

## INVITED COMMENTARY

## Commentary Regarding “Outcomes After One Stage Versus Two Stage Open Repair of Type II Thoraco-abdominal Aortic Aneurysms”

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In this issue of the *European Journal of Vascular and Endovascular Surgery*, Gombert et al.<sup>1</sup> compare open one stage with two stage repair of type II thoraco-abdominal aortic aneurysm (TAAA). The authors conclude that open two stage repair, if anatomically feasible, demonstrates a lower mortality than and similar complication rates to one stage repair. These findings do not come as a surprise and reflect a current trend in TAAA repair strategy: towards endovascular and hybrid repair and towards two stage repair in order to reduce both mortality and morbidity. However, this retrospective study compares 76 open one stage patients to only 12 patients with an open two stage procedure and six patients with a hybrid approach, so conclusions may be limited.

In a very recent systematic review of the literature including 30 articles and 9963 patients, Moulakakis et al.<sup>2</sup> demonstrated that despite the advances in open surgical techniques, the mortality of open TAAA repair continues to remain considerable, being highest in type II TAAA (10.3%). The authors have not suggested any significant difference resulting from a two staged approach in this large number of patients. In contrast, Corvera et al.<sup>3</sup> suggested that open one stage repair of extended TAAA (69 patients with type II TAAA) using deep hypothermia and circulatory arrest has low morbidity, mortality, and re-intervention rates, while posing excellent long-term survival rates.

Hybrid repair of extensive TAAA, commonly being undertaken in a two stage set up, has shown encouraging results. Shuto et al.<sup>4</sup> demonstrated their 10 year experience on hybrid repair of extensive TAAA, with good outcomes even in elderly and high risk patients. Jain et al.<sup>5</sup> also showed that staged hybrid type II TAAA repair, using a combination of proximal TEVAR with open distal repair, can be performed with low surgical morbidity and mortality, and favourable mid-term outcomes. However, Gombert et al. did not demonstrate the same benefit of a two stage approach in terms of morbidity (spinal cord ischaemia and renal function impairment), potentially because of the small number of patients. Results from open TAAA repair publications may appear surprising at first glance, but when going into detail it becomes clear that differences in patient selection, age of patients, and grouping of anatomies may account for most of the differences in outcome. A mean age of  $\leq 60$  years, as reported in most series on open TAAA repair, does not reflect the population of TAAA patients that we see in our institution and demonstrates that patients of

intermediate and high risk of open repair are already directed to endovascular therapy or refused.

Recently, fenestrated and branched stent grafts have provided a less invasive method of treating extensive TAAAs. Even patients at high risk of open repair (American Society of Anesthesiologists' grade 3 and 4) with type II TAAA can be treated by a total endovascular approach, with good outcomes in terms of mortality.<sup>6,7</sup> In endovascular repair there is also a debate on whether an endovascular two stage approach may offer better results, especially in terms of spinal cord ischaemia.<sup>7,8</sup> Future studies may demonstrate whether a one stage vs. two stage approach is better for the patient but in terms of an endovascular approach.

### CONFLICT OF INTEREST

Tilo Kölbel has intellectual property with Cook Medical.

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