Microcirculation of vascular malformations using contrast-enhanced ultrasound (CEUS) and time intensity curve (TIC) analyses

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Quantification of dynamic micro-vascularization differences of peripheral vascular malformations with CEUS and TIC.

Material and Methods: CEUS war performed after injection of 1-2.4 ml of sulfur hexafluoride microbubbles using a 6-9 MHz linear probe by one experienced examiner. Regions of interest (10x 30 mm) were defined in the centre, and at the margins of the malformation as well as in the healthy tissue. TIC with Time to Peak (TTP), and Area und the Curve (AUC) were calculated using special software.

Results: Evaluation of the capillary micro-vascularization in all cases was only possible by using CEUS. There were no complications after the i.v. contrast injection. Retrospective analysis of 197 patients with 135 venous (VM), 39 arterio-venous (AVM), and 23 combined peripheral vascular malformations before and after percutaneous treatment. After the treatment there was a significant decrease in AUC for VM in the centre down to 337.7 rU (p=0.043) and in the surrounding tissue to 139.9 rU (p=0.022). After the treatment TTP for AVM increased to 17.7 sec in the centre and to 23.2 sec in the surrounding tissue. After the treatment the AUC for AVM in the centre decreased to 518.9 rU at the margins 417.6 rU, and in the surrounding tissue 181.1 rU.

Conclusion: By using CEUS and TIC analysis therapy-induced changes of vascular malformations can be displayed.