Impact of Calcification Modeling and Planning Circles with Fusion Imaging for the Chronical Total Occlusion of Iliac and Femoro-Popliteal Arteries
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Objectives: To examine the contribution of calcification modeling and planning circles with fusion imaging for the chronical total occlusion (CTOs) of iliac and femoro-popliteal arteries.

Methods: We analyzed a cohort of 180 patients who were treated by endovascular means for iliac and femoro-popliteal arteries CTOs during a period of 3 years. The procedures were performed in the hybrid room equipped with the Innova IGS 530 system (GE Healthcare). The pre-operative imaging fusion was edited on the dedicated workstation Advantage Workstation VS7 with Vessel ASSIST. A centerline was manually adjusted inside the occluded artery. Planning circles were strategically positioned inside the calcifications edited by the centerline. The workstation allows also to combined the modeling of all the calcifications inside the artery with the planning circle in the same volume. The fusion technic was a fusion between 3D volume extracted from preoperative CT and 2D live fluoroscopy with bone registration. An arteriography was systematically achieved allowing to adjust if necessary the vascular and calcification volumes.

Results: 62 Iliac CTOs (mean length occlusion= 57.3 mm), and 118 femoro-popliteal CTOs (82.7 mm) were performed. The success of the recanalisation reach 95% (n=171/180). In 49% (n= 88/180) the recanalization have been directly in transluminal inside the planning circles. In 41% (n=74/180) the recanalization has been subintimal and have been redirected in transluminal between two circles. In 5% (n=9/180) the subintimal recanalisation can’t be redirected transluminal and an IVUS-guided re-entry catheter have been used.

Conclusion: The CTOs under fusion imaging with calcification modeling and planning circles is a reliable and reproducible technic. It allows to redirect easily between two circles inside the calcification. It might have an economic impact by reducing the use of re-entry device, and might have an impact on the radiation exposure.