Abdominal aortic aneurysms – Geographic differences

The prevalence of patients presenting with abdominal aortic aneurysm (AAA) is increasing based on the ageing population. Most frequently older men (>60 years) are affected. The risk of rupture increases with AAA size [1]. In general, the threshold for AAA repair to prevent rupture is 5.0 cm in women and 5.5 cm in men [2]. In 1951, open-surgical AAA repair, and in 1986, endovascular aneurysm repair (EVAR) were introduced. For its lower perioperative morbidity and mortality, EVAR is more and more replacing surgical AAA repair. However, long-term mortality (>8 years after AAA repair) favours open surgery as recently accentuated by the 15-year follow-up data from the EVAR trial-1 [3]. A recent published study reports differences in treatment strategies and clinical outcomes of endovascular/surgical AAA repair comparing cases in England and the United States [4].

Patients with elective admission for unruptured AAA repair were identified from the Hospital Episode Statistics database in England and the Nationwide Inpatient Sample in the United States. All patients were treated between 2005 and 2012. The purpose of this study was to examine differences in the frequency of aneurysm repair, the mean diameter of treated aneurysm, the rate of aneurysm rupture, and aneurysm-related death. All results were adjusted for differences in age and sex applying the direct standardisation method. In addition, patients with ruptured AAA during the same period were identified.

During that period, a total of 29, 300 patients were treated in England and 278,921 patients in the United States (OR: 0.49, 95%-CI: 0.48–0.49, P<0.001). In both countries, the incidence of AAA repair increased from 27.1 to 31.9 procedures per 100,000 persons in England and 57.9 to 64.2 in the United States, respectively. Nevertheless, the rate of endovascular repair was lower in England (45.5% vs. 67.0%, p<0.001). In both countries, the proportion of EVAR increased to up to 67.2% in England and 75.4% in the United States in the year 2012.

The mean diameter of AAA repair was 63.7 mm in England and 58.3 mm in the United States (p<0.001). In-hospital mortality was 2.6% (EVAR: 0.9%, open surgery: 4.1%) in England and 1.8% (EVAR: 0.8%, open surgery: 4.0%) in the United States (p=0.40). Three year survival (Kaplan-Meier analysis) was 78.5% (EVAR: 76.6%, open surgery: 79.8%) and 79.5% (EVAR: 78.1%, open surgery: 79.1%) comparing England and the United States (P=0.17). The incidence of patients with ruptured AAA was 21.3 per 100,000 persons in England and 16.3 per 100,000 persons in the United States (OR: 2.23, 95%-CI: 2.19–2.27, p<0.001). In both countries, the rate of aneurysm-related death decreased from 2005 to 2012: from 53.5 to 34.4 per 100,000 persons in England and 16.2 to 9.0 in the United States, respectively (OR: 3.60, 95%-CI: 3.55–3.65, p<0.001).

The data may suggest that the United States implement better AAA screening programs. In consequence, AAA are detected and treated with smaller diameters. This also explains the higher numbers of AAA treatment and the reduced number of ruptured AAA in the United States. It also explains the lower mortality rates, which may furthermore be attributed to the higher proportion of EVARs in the United States. Interestingly, the proportion of EVAR rates were rapidly increasing over the observation period in both countries but primarily in England. Long-term mortality in this study was limited to a three year follow-up, showing no differences. However, the benefit of open surgery AAA treatment becomes obvious in the longer follow-up as recently shown by the 15-year EVAR trial-1 data [3]. Therefore, longer follow-up data (10–15 year follow-up) of the present study would be interesting since more patients were treated with open surgery in England.

In summary, the present study reveals that the rate of AAA repair was twice as high in the United States. In addition, the aneurysm diameter was 5.3 mm larger in England at the point of treatment. Furthermore, the proportion of open surgical AAA treatment was higher in England despite a trend to close this gap over time. In both countries, the aneurysm-related mortality decreased but overall it was 3.5 times higher in England.

The majority of these differences may be attributed to favourable screening programs for AAA and the higher proportion of EVARs in the United States.

References

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