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Abstract: PURPOSE: The aim of this study was to investigate the use of a fibrin-specific contrast agent (EP-2104R, EPIX Pharmaceuticals, Lexington, Massachusetts, USA) for targeted molecular magnetic resonance (MR) imaging of human clot material removed from patients in a model of coronary thrombosis in swine. MATERIALS AND METHODS: Freshly ex vivo engineered clots from human blood and human in situ developed clots removed from patients were delivered into the coronary arteries of nine domestic swine. For MR imaging a navigator-gated, free-breathing, cardiac-triggered 3D inversion recovery black-blood gradient echo sequence was performed prior to clot delivery (baseline), after clot delivery but prior to contrast media administration, and two hours after systemic (i.v.) injection of 4 micromol/kg EP-2104R. MR images were analyzed by two investigators and the contrast-to-noise ratio and Gadolinium (Gd) concentration in the clots were assessed. RESULTS: On baseline images and prior to contrast media application no thrombi were visible. Post contrast administration all 10 coronary emboli (five ex vivo engineered clots and five human clots removed from patients) were selectively visualized as white spots with a mean contrast-to-noise ratio to the blood pool and the surrounding tissue of >12 and a mean Gd