PURPOSE: We compared innovative ultrasound techniques such as tissue harmonic imaging (THI) and cross-beam technique with speckle reduction imaging (SRI) to conventional fundamental B scan in the diagnosis of deep vein thrombosis.

MATERIAL AND METHODS: We investigated a total number of 185 patients with clinical symptoms of acute vein thrombosis. We documented the thrombosis in the patients using multifrequency ultrasound probes (5-7 MHz, 6-9 MHz, 9-14 MHz, Logig 9, GE) and recorded ultrasound sequences in fundamental B scan, THI, and cross-beam technique with SRI (grade 2). Three blinded ultrasound investigators ranked the marking of the thrombosis in each of these image modalities and graded them with the numbers 5 = weak, 4 = moderate, 3 = satisfactory, 2 = good, and 1 = excellent. We calculated the median and a t-test for each of these image modalities.

RESULTS: We diagnosed 115 thromboses (62%) in 185 investigated patients. This group could be divided as follows: 11 patients (6%) with three-level thrombosis, 37 patients (20%) with two-level thrombosis, and 67 (36%) with one-level thrombosis. The one-level thrombosis group included five (3%) patients with muscle vein thromboses, seven (4%) cases of thrombophlebitis without involvement of the deep vein system, and three (2%) cases of thrombophlebitis with involvement of
the deep vein system. The t-test for unconnected samples showed significant differences (p<0.05) in iliac veins and highly significant differences (p<0.001) in the veins of the lower extremity due to the superior capabilities for detection of thrombosis using the cross-beam technique with SRI compared to THI and the fundamental B scan. CONCLUSION: The use of high-resolution linear ultrasound probes with the concomitant application of THI and cross-beam technique with SRI facilitates the diagnosis of deep vein thrombosis. The employment of these new ultrasound modalities is an advantage in distinguishing the veins from the surrounding tissue structures and helps in evaluating the compressibility of venous vessels.