



Management of Complex Coronary Ostium Anatomy in a TAVI Case – a Hybrid Approach

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Objective: Deep coronary ostium height may result in coronary occlusion during TAVI. To overcome this, chimney stent techniques are helpful but also technically demanding and probably not feasible in every anatomy. A hybrid strategy with additional bypass surgery is another option which we here want to discuss.

Methods: We present a case of a 76-year-old female patient with severe aortic stenosis (max/mean gradient 69/44mmHg, calcium score: 2754.8, NYHA III) suitable for transfemoral access (Fig. 1, 2, 4). This patient is at high risk for conventional SAVR due to comorbidities: Ig A lambda multiple myeloma under immune therapy, chronic obstructive pulmonary disease and coronary artery disease with stent-treated two-vessel stenosis. A right coronary artery ostial height of 5 mm combined with unfavourable ostial origin angulation (Fig. 3) made her a high risk candidate for occlusion of the right coronary artery during TAVI.

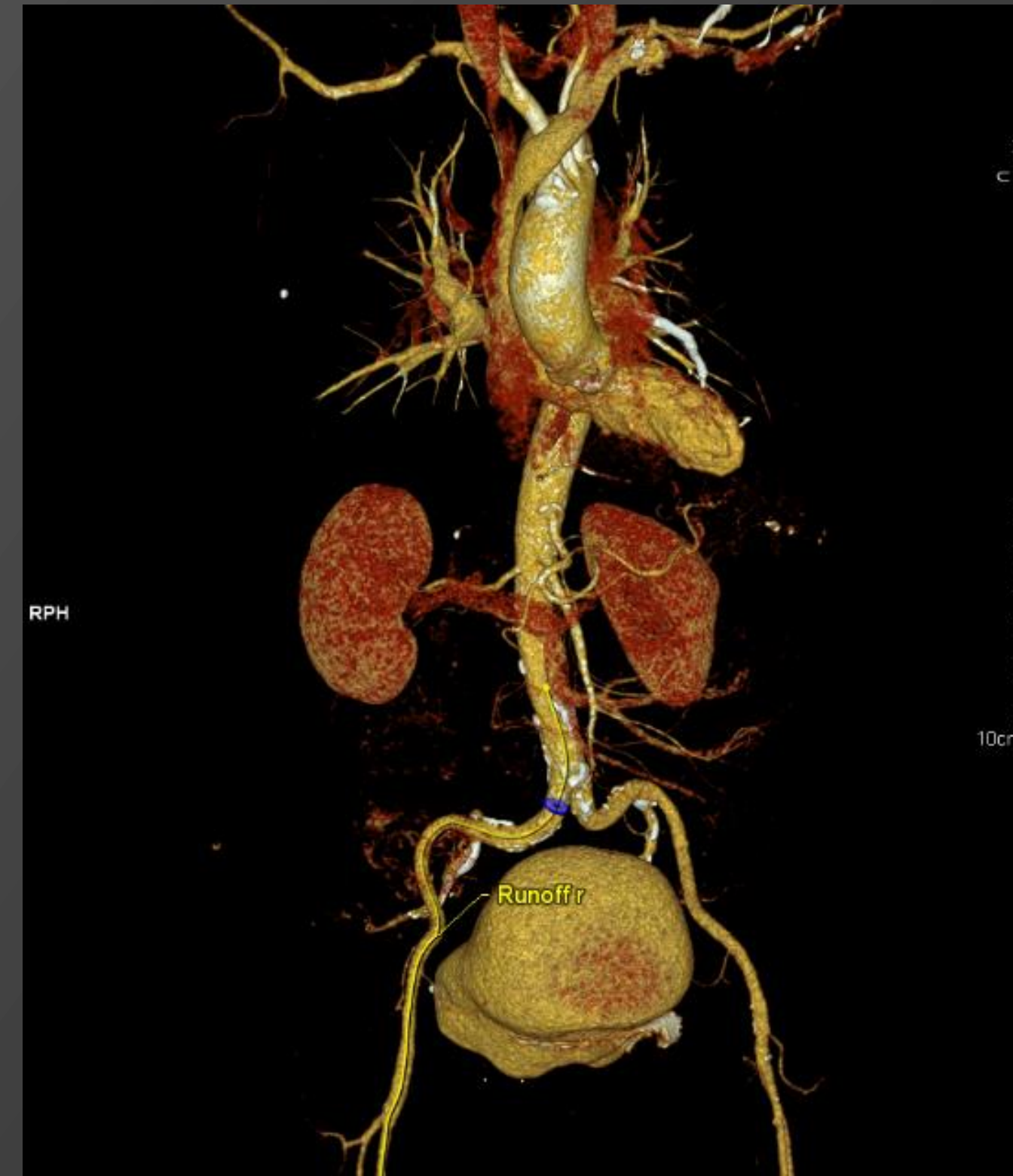


Fig. 1: 3D model of the aortic and iliac vessels

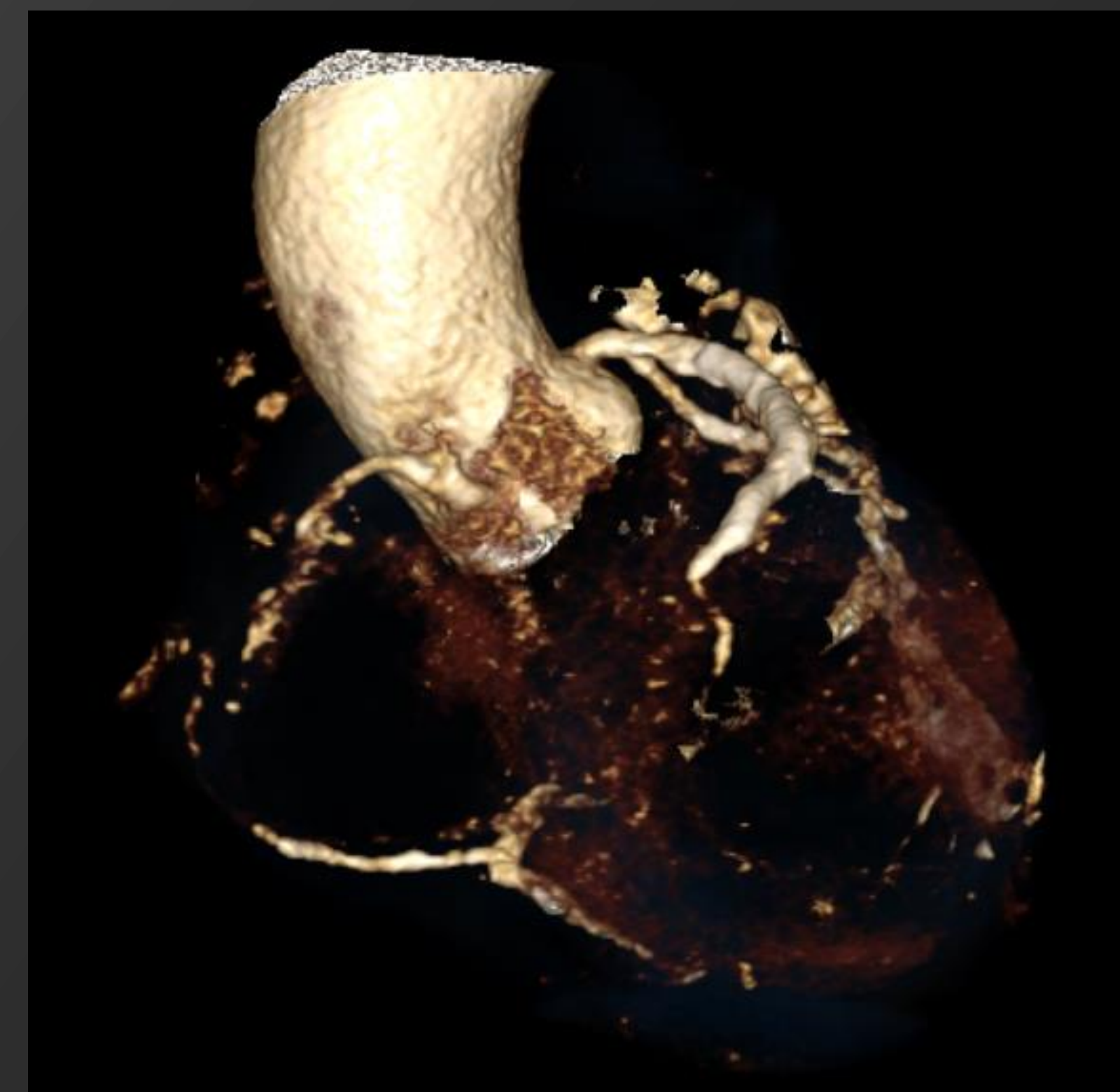


Fig. 2: 3D model of the aortic root and coronary vessels



Fig. 3: Projection of the origin of the right coronary artery shows height of 5mm and an steep angle



Fig. 4: Projection of the origin of the left coronary artery with height of 12mm

Results: The heart team decision was to aim for transfemoral TAVI with a balloon expandable valve. To estimate the risk for right coronary occlusion we first performed balloon pre-dilatation with additional contrast agent injection (Fig. 5). As expected from the CT-scan the balloon occluded the right ostium. This led to periprocedural heart team decision to perform initially an off pump single bypass surgery using a venous graft to the right coronary artery. Subsequent transfemoral implantation of a balloon expandable 23 mm aortic valve was done. Intraoperative echo revealed a good valve implantation result, normal left ventricular contractility and no ECG signs of ischemia. No periprocedural complications occurred and the patient was extubated after procedure and transferred to the ward on the next day. The patient was discharged at the 8th postoperative day.

Conclusion: We conclude that in patients with critically low coronary ostial height and unfavourable ostial angulation, a potential coronary occlusion may be simulated by the use of a TAVI predilatation balloon. In TAVI procedures performed in an operating room setting, a simultaneous hybrid approach using off pump CABG with subsequent TAVI may be used in cases where coronary catheter based TAVI protection techniques are judged to be at higher ischemic risk (small aortic valve annulus, coronary ostial calcium load in combination with difficult angulation).

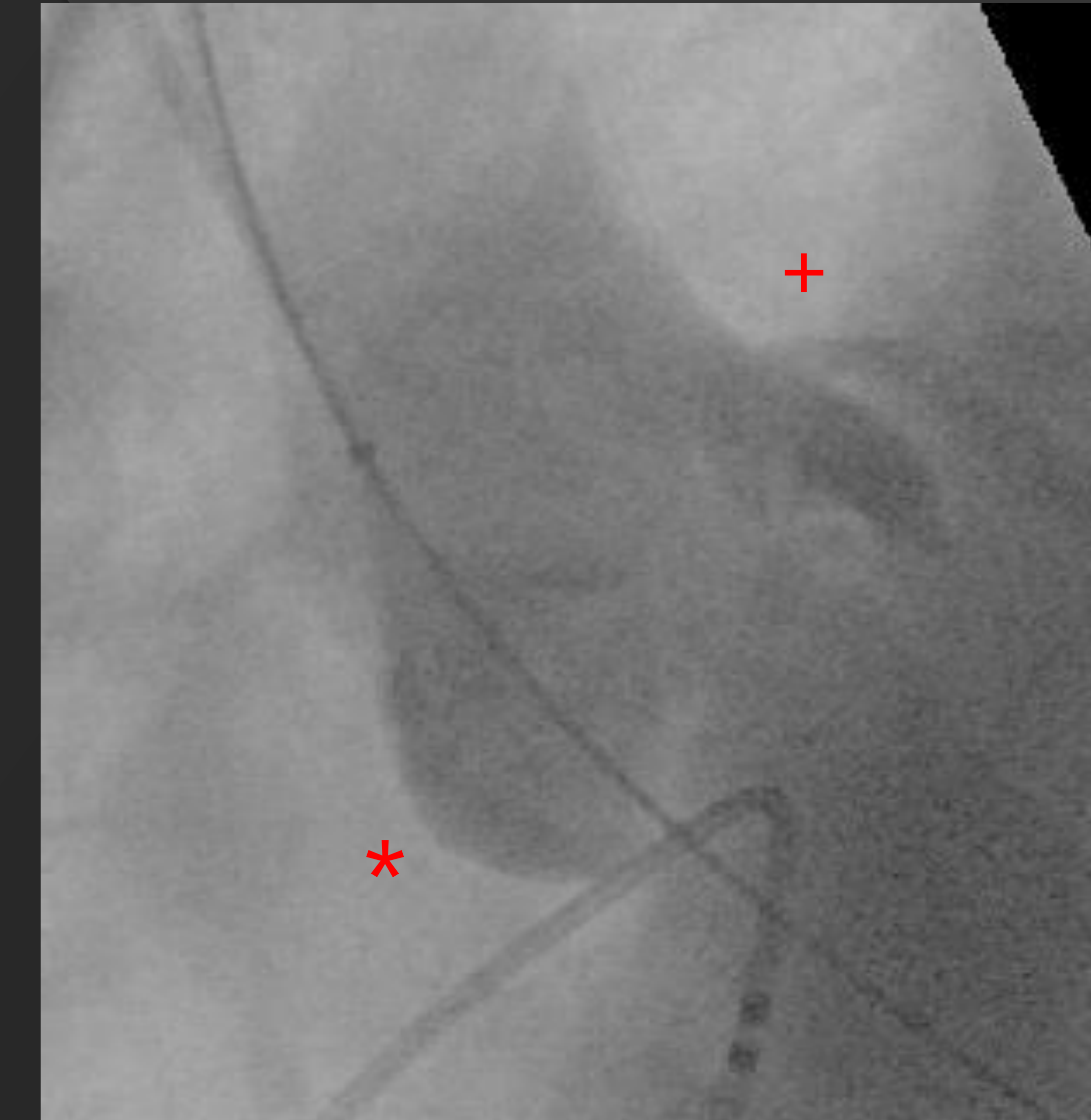


Fig. 5: Balloon pre-dilatation for risk-estimation for right coronary occlusion:
(*) Right coronary is occluded; (+) Left coronary patent