



# Calcium Fracture After Intravascular Lithotripsy as Assessed With Optical Coherence Tomography

Hiroki Emori, MD, PhD; Yasutsugu Shiono, MD, PhD; Nehiro Kuriyama, MD, PhD;  
Yasuhiro Honda, MD; Suguru Ebihara, MD, PhD; Kosuke Kadooka, MD;  
Kenji Ogata, MD; Toshiyuki Kimura, MD; Kensaku Nishihira, MD, PhD;  
Atsushi Tanaka, MD, PhD; Yoshisato Shibata, MD

**Background:** Plaque characteristics associated with effective intravascular lithotripsy (IVL) treatment of calcification have not been investigated. This study identified calcified plaque characteristics that favor the use of IVL.

**Methods and Results:** Optical coherence tomography (OCT) was performed in 16 calcified lesions in 16 patients treated with IVL and coronary stenting. Cross-sectional OCT images in 262 segments matched across pre-IVL, post-IVL, and post-stenting time points were analyzed. After IVL, 66 (25%) segments had calcium fracture. In multivariable analysis, calcium arc (odds ratio [OR] 1.22; 95% confidence interval [CI] 1.13–1.32;  $P < 0.0001$ ), superficial calcification (OR 6.98; 95% CI 0.07–55.57;  $P = 0.0182$ ), minimum calcium thickness (OR 0.66; 95% CI 0.51–0.86;  $P = 0.0013$ ), and nodular calcification (OR 0.24; 95% CI 0.08–0.70;  $P = 0.0056$ ) were associated with calcium fracture. After stenting, stent area was larger for segments with fracture (8.0 [6.9–10.6] vs. 7.1 [5.2–8.9] mm<sup>2</sup>;  $P = 0.004$ ).

**Conclusions:** Post-IVL calcium fracture is more likely in calcified lesions with lower thickness, a larger calcium arc, superficial calcification, and non-nodular calcification, leading to a larger stent area.

**Key Words:** Calcified lesions; Intravascular lithotripsy; Optical coherence tomography