



Ultrasound flow velocity patterns in surveillance of type II endoleaks – the clue for the prediction of aneurysm rupture?

Endoleaks are the most common complication after endovascular aneurysm repair (EVAR) and may lead to aortic sac rupture and death. Type II endoleaks (T2EL), caused by a retrograde filling of the excluded aneurysm via the inferior mesenteric artery or lumbar arteries, are the most prevalent finding of computed tomography angiography (CTA) and duplex ultrasound (DUS). Natural history of T2EL (spontaneous resolution or expansion, rupture) is uncertain and unpredictable.

Recently, Monastiriotes et al. analysed ultrasound flow patterns in T2EL and their influence on sac enlargement [1]. The study was an observational, retrospective, monocentric analysis with prospective data collection. The follow-up involved CTA and DUS after one, six, and 12 months. Of 382 patients included, there were 56 subjects (14.7%) with T2EL identified, in the majority, within the first month after EVAR. From each duplex signal within aneurysm sac, a Doppler spectral waveform was documented and classified into one of four groups. Different resistance characteristics (low with enddiastolic velocity >0.1 m/s, high with enddiastolic velocity <0.1 m/s) and flow characteristics (peak systolic velocity >0.3 m/s for high flow, and less for low flow) were noted. Four groups were formed based on their patterns: high resistance low flow, HRLF (14/56), low resistance low flow, LRLF (7/56), low resistance high flow, LRHF (13/56), and to-fro flow pattern, TFF (22/56). The treatment was performed if the aneurysm sac dimension enlarged over 5 mm confirmed with CTA. The high flow groups (LRHF and TFF) were analysed together as a high-risk T2EL in comparison to the low flow/low risk groups (22/56). In the low-risk group, the spontaneous resolution of T2EL occurred in 86%, in comparison to 63% in the high-risk patient group (n.s.). There was no rupture observed in the low-risk group and only one patient needed intervention because of sac enlargement. Whereas in a high-risk group, three patients presented with sac rupture and eight had undergone endovascular interventions. These differences were not significant in both groups. In the high flow group, a higher incidence of persisted T2EL (6/35 vs. 2/21) and sac enlargement (7/35 vs. 1/21) was observed.

This is a large study analysing waveform patterns in T2EL, yet it is not powerful enough to reach significant results. However, the authors give important insights into the haemodynamic situations in different T2EL and the resulting spectral waveform patterns. The authors themselves reflect on the small number of subjects and emphasize the need for multicentre studies in this field.

An aneurysm sac rupture without sac enlargement deserves particular attention. In a meta-analysis by Sidloff et al., it is considered in six out of 14 ruptures (over 1,500 subjects with T2EL analysed) [2]. In a study by Monastiriotes et al., all the ruptures (3/56) appeared only in the high flow group [1]. The other interesting point is that the T2EL was not associated with an increased mortality in Monastiriotes' and the other studies [3, 4]. Therefore, the trend is to support a conservative and not an aggressive interventional procedure in T2EL.

References

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