meets both core requirements of the Society of Vascular Surgery/International Society of Vascular Surgery, as changes in the aneurysm size were referenced to those measurements obtained from the first set of postoperative images, and the Kaplan-Meier analysis was used to analyze freedom from aortic neck dilatation (AND).

The study[2] compared 200 patients treated with self-expanding aortic stent-grafts with 42 patients treated with balloon expandable aortic endografts, in terms of AND and endograft migration. The results support several conclusions: First, that endograft migration is correlated to AND; indeed, all 52 patients who presented endograft migration were part of the 58 patients with AND; second, that the ongoing aneurismal degeneration plays a key role in the etiology of AND, as the phenomenon was noticed in both groups (self-expanding and balloon expandable endografts); and third, that the endograft design plays an important role, as the phenomenon of AND was noticed significantly more frequent in the self-expanding group (55 patients in the self-expanding group, versus three patients in the balloon expandable group, $P = .023$).

In conclusion, this study confirms findings from previous reports[3,4] that support that balloon expandable endografts protect from AND.

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Reply

We thank Dr Dalainas and colleagues for their interest in our review article on aortic neck dilatation (AND)[1] and congratulate them on their recently published paper.[2]

As elaborated in great detail in our review,[1] we are very concerned that the claimed absence of AND in patients treated with balloon-expandable grafts is not sufficiently supported scientifically, but rather based on observational data only. In two series,[3,4] the number of patients at risk was reduced to 50% during follow-up, thereby leading to a potential selection bias towards underestimation of AND, especially since one series[4] excluded acute and mid-term failures from long-term analysis. Moreover, the authors of that series were not very diligent in describing the methodology used to determine changes in neck dimensions during follow-up.[4] These are crucial shortcomings that potentially impair the validity of drawn conclusions.

Several studies indicate that AND is an expression of ongoing aneurysmal degeneration in the seemingly non-diseased infrarenal aortic segment.[1,5] Thus, why should the presence of an endovascular graft, be it balloon-expandable or self-expandable, alter the natural course of ongoing aneurysmal involvement? Lacking randomized controlled data, this observation is much more likely to be the result of confounding bias.

Factors such as large abdominal aortic aneurysm (AAA) neck diameter as well as AAA size and circumferential thrombus were recently shown to independently predict AND.[6] Unfortunately, the study by Dalainas and coworkers[2] did neither provide a detailed comparison of clinical and morphological baseline data comparing both treatment groups nor was the statistical analysis adjusted for the above-mentioned factors.[2] Therefore, we feel that this series does not substantially strengthen the case for an absence of AND in patients treated with balloon-expandable grafts, and it therefore does not alter our conclusions in this respect. However, we agree it might have been worthwhile to discuss the shortcomings of this study along with the other observational series in our review.

In summary, both endovascular and open surgical AAA repair should at present be regarded a "mechanical solution to the problem of progressive expansion of abdominal aortic aneurysm and the risk of rupture."[7] Further studies are required to gain an in-depth understanding of the pathophysiology and potential dedicated mechanisms for its inhibition.

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Regarding "Incidence and clinical significance of peripheral embolization during percutaneous interventions involving the superficial femoral artery"

In the article by Lam et al,[1] the authors investigated the incidence and clinical significance of distal embolization during endovascular procedures of the superficial femoral artery. We would like to comment on the study, as well as cite other published studies that were not discussed by the authors.[2,3] Amassed litera-

ture data report a distal embolization rate of 1.6% to 2.4% during peripheral endovascular procedures.[3] The incidence of distal embolization is even higher in case of intra-arterial thrombolysis, varying from 3.8% to almost 24%.[3]

We have recently published two articles on the topic of distal embolization during percutaneous interventions of the peripheral arteries,[2,3] which document that the phenomenon is frequent and underestimated. We harvested 50 filter baskets that were applied during various percutaneous infra-aortic revascularization procedures. Collected filters were histologically examined and the debris was digitally quantified. The presence of peripheral emboli showers was verified by the detection of multiple microemboli $<100\mu m$, which were abundant in almost all specimens.[3] This finding is in accordance with the Doppler embolic signals by Lam et al,[1] as well as with electron microscopy findings by Konig et al.[4] Interestingly, particles with a major axis larger than 1 mm and 3 mm were detected in 58.0% and 12.0% of the examined filters, respectively[3] (example shown in the figure). Undoubtedly, without filter protection, all of these particles would have escaped to the periphery embolizing the distal arterial tree. Although lower extremities are believed to tolerate distal embolization due to their many alternate roots of blood supply, patients with poor run-off vessels may suffer catastrophic outcomes in case of atherothrombotic embolization.[2,5] This was also the case in one patient in the study of Lam et al, where occlusion of a single run-off vessel ended up to major amputation despite angiographically successful thrombolysis.[1] Furthermore, multivariate regression analysis to adjust for confounding factors has incriminated the application of thrombectomy and/or thrombolysis as the only adverse factor associated with increased embolization events ($P < .05$), which is in keeping with the higher reported rates of angiographic evidence of distal emboli during such procedures.[3]

The high incidence of distal embolization during peripheral interventions is also advocated by recent data from the PROTECT study,[6] which emphasizes the frequency and recognizes the potential clinical significance of athero-embolization during treatment of peripheral arterial occlusive disease in a large patient group. Moreover, both Lam et al[1] and others[5,6] underline a positive correlation of atherectomy and peripheral embolic events, which can be reasonably avoided with the use of distal protection devices.

In conclusion, we strongly believe that distal protection devices during infrainguinal interventions may safeguard the distal vascular bed, especially in selected cases with a riskier embolic profile like thrombolysis and atherectomy. Notwithstanding their scarcity, available literature data should prompt further studies of the use of protection filters during peripheral endovascular procedures.

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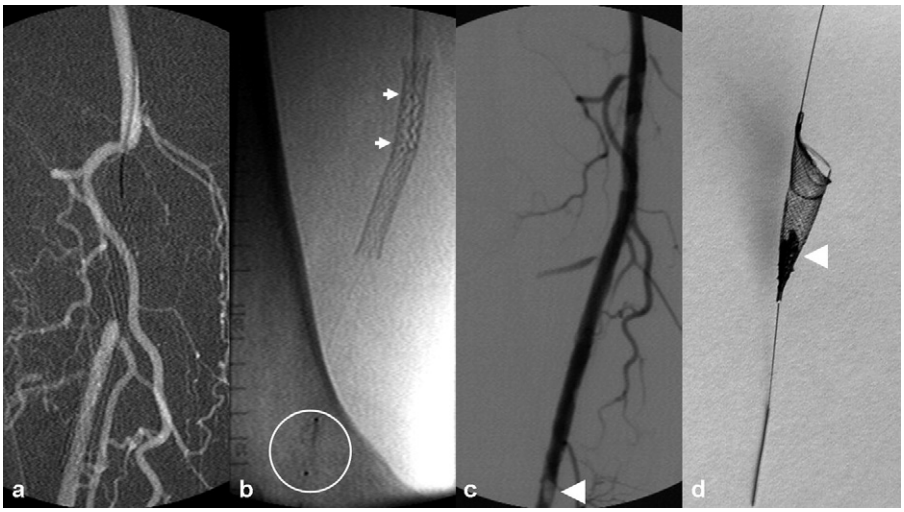

Fig. Example of distal filter protection during a peripheral percutaneous intervention. **a,** Recanalization of a subacute occlusion of a superficial femoral artery stent. **b,** Application of cryoplasty (*arrows*) under distal safeguarding with a filter protection device (Spider, EV3, Plymouth, Minn). **c,** Note the filling defect within the filter basket after successful angioplasty (*arrowhead*). **d,** Macroscopic image of the collected basket containing an embolus >3mm (*arrowhead*).