Streszczenie w języku angielskim

Title: Intravascular Lithotripsy as a Novel Technique for the Revascularization of Left Main Coronary Artery Stenosis.

Background: Calcified lesions of the left main coronary artery represent a major challenge, being associated with suboptimal stent expansion, increased procedural complexity, and worse clinical outcomes. Intravascular lithotripsy (IVL) has emerged as a novel calcium-modifying technology. However, its role in left main (LM) stenosis, has not yet been fully established.

Aim: The aim of this study was to evaluate the safety and efficacy of IVL in the treatment of calcified LM disease. The study assessed procedural outcomes, intravascular imaging parameters, long-term clinical results, and sought to identify factors influencing treatment success and prognosis.

Methods: This retrospective, multicenter observational study included 89 patients with severely calcified LM lesions who underwent PCI with IVL. Patients with de novo stenoses, in-stent restenosis and stent underexpansions were included. Data collection covered clinical characteristics, angiographic and procedural details, use of intravascular imaging (IVUS/OCT), and post-procedural follow-up. The primary endpoint was procedural success, defined as residual stenosis <20%. The secondary endpoints were the device-oriented composite endpoint (DOCE), defined as a composite of target lesion revascularization (TLR), target vessel myocardial infarction (TV-MI), and cardiovascular death.

Results: The majority of patients were male (83.1%) with a mean age of 72.6 ± 7.8 years. Hypertension and hyperlipidemia were highly prevalent (83.1% and 86.5%, respectively). More than half of patients (51.7%) presented with acute coronary syndrome, with a mean left ventricular ejection fraction of 42.5 ± 15.2%. The main indications for IVL were de novo calcification (71.9%), in-stent restenosis (21.4%), and stent underexpansion (6.7%). Intravascular imaging (IVUS or OCT) guidance was used in 79.5% of cases, and 95.5% of procedures involved the left main bifurcation. Mechanical circulatory support with Impella CP was used in 10.1% of procedures, and rotational atherectomy prior to IVL was performed in 11.2% of cases. IVUS/OCT assessment showed a median preprocedural minimal lumen area (MLA) of 3.0 mm² (2.5–4.6). Calcium fractures were observed in 79.4% of lesions, and the median final minimal stent area (MSA) was 8.8 mm² (8.0–10.1), resulting in an acute lumen area gain of 5.6 mm² (4.3–7.0). Procedural success, defined as residual stenosis <20%,

was achieved in 95.4% of cases. Periprocedural complications included dissection (3.4%), perforation (1.1%), and no-reflow (1.1%). At long-term follow-up (median 262 days, (interquartile range 114–994), TLR occurred in 5.4%, TV-MI in 6.4%, and cardiovascular death in 21.1% of patients; DOCE occurred in 26.3%.

Conclusions: IVL is a safe and effective method for calcium modification in LM stenoses, enabling adequate stent expansion and favorable procedural outcomes with low complication rates.

Key words: Intravascular lithotripsy; Left main coronary artery; Calcified coronary lesions; Percutaneous coronary intervention;