there are still scarce data regarding ways to quantify the imminent vessel rupture. The aim was to evaluate the risk of vessel rupture based on balloon diameter and pressure in calcified coronary lesions.

METHODS We conducted ex vivo experiments based on cadaver heart models within calcified coronary lesions. We performed pre-specified post-dilatations using noncompliant catheter balloons (NCCBs), respectively, ranging from 1:1, +0.5, +1.0, and +1.5 mm bigger NCCBs at 10, 20, and 30 atm assessed by coherence tomography. In silico experiments with finite element models were conducted, and strain value >0.765 was considered tissue damage or rupture.

RESULTS We analyzed 134 OCT pullbacks from 10 ex vivo experiments for a total of 72,360 frames, 50% heavily calcified lesions and 50% low calcified lesions. Significant vessel ruptures were identified in all experiments upon post-dilatation with NCCB; 60% occurred using a median of +1.0 mm NCCB from 20 atm for both low and heavy calcium. FEM also showed that initiation of tissue dissection was consistent with the location of strain concentration at calcium shoulders, and the area of tissue with higher strain (>0.765) increased along with higher inflation pressures in accordance with the propagation of vessel rupture.

CONCLUSION Stent optimization using +1.0 mm bigger NCCBs yielded coronary ruptures with potential harmful damages to the vessels in both heavily and low calcified lesion morphology.

CATEGORIES IMAGING: Imaging: Intravascular

TCT CONNECT-409

Mechanisms of Multi layer In-Stent Restenosis Assessed by Optical Coherence Tomography

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