Prospective evaluation of post-interventional passive expansion of partially dilated transjugular intrahepatic portosystemic shunt (TIPS)-stents – A 3D-sonography study


Purpose: It has recently been suggested that underdilated self-expanding TIPS stents ultimately expand after implantation. The purpose of our study was to prospectively investigate early expansion kinetics within the first six weeks.

Material and methods: Patients undergoing TIPS creation with underdilatation of 10mm Viatorr stent-grafts, received 3D-sonography follow-up examinations (immediately after TIPS creation, one and six weeks later). Using a commercially available 3D-transducer, volume data sets were generated in longitudinal direction of the stent. Orthogonal views of the TIPS within the parenchymal tract were reconstructed and used for blinded stent diameter measurements. The measurement technique was validated with peri-interventional plain x-ray images with a sizing catheter within the stent as the gold standard. Stent diameter changes over time and interrelations with individual patient characteristics (especially liver stiffness evaluated by shear-wave elastography) were analysed using a general linear model for repeated measures.

Results: 20 patients (7 female; mean age 66; range 31-80) with liver cirrhosis (aetiology: 14 alcoholic, 2 hepatitis, 4 other) were included. After dilatation to a diameter of 8 mm, initial stent-recoil was observed to a mean diameter of 7.6 mm (±0.17SD). One and six weeks later, the diameter had increased to 8.7 mm (±0.27SD) and 9.4 mm (±0.11SD), respectively (p<0.001). Validation measurements showed no significant differences between 3D-sonography and the gold standard. Further analysis showed no statistically significant associations of stent expansion and clinical parameters. Shear-wave elastography showed a trend towards smaller stent expansion in cases of higher liver stiffness.

Conclusions: Underdilated self-expanding Viatorr stent-grafts used for TIPS creation significantly expand soon after intervention. These changes can be non-invasively monitored using 3D-sonography.