repair trial 1 (EVAR trial 1): a randomised controlled trial. *Lancet* 2016;**388**:2366–74.
3 Lederle FA, Kyriakides TC, Stroupe KT, Freischlag JA, Padberg Jr FT, Matsumura JS, et al. OVER veterans affairs cooperative study group open versus endovascular repair of abdominal aortic aneurysm. *N Engl J Med* 2019;**380**:2126–35.
4 Stroupe KT, Lederle FA, Matsumura JS, Kyriakides TC, Jonk YC, Ge L, et al. Open versus endovascular repair (OVER) veterans affairs cooperative study group. Cost-effectiveness of open versus endovascular repair of abdominal aortic aneurysm in the OVER trial. *J Vasc Surg* 2012;**56**:901–9.

Julien Al Shakarchi
University Hospital of North Midlands, Stoke on Trent, UK
Email-address: j.alshakarchi@nhs.net

Available online 19 September 2019

https://doi.org/10.1016/j.ejvs.2019.08.022
DOI of original article: https://doi.org/10.1016/j.ejvs.2019.07.005

Risk Factors for Pulmonary Embolism

We read with great interest the extremely informative and well performed paper recently published by Grobben and colleagues,[1] demonstrating that silent pulmonary embolism (PE) after endovascular aortic repair occurs in approximately one in 10 patients, despite routine thrombo-embolism prophylaxis. Although various risk factors for PE have been considered, the influence of systemic immuno-inflammatory disease, such as psoriasis, has not. However, it is well known that clinical data have convincingly demonstrated that systemic immuno-inflammatory disease patients have an increased risk of developing cardiovascular disease and an increased risk of PE.[2,3] A recent study by Chung and colleagues reported that patients with psoriasis presented a 2.02 fold adjusted hazard ratio of venous thrombo-embolism compared with the general population.[4] Therefore, systemic immuno-inflammatory disease should be investigated for studies in which the risk factors for PE are evaluated. Data should be collected in the baseline clinical characteristics. We are surprised that this potentially important factor has not been considered, despite the known increase in PE risk with a prior medical history of systemic immuno-inflammatory disease.

If systemic immuno-inflammatory disease had been investigated in the study presented by Grobben and colleagues, it would have been of utmost interest to consider this risk factor and to evaluate its potential contribution to PE. Such knowledge would not only reinforce the clinical relevance of systemic immuno-inflammatory disease effects on PE but also enable preventive recommendations.

CONFLICT OF INTEREST

None.

FUNDING

None.

REFERENCES

1 Grobben RB, Frima C, Nathoe HM, Leiner T, Kwakkel-van Erp JM, van Klei WA, et al. Pulmonary embolism after endovascular aortic repair, a retrospective cohort study. *Eur J Vasc Endovasc Surg* 2019;**57**:304–10.
2 Lutsey PL, Prizment AE, Folsom AR. Psoriasis is associated with a greater risk of incident venous thromboembolism: the Iowa Women's Health Study. *J Thromb Haemost* 2012;**10**:708–11.
3 Wang Y, Gao H, Loyd CM, Fu W, Diaconu D, Liu S, et al. Chronic skin-specific inflammation promotes vascular inflammation and thrombosis. *J Invest Dermatol* 2012;**132**:2067–75.
4 Chung WS, Lin CL. Increased risks of venous thromboembolism in patients with psoriasis. A Nationwide Cohort Study. *Thromb Haemost* 2017;**117**:1637–43.

Guan Y. Kang*
Department of Cardiology, The Fifth People's Hospital of Dongguan (also called Taiping People's Hospital of Dongguan), The Dongguan Affiliated Hospital of Medical College of Jinan University, Dongguan, Guangdong, China

Hui Q. Zhang[1]
Department of Pharmacy, The Fifth People's Hospital of Dongguan (also called Taiping People's Hospital of Dongguan), The Dongguan Affiliated Hospital of Medical College of Jinan University, Dongguan, Guangdong, China

*Corresponding author. Department of Cardiology, The Fifth People's Hospital of Dongguan (also called Taiping People's Hospital of Dongguan), The Dongguan Affiliated Hospital of Medical College of Jinan University, 111 Humen Road, Humen, Dongguan 523905, Guandong, China.
Email-address: gykang2008@126.com (Guan Y. Kang)

Available online 23 October 2019

https://doi.org/10.1016/j.ejvs.2019.09.509
DOI of original article: https://doi.org/10.1016/j.ejvs.2018.08.054

Response to Letter to the Editor: Risk Factors of Pulmonary Embolism

We thank Dr Kang and Dr Zhang for their interest in our study and their note regarding the potential relevance of systemic inflammatory disease (e.g. psoriasis) as a risk

[1] GuanYang Kang and Hui Qing Zhang equally contributed to this work.

factor for pulmonary embolism (PE) after endovascular aortic repair (EVAR).

We acknowledge the clinical relevance of psoriasis as a risk factor for venous thromboembolism (VTE) in the general population, with hazard ratios ranging from 1.35 to 2.02.[1,2] Notably, associations for PE have been reported to be lower: 0.97 (0.89–1.06) for mild psoriasis and 1.34 (1.01–1.80) for severe psoriasis.[2] Although such an association has not been convincingly shown in the surgical population, it could be postulated that the systemic inflammation after EVAR may be more pronounced in patients with psoriasis (i.e. because systemic inflammation is inherently attenuated in these patients) resulting in a higher risk of PE.

We chose not to evaluate risk factors other than those included in the Wells score because the study was neither designed nor powered to assess such an association. Still, based on a psoriasis prevalence of 2% (of which $<$ 10% severe) and a relative risk of $\leq$2 for PE in the general population, it is unlikely that psoriasis will have influenced the results significantly.[2,3] We believe that prolonged immobilisation and intensive care admission should be regarded as the most important risk factors for VTE in the surgical population, and consequently deserves consideration for adequate prophylaxis.[3]

Additional studies that include systemic inflammation should be performed to assess the most relevant risk factors for VTE within this population, and the requirement for prophylaxis.

REFERENCES

1 Chung WS, Lin CL. Increased risks of venous thromboembolism in patients with psoriasis: a nationwide cohort study. *Thromb Haemost* 2017 Jul 26;**117**:1637–43. https://doi.org/10.1160/TH17-01-0039.

2 Ogdie A, Kay McGill N, Shin DB, Takeshita J, Jon Love T, Noe MH, et al. Risk of venous thromboembolism in patients with psoriatic arthritis, psoriasis and rheumatoid arthritis: a general population-based cohort study. *Eur Heart J* 2018 Oct 14;**39**:3608–14. https://doi.org/10.1093/eurheartj/ehx145.

3 Grobben RB, Frima C, Nathoe HM, Leiner T, Kwakkel-van Erp JM, van Klei WA, et al. Pulmonary embolism after endovascular aortic repair, a retrospective cohort study. *Eur J Vasc Endovasc Surg* 2019 Feb;**57**:304–10. https://doi.org/10.1016/j.ejvs.2018.08.054.

Remco B. Grobben*
Cardiology, University Medical Center Utrecht, the Netherlands

Cynthia Frima
University Medical Center Utrecht, the Netherlands

Hendrik M. Nathoe
Cardiology, University Medical Center Utrecht, the Netherlands

Joost A. Van Herwaarden
Vascular surgery, University Medical Center Utrecht, the Netherlands

*Corresponding author.
Email-address: r.b.grobben@umcutrecht.nl (Remco B. Grobben)

Available online 17 October 2019

https://doi.org/10.1016/j.ejvs.2019.09.001
DOI of original article: https://doi.org/10.1016/j.ejvs.2019.09.509

Cardiac Effects of Aortic Endografts

We have read with great interest both the paper by Rong *et al.*,[1] and the accompanying Editorial by Lejay *et al.*,[2] regarding the effects of aortic graft implantation on the heart and downstream vessels. The authors of the paper and editorial, and the journal editors, deserve congratulations for bringing a fundamental issue of great clinical importance to the readership.

We have been working on the subject for several years and have published the results of clinical studies and presented on the subject at multiple international meetings.[3]

We fully agree with the authors' conclusions about altered left ventricular function and impaired ventricular arterial coupling due to insertion of the rigid graft, although we believe that increased inflammation also plays a major role.

In previous studies we found variations in the inflammatory response related to graft type,[4] and also that haemodynamics and biological markers like N terminal pro-brain natriuretic peptide can be affected.[5]

We wonder whether the authors of this paper have seen similar variations in their study population.

REFERENCES

1 Rong L, Palumbo M, Meineri M, Arguelles GR, Kim J, Lau C, et al. Immediate impact of prosthetic graft replacement of the ascending aorta on circumferential strain in the descending aorta. *Eur J Vasc Endovasc Surg* 2019;**58**:521–8.

2 Lejay A, Geny B, Kolh P, Chakfe N. Effects of aortic graft implantation on heart and downstream vessels: an artery is not a rigid pipe. *Eur J Vasc Endovasc Surg* 2019;**58**:477–8.

3 Kadoglou NP, Moulakakis KG, Papadakis I, Ikonomidis I, Alepaki M, Lekakis J, et al. Changes in aortic pulse wave velocity of patients undergoing endovascular repair of abdominal aortic aneurysms. *J Endovasc Ther* 2012;**19**:661–6.

4 Kadoglou NP, Moulakakis KG, Papadakis I, Ikonomidis I, Alepaki M, Spathis A, et al. Differential effects of stent-graft fabrics on arterial stiffness in patients undergoing endovascular aneurysm repair. *J Endovasc Ther* 2014;**21**:850–8.

5 Moulakakis KG, Kadoglou NP, Antonopoulos CN, Mylonas SN, Kakisis J, Papadakis I, et al. Changes in arterial stiffness and N-terminal pro-brain natriuretic peptide Levels after endovascular repair of descending thoracic aorta. *Ann Vasc Surg* 2017;**38**:220–6.

Christos D. Liapis*
Department of Vascular & Endovascular Surgery, Athens Medical Center, Athens, Greece