INVITED COMMENTARY

Can we learn anything from the dinosaurs?

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In this edition of *European Journal of Vascular and Endovascular Surgery,* Jungi et al. report results of strictly open surgical treatment of patients with thrombosed popliteal artery aneurysm (PAA): 51 patients during 10 years, most of them with severe ischaemia, with 16% undergoing amputation at $\leq$30 days.[1] The Bern group are sceptical of endovascular surgery, and have published excellent results of ruptured abdominal aortic aneurysm (AAA) repair performed by open surgery alone.[2] They use a similar approach for the treatment of thrombosed PAA. Although pre-operative thrombolysis was performed in two cases, this was a mistake. The group preferred immediate open surgery, combined in a third of cases with intra-operative thrombolysis.

It is interesting to compare these results with results from other contemporary cohorts. The largest series is Vascunet, including 1471 PAAs from eight countries.[3] Of the patients with thrombosis and acute limb ischaemia (ALI), only 6.5% underwent amputation. Although the degree of ischaemia may differ between the cohorts, this is an unlikely explanation for the lower percentage of amputations. Open repair of PAA also dominated in Vascunet: 87.8% for ALI, compared with 75.9% if elective. Many registries did not register thrombolysis. However, among 174 patients treated for ALI in Sweden in 2008–2013, 118 (67.8%) received pre-operative thrombolysis, and 92 (78.0%) showed improved outflow. Ten percent underwent amputation, among those who received a complete PAA treatment, compared with only 5.6% in the Bern experience.

The use of stentgrafts in PAA can certainly be questioned, with open surgery having better long-term results,[3,4] in particular if outflow is poor, as is common in PAA with ALI. However, choosing not to use the opportunity to improve outflow by pre-operative thrombolysis, when time permits, seems counterintuitive.

It is difficult to extrapolate results to women as they are only $\approx$5% in most PAA cohorts,[1,3,4] but 74 women with 81 PAAs were identified in Swedvasc.[5] Women with PAA $<$2 cm developed ischaemia more often than men, and they had bilateral disease less often.

The forthcoming 2019 European Society of Vascular Surgery Guidelines on AAA[6] have a strong (I,B) recommendation: "It is recommended that centres or networks of collaborating centres treating patients with abdominal aortic aneurysms can offer both endovascular and open aortic surgery at all times." As an analogy, palaeontologists recently described that even large land living dinosaurs had feathers. Birds are indeed direct offspring of surviving dinosaurs. Only the flying dinosaurs survived the changing climate 80 million years ago, as they could both fly and walk. Similarly, perhaps the vascular surgeons who will best "survive" developments in techniques are those who embrace both open and endovascular techniques, tailoring the treatment to the patient, rather than to their personal preference?

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DOI of original article: https://doi.org/10.1016/j.ejvs.2018.09.030

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https://doi.org/10.1016/j.ejvs.2018.10.035