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Detection and Implication of Plaque Erosion as a cause of coronary thrombosis

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Histology studies

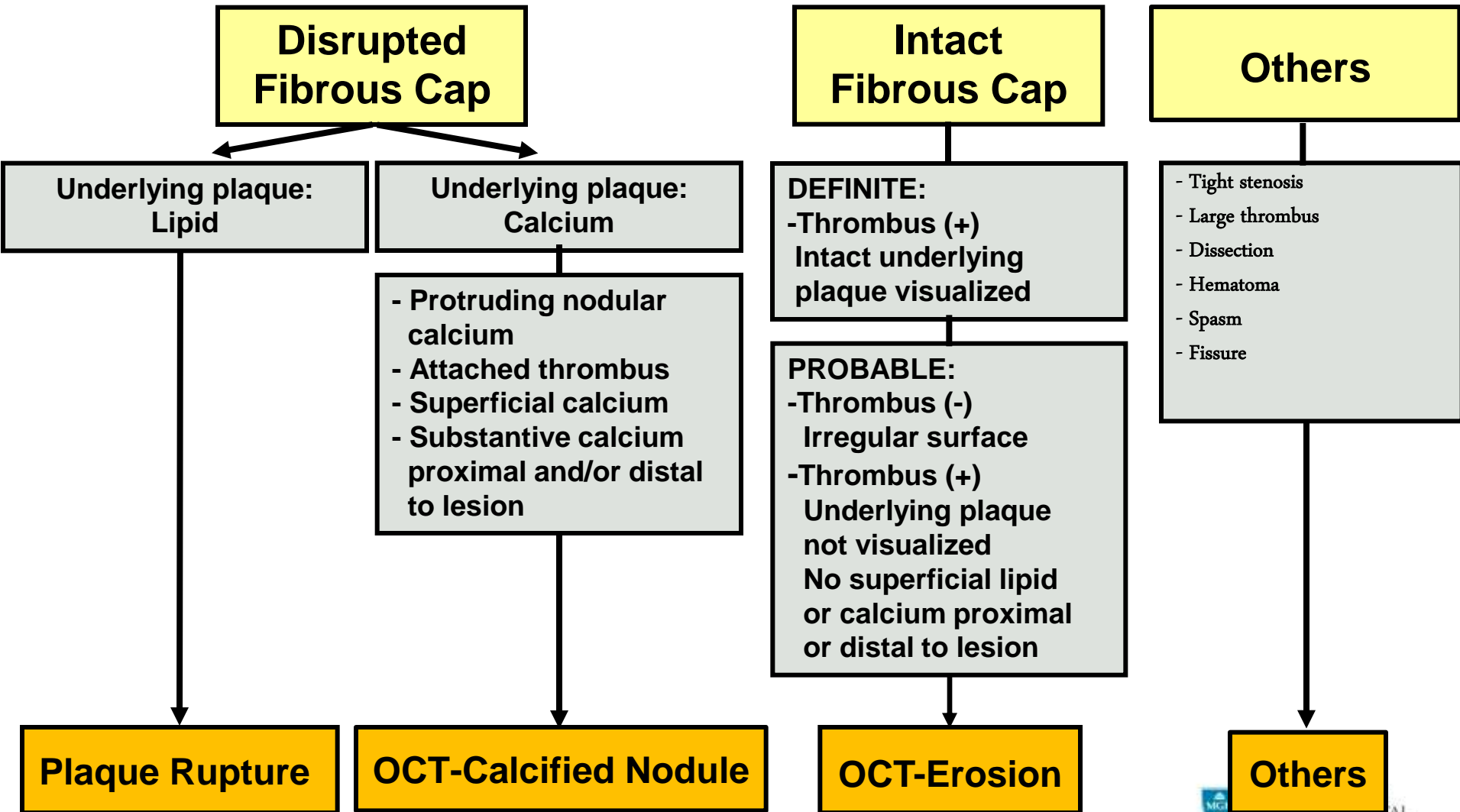
1. van der Wal *et al* reported that the prevalence of plaque rupture and **erosion** was 60% and **40%**, respectively.
2. Farb *et al* studied 50 sudden death cases and found ruptures in 28 (56%) patients and **erosions** in 22 (**44%**).
3. Hisaki *et al* reported 70 (56.4%) plaque ruptures and 54 (**43.5%**) **erosions** in 124 lesions.



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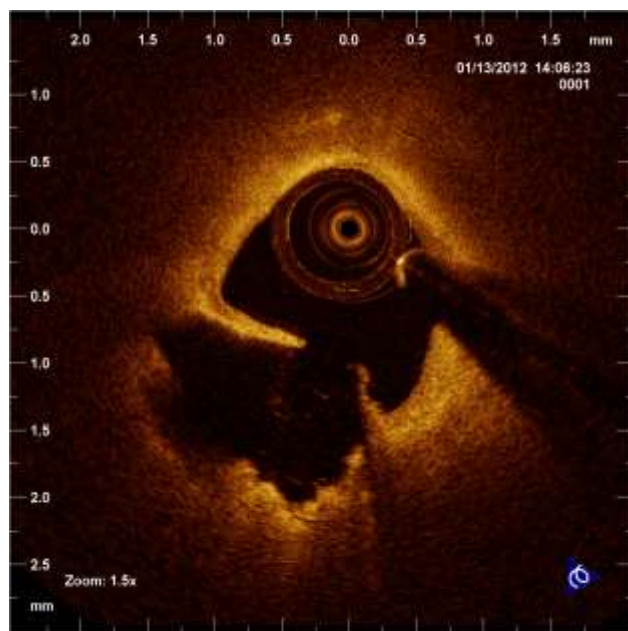
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OCT Plaque Classification

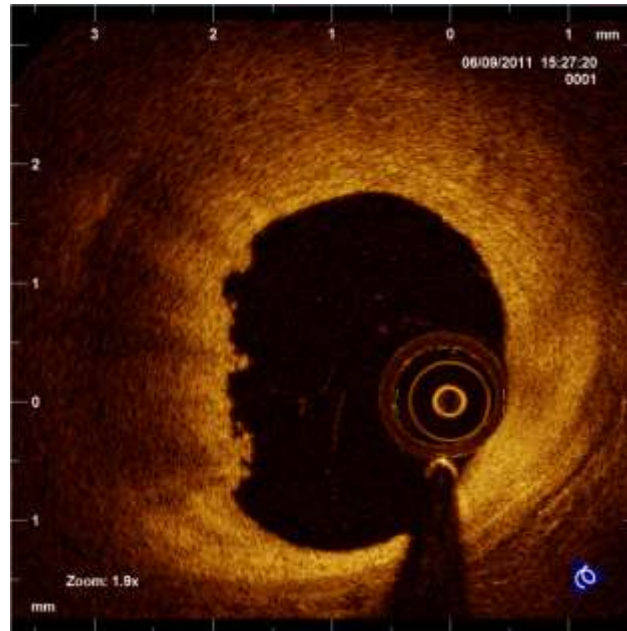


Underlying Mechanisms

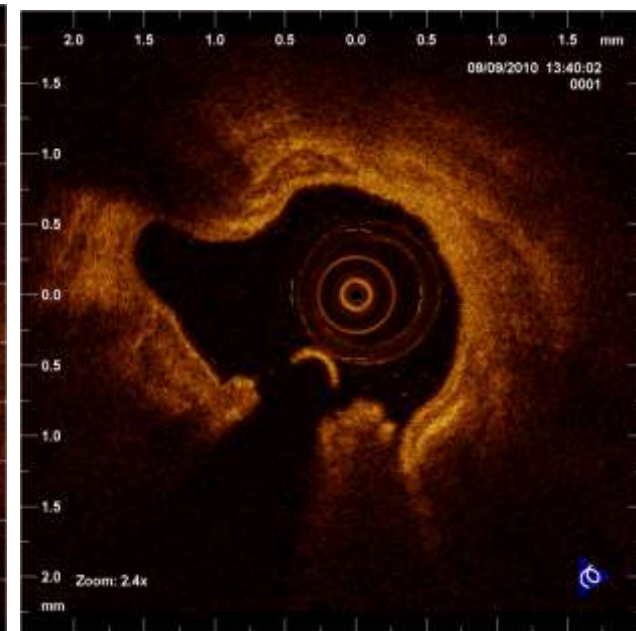
Rupture



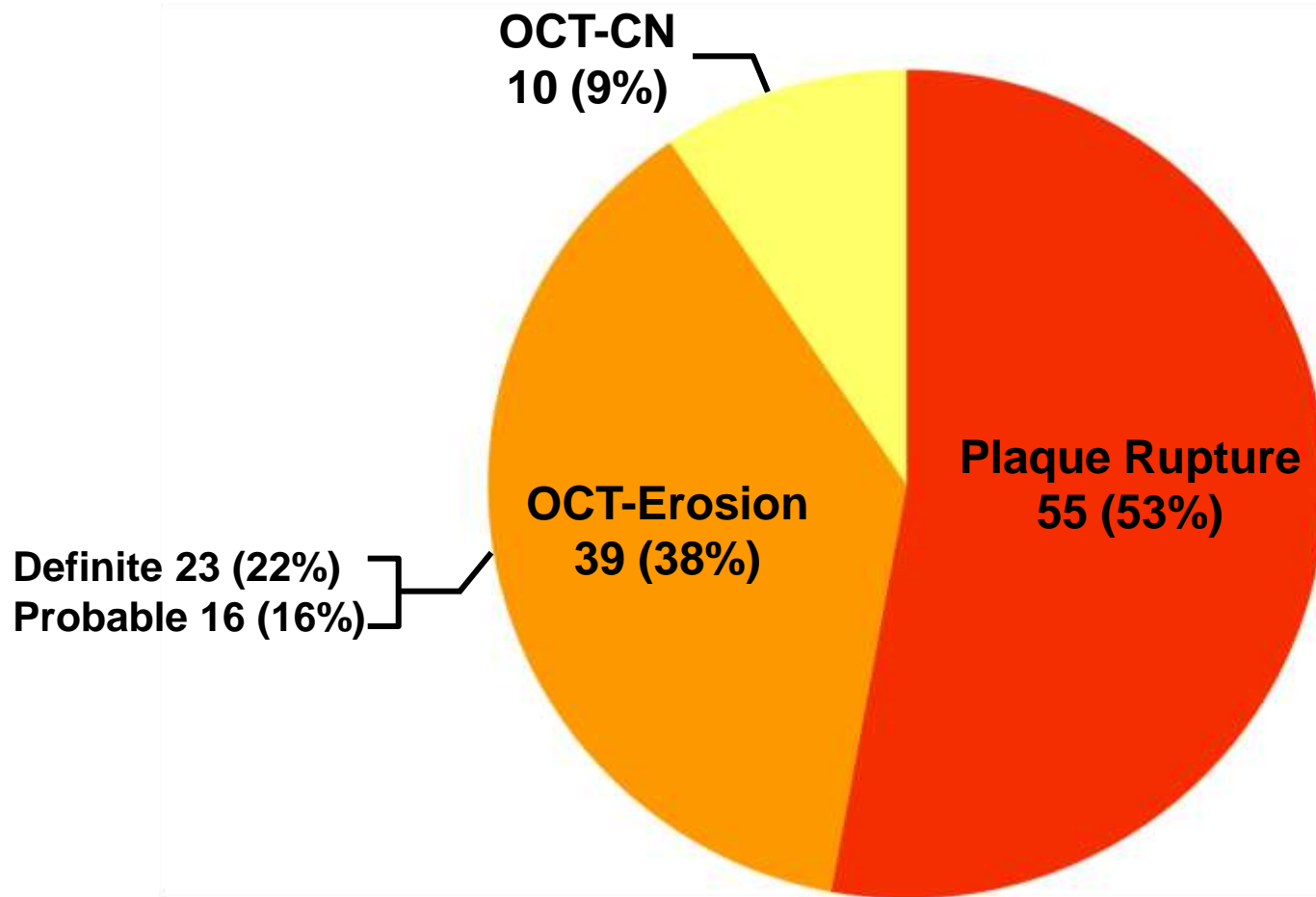
Erosion



Ca Nodule



Incidence

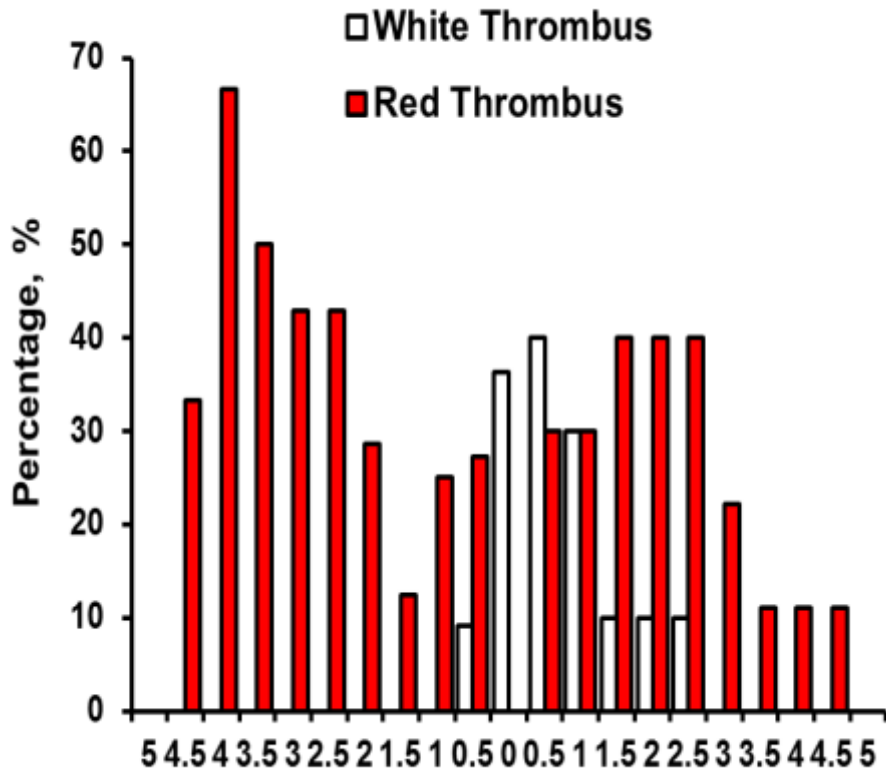


n = 104

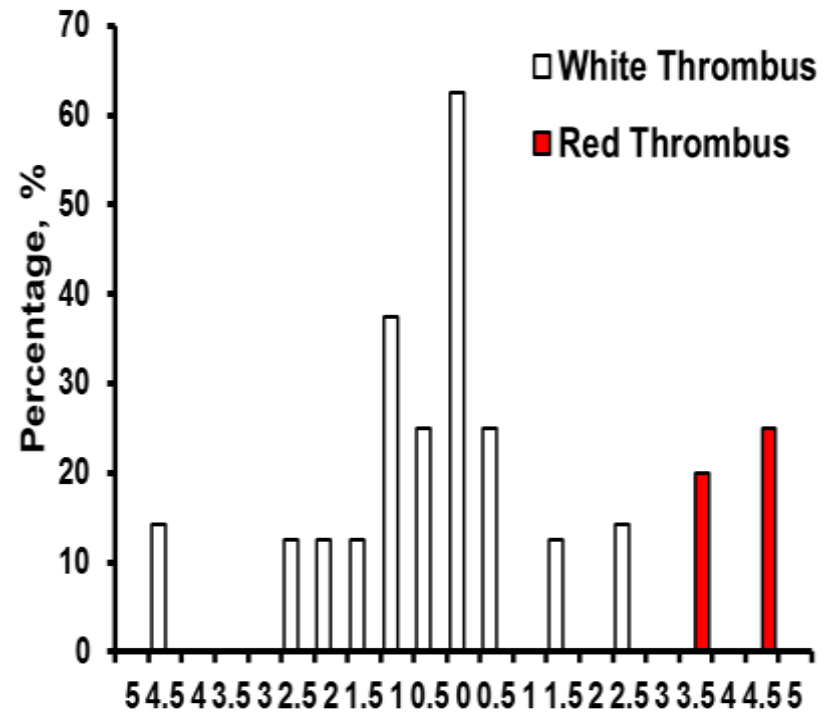
Conclusions

- (1) OCT is able to define plaque erosion and calcified nodules in addition to rupture *in vivo*;
- (2) More than one third of ACS cases caused by erosion;
- (3) In erosion, vascular integrity is better preserved with larger lumen and platelet rich thrombus is more frequently observed;

Post-lysis Residual Thrombus



Rupture



Erosion

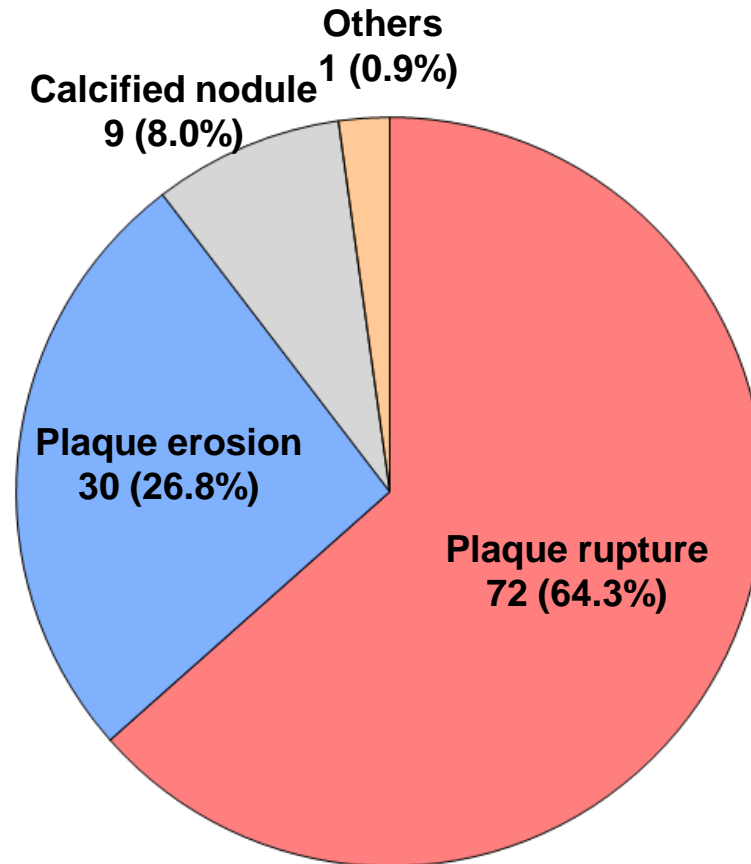
Plaque Rupture, Plaque Erosion and Calcified Nodule in Patients with STEMI: A Combined OCT and IVUS Study

In collaboration with Dr. Higuma at Hirosaki University, Japan

JACC Interv. In press

Tsunenari Soeda, MD, PhD

Underlying Mechanisms of STEMI



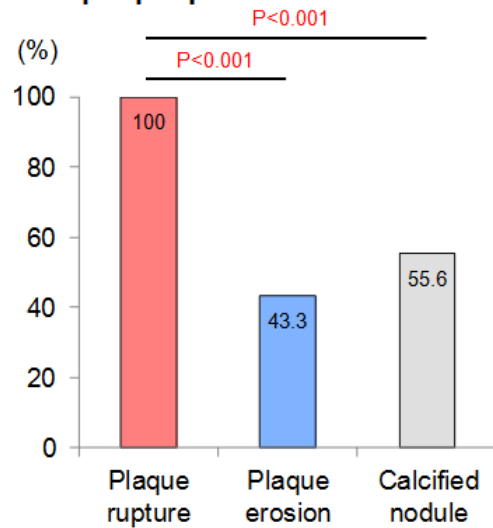
Intra-observer's reliability 0.85

Inter-observer's reliability 0.87

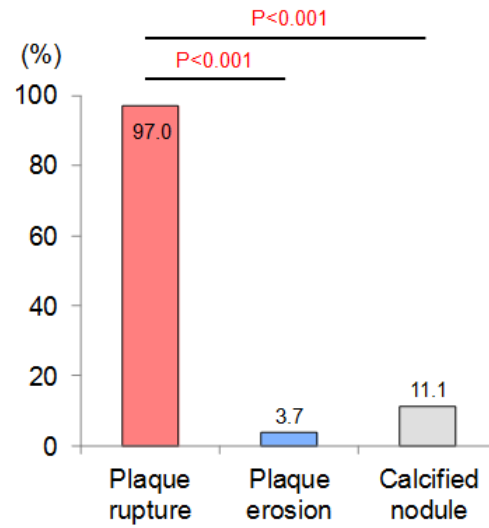
Total 112 STEMI

OCT Findings

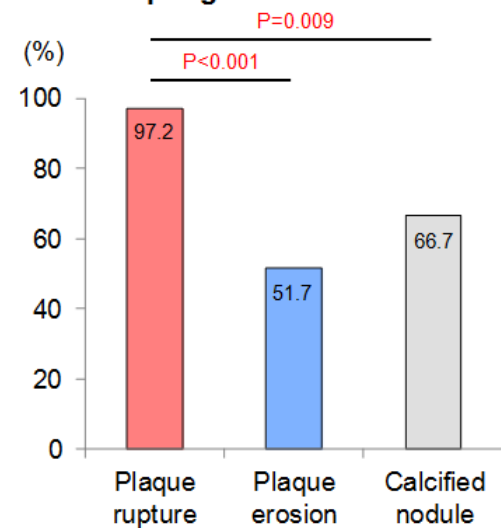
A. Lipid plaque



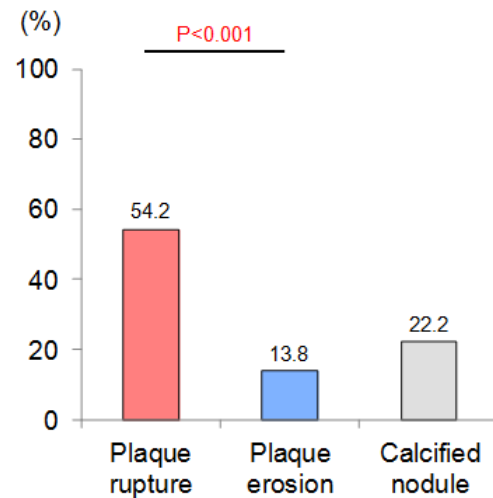
B. TCFA



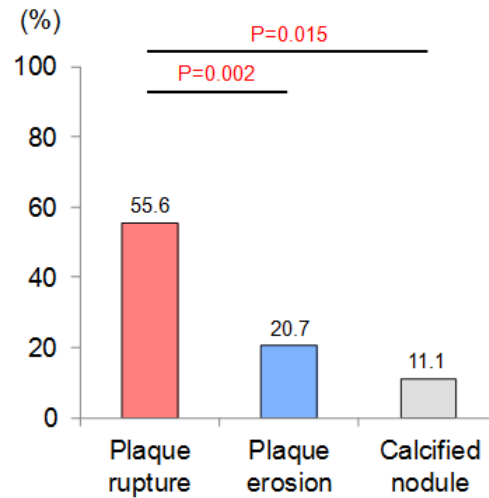
C. Macrophage



D. Microchannel

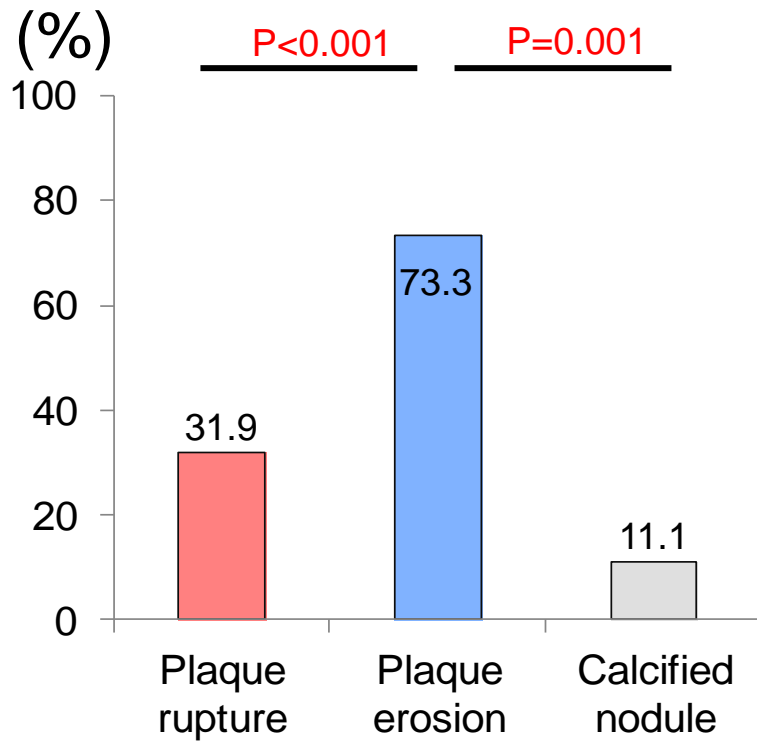


E. Cholesterol crystal

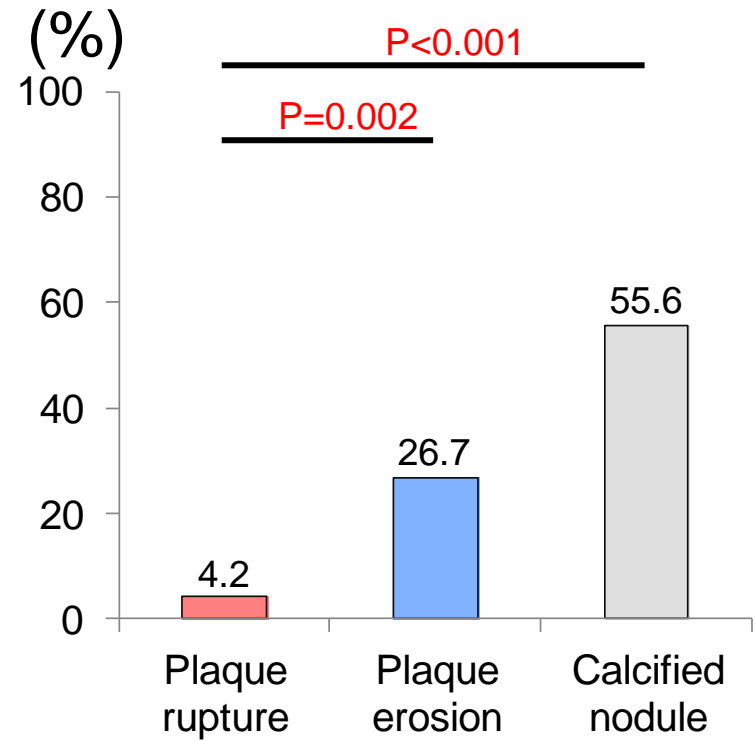


IVUS Findings

Eccentric plaque

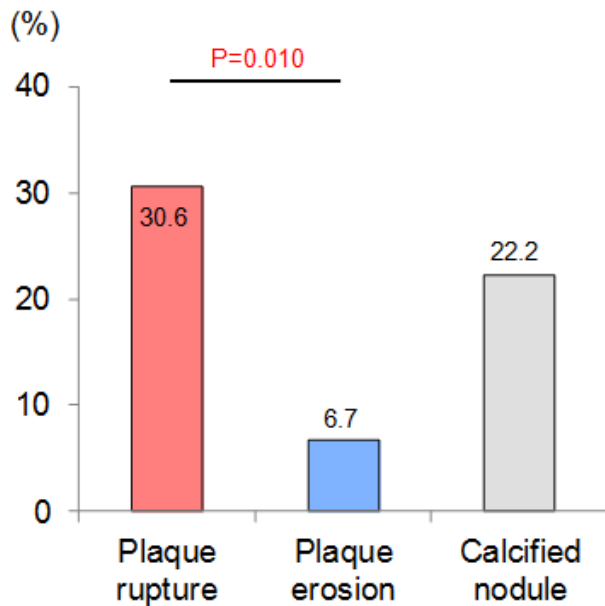


Constrictive remodeling

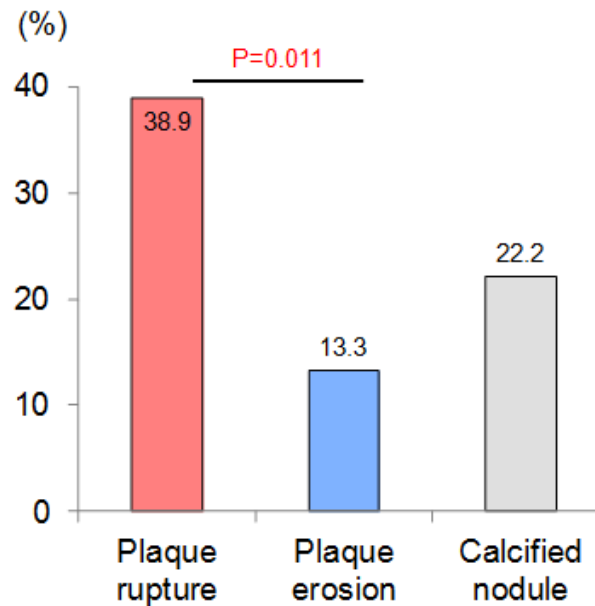


Acute outcomes after PCI

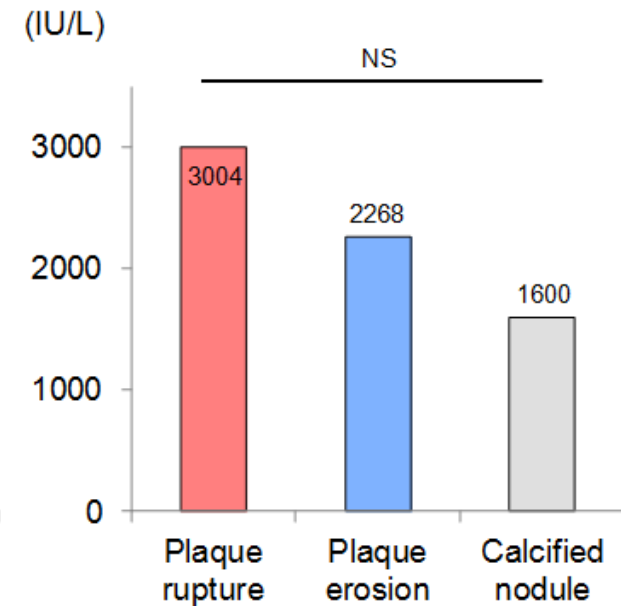
A. Myocardial brush grade ≤ 1



B. No reflow



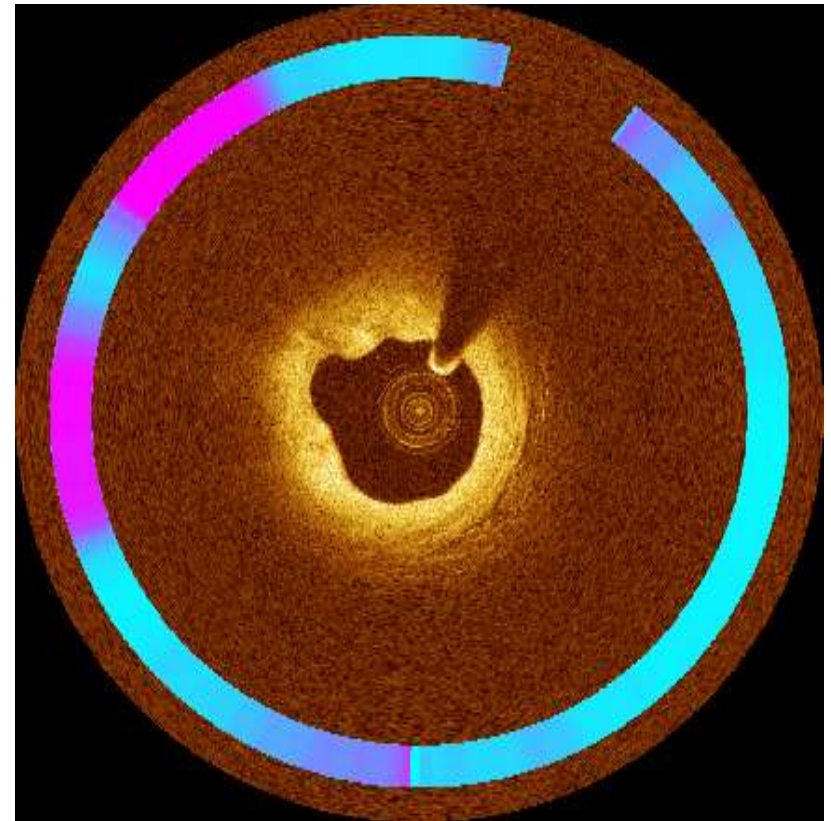
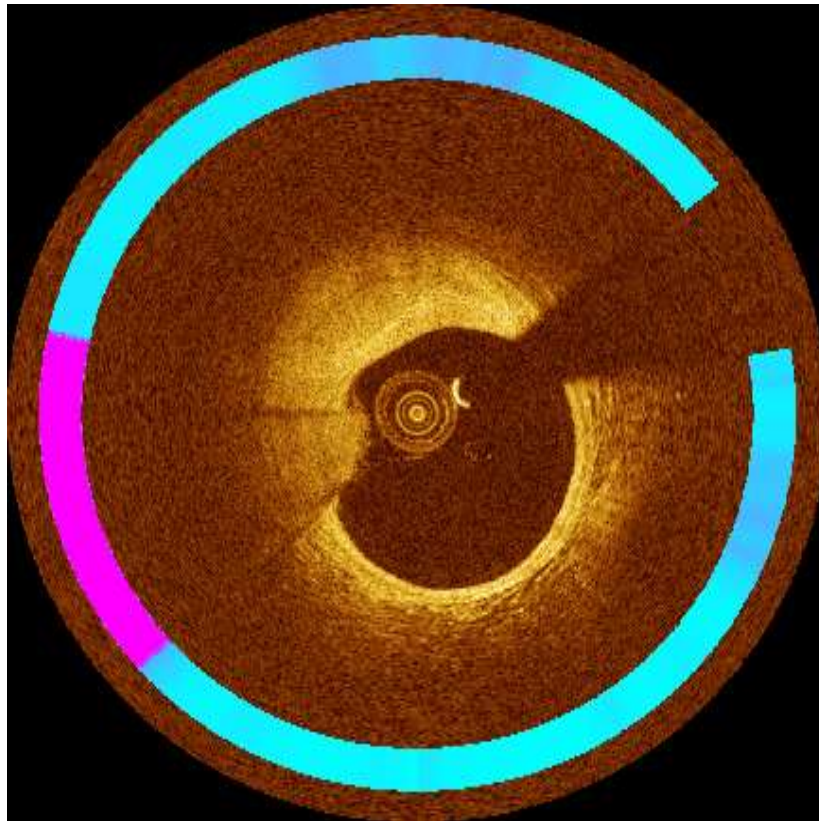
C. Peak CK



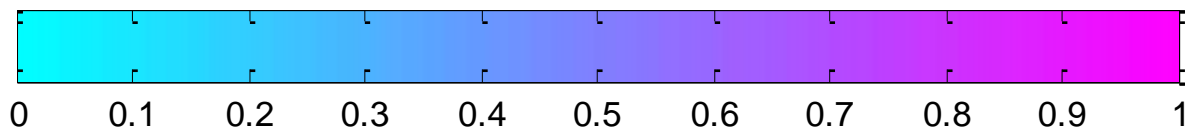
Summary

1. The incidence of erosion was 26.8% in STEMI.
2. Erosion had lower prevalence of TCFA and other features of plaque vulnerability.
3. Erosion had more eccentric plaques with more constrictive remodeling.
4. Erosion had better outcome after PCI in patients with STEMI.

Computer Aided Diagnosis of Plaque Erosion



Probability of
Plaque Erosion



Wang Z. Circ Img 2014

Erosion: Facts

1. Incidence: 27- 38%
2. Vascular integrity: better preserved
3. Lumen: larger
4. Better response to antithrombotic therapy
5. Less inflammation
6. Eccentric plaque and constrictive remodeling
7. Better outcome after PCI
8. Diagnosis became easier

Implication

1. Incidence: 27-38%

Clinically important

Implication

1. Incidence: 27-38%.
2. Vascular integrity: better preserved
3. Lumen: larger
4. Better response to antithrombotic therapy
5. Less inflammation.
6. **Pharmacologic therapy**
7. Better outcome after PCI.
8. Detection became easier.

Implication

1. Incidence: 27-38%.
 2. Vascular integrity: better preserved.
 3. Lumen: larger.
 4. Better response to pharmacologic
 5. Less inflammation
 6. Eccentric and constrictive remodeling
 7. Better outcome after PCI
 8. Diagnosis became easier
- PCI is treatment of choice.**

Implication

Optimal Treatment

Unknown

Collaborators

Registry

20 sites (Australia, China, Hong Kong, Japan, Korea, USA)

MGH

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Thank You