Calcified in-stent restenosis in a venous stent

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Case
35-year-old woman, non smoker, no oral contraceptives, Faktor V Leiden heterozygous
10 years earlier treated for acute left-sided DVT with catheter-directed thrombolysis (CDT) and stenting of the left common iliac vein
Stent used: 12mm, 12cm arterial nitinol stent
Terminated anticoagulation after 1 year
2 successful pregnancies within the past 10 years
Presented with 1 week’s recurrent symptoms of acute left-sided DVT (lower back pain, swelling and pain of left leg)
Initial treatment with 72 hrs of ultrasound accelerated CDT (UACDT) unsuccessful, significant residual thrombus inside the stent
CT-scan (Fig 1) revealed severe calcification of the in-stent restenosis

Lessons learned from this case
- With increasing numbers of stentings of central veins, the first ones being far more than a decade ago, we might just begin to see the tip of the iceberg in regards of late stent-related complications, as these, like in our case, seem to be able to occur even after many symptom-free years
- Long-term stent-surveillance might be indicated, particularly in patients at risk (i.e. suboptimal initial result, post-stent pregnancies, trombophilia) as in our case
- Late in-stent restenoses and occlusions of stents inside the deep veins can be calcified
- The treatment of these calcified stenoses is complex and challenging, but nevertheless possible with the described minimally invasive approach


Results
Rotarex®- debulking resulted in removal of apx. 25-50% of the calcified material
Pre- and post- ballooning furthermore maximized the inner diameter of the stent complex
The May-Thurner compression was completely resolved
Un-observed venous outflow from the left leg was re-established (no collaterals visible), but the inner diameter of the stent-complex is only 9-10mm
The patient experienced instant symptom-relief
We discovered partial rethrombosis after 8 mths, which resolved spontaneously after raising the INR to 3.0-3.5

Fig 1 3D CT reconstruction showing severely calcified material (red arrows) inside the old stent in the left iliac veins. The stent is severely compressed at the May-Thurner point (yellow arrow). IVF filter in place. Inlay picture shows cross sectional view of the stent with the calcification (arrow)

Fig 2 Venograms showing the results after 48 hrs of UACDT (left) and after debulking using the Rotarex® catheter (middle) Fluoroscopy showing the Atlas® balloon forcing the residual thrombus material (arrow) into the vessel wall (right)

Treatment
- IVC filter for protection against embolisation (Opt-Ease®, Cordis Corp, Fremont, CA)
- 48 hrs of UACDT (EKOS®, EKOS Corp, Bothell, Wash.)
- Mechanical debulking with 8F over-the-wire thrombectomy-catheter (Rotarex®, Straub Medical AG, Wangs, Switzerland)
- Pre-balloonning at 16 Bar with 12mm, non-compliant high-pressure balloon (Atlas®, C.R. Bard Inc, Murray Hill, NJ)
- Stenting of the entire lesion, covering the May-Thurner point and the entire old stent with a 12mm, 15cm high-radial-force, dedicated venous nitinol stent (Sinus Venous®, Optimed GmbH, Ettingen, Germany)
- Post-balloonning of the entire stent-complex at 14 Bar with 12mm Atlas®-balloon
- Removal of IVC filter
- Life-long anticoagulation with Warfarin (INR 2.0 – 3.0)
- Knee-high compression stockings (CCL 2)

Fig 3 Final venograms, A-P view (left) and at the same angle-of-view as Fig 1 (right), showing reestablished unobstructed venous outflow from the left leg. The residual calcified material is sandwiched between the stents (red arrows). The May-Thurner compression is completely resolved (yellow arrow)