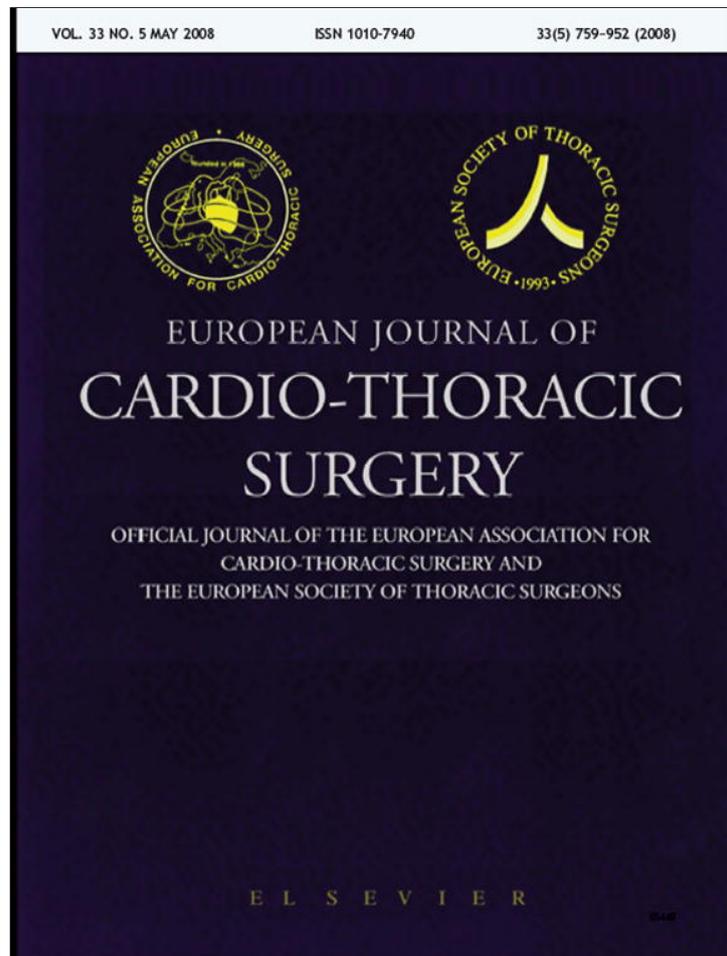


Provided for non-commercial research and education use.  
Not for reproduction, distribution or commercial use.



This article appeared in a journal published by Elsevier. The attached copy is furnished to the author for internal non-commercial research and education use, including for instruction at the authors institution and sharing with colleagues.

Other uses, including reproduction and distribution, or selling or licensing copies, or posting to personal, institutional or third party websites are prohibited.

In most cases authors are permitted to post their version of the article (e.g. in Word or Tex form) to their personal website or institutional repository. Authors requiring further information regarding Elsevier's archiving and manuscript policies are encouraged to visit:

<http://www.elsevier.com/copyright>

## Reply to the Letter to the Editor

## Reply to Jung

Seyedhossein Aharnejad\*

Department of Cardio-Thoracic Surgery, Vienna Medical University,  
Währingerguertel 18-20, A-1090 Vienna, AustriaReceived 13 February 2008; accepted 14 February 2008; Available online  
17 March 2008

Keywords: Matrix metalloproteinases; Serum; ELISA; Blood sampling procedure

We thank the Editor for giving us the opportunity to reply to Dr Jung's letter to the Editor [1].

We are aware of the important impact of blood sampling procedure in measuring circulating MMP and TIMP concentrations in peripheral blood. For this reason, we used a standardized protocol for serum sampling, defining the clotting time at 30 min following blood collection by venous puncture followed by centrifugation for 15 min at  $1000 \times g$ , storing serum samples at  $-80^\circ\text{C}$  prior to analysis. The implementation of these procedures in the study avoids increased MMP levels due to longer clotting times or varying sample preparation procedures. We agree that there might be some methodological concerns associated with the use of serum MMP levels from patients for analysis of correlation with clinical disease associated parameters. However, the primary aim of this study was to investigate whether measurement of serum protein markers is related to clinical conditions following cardiac transplantation and was not to evaluate the best methodological approach to be used in the laboratory. In this context, there are numerous recently published articles describing the use of serum MMP levels in patients and their potential correlation with clinical parameters [2–4]. To our understanding, the most important issue in this context is that the same method is used throughout the study to enable the correlation of serum protein markers with clinical parameters. Even in the case where using serum MMP measurements results in high background levels in serum due to the release of these factors during blood sample preparation, it does not matter whether the absolute marker levels are low or high. The key issue is whether the marker level in a patient can be clearly associated with a clinical parameter or disease. Of course, comparison of the results from different studies has to take into account the different methods used. In conclusion, we think that our study provides important findings on the relationship between MMP and TIMP serum levels in cardiac transplantation and, as we already stated in the article, further investigations are necessary for the implementation of our results in clinical practice.

## References

- [1] Jung K. Matrix metalloproteinases do not properly work as peripheral blood biomarkers without taking into account the preanalytical impact of blood sampling. *Eur J Cardiothorac Surg* 2008;33:944.  
[2] Suzuki H, Kusuyama T, Sato R, Yokota Y, Tsunoda F, Sato T, Shoji M, Iso Y, Koba S, Katagiri T. Elevation of matrix metalloproteinases and interleukin-

6 in the culprit coronary artery of myocardial infarction. *Eur J Clin Invest* 2008;38:166–73.

- [3] Nikkola J, Vihinen P, Vuoristo MS, Kellokumpu-Lehtinen P, Kähäri VM, Pyrhönen S. High serum levels of matrix metalloproteinase-9 and matrix metalloproteinase-1 are associated with rapid progression in patients with metastatic melanoma. *Clin Cancer Res* 2005;11:5158–66.  
[4] Wu ZS, Wu Q, Yang JH, Wang HQ, Ding XD, Yang F, Xu XC. Prognostic significance of MMP-9 and TIMP-1 serum and tissue expression in breast cancer. *Int J Cancer* 2008;122:2050–6.

\* Corresponding author. Tel.: +43 1 40400 5620/5630; fax: +43 1 40400 564.  
E-mail address: seyedhossein.aharnejad@meduniwien.ac.at.

doi:10.1016/j.ejcts.2008.02.018

## Letter to the Editor

## Endovascular repair of type B aortic dissection: is it possible to prevent post-procedure complications?

Pasquale Mastroroberto<sup>a,\*</sup>, Antonio di Virgilio<sup>a</sup>,  
Attilio Renzulli<sup>a</sup>, Ciro Indolfi<sup>b</sup>

<sup>a</sup>Cardiovascular Surgery Unit,  
Department of Experimental and Clinical Medicine,  
University Magna Graecia, Viale Europa-88100, Catanzaro, Italy  
<sup>b</sup>Cardiology Unit, Department of Experimental and  
Clinical Medicine, University Magna Graecia, Catanzaro, Italy

Received 4 January 2008; accepted 24 January 2008; Available online  
4 March 2008

Keywords: Thoracic aorta; Dissection; Endovascular surgery

We read with great interest the article on secondary complications following endovascular repair of type B aortic dissection [1], which helps all surgical teams involved in this procedure. Nevertheless, on the basis of the following reported personal experience, we believe that some observations may be pointed out.

From January 2002 to July 2007, 11 patients underwent a thoracic endovascular stent-graft procedure for progressive type B aortic dissection at our institution. We circumscribed indication for treatment only on the evidence or high suspicion of impending aortic rupture and visceral and/or peripheral ischemia. Patients with severe hypertension and persistent pain were treated with aggressive medical therapy because of the conviction that primary conservative treatment determines a low incidence of aneurysm formation and rupture during the chronic phase [2]. CT-scan and angiography of the entire aorta were performed to determine the site of aortic tear and the relationship between dissection and aortic branches. Nine patients presented also signs of aortic ulceration and two left pleural effusion considered as suspicion of aortic rupture without hemodynamic instability. In all patients we used the Talent<sup>TM</sup> endoluminal stent-graft system (Medtronic Vascular Inc., Sunrise, FL, USA) and the left subclavian artery was crossed with the uncovered portion of the stent-graft in six cases and the covered segment in the other five

patients without prior carotid-to-carotid or subclavian-to-carotid bypass intervention. In all cases balloon dilatation was not performed and no patients showed persistent blood flow in the false lumen at the end of the procedure. One patient presented paraplegia at 30 days follow-up and in two cases a thoracentesis was performed because of post-procedural left pleural severe effusion. At the follow-up no cases of endoleak and/or retrograde type A dissection were revealed.

We agree with Neuhauser et al. [1] that extension of dissection is one of well-known events in type B dissection [3]. Nevertheless it is clear that the initial act of retrograde dissection is the 'graft-stent procedure' itself and is probably related to a repeated balloon dilatation in an extremely fragile aorta.

We do not consider 'endovascular stent-graft repair of the thoracic aorta an alternative to surgical repair' [1] but the treatment of choice with more indications in the near future in all cases when descending thoracic aorta is involved. We believe that the high incidence of retrograde type A dissection with high risk of mortality related to a second procedure may be prevented by (a) using a stent-graft with an appropriate size not requiring balloon dilatation, (b) trying the 'chronicity' of the dissection by an aggressive medical therapy in order to perform the stent-graft implantation on a 'stabilized aorta' and (c) paying attention that the guide wire is not misplaced in the false lumen [4].

These considerations obviously are not a dogma or a paradigm for a successful treatment but the confirmation of the speculative analysis already presented [1] and supported by our encouraging results.

Again we congratulate the authors for their fine observation and their contribution to improving our knowledge in this field.

## References

- [1] Neuhauser B, Greiner A, Jaschke W, Chemelli A, Fraedrich G. Serious complications following endovascular thoracic aortic stent-graft repair for type B dissection. *Eur J Cardiothorac Surg* 2008;33:58–63.
- [2] Winnerkvist A, Lockowandt U, Rasmussen E, Radegran K. A prospective study of medically treated acute type B aortic dissection. *Eur J Vasc Endovasc Surg* 2006;32(4):349–55.
- [3] Fanelli F, Salvatori FM, Marcelli G, Bezzi M, Totaro M, Vagnarelli S, Dake MD, Rossi P, Passariello R. Type A aortic dissection developing during endovascular repair of an acute type B dissection. *J Endovasc Ther* 2003;10:254–9.
- [4] Fayad A. A misplaced guide wire in the false lumen during endovascular repair of a type B aortic dissection. *Can J Anaesth* 2007;54(11):947–8.

\* Corresponding author. Tel.: +39 09613647421; fax: +39 09613647142.  
E-mail address: [mastroroberto@unicz.it](mailto:mastroroberto@unicz.it) (P. Mastroroberto).

## Reply to the Letter to the Editor

### Reply to Mastroroberto et al. Serious complications following endovascular thoracic aortic stent-graft repair for type B dissection

Beate Neuhauser\*  
Department of Vascular Surgery,  
University Hospital Innsbruck, Austria

Received 22 January 2008; accepted 24 January 2008; Available online  
4 March 2008

**Keywords:** Endovascular thoracic aortic repair; Severe complication; Type B dissection

We would like to thank Mastroroberto et al. for their comments [1] on our paper regarding our observations in our report called serious complications following endovascular thoracic aortic stent-graft repair for type B dissection [2].

Indication for endovascular repair at our department is a complicated course of type B dissection including thoracic aortic rupture, suspicion of impending rupture, visceral and/or peripheral ischemia, uncontrollable hypertension, and severe therapy-resistant pain as mentioned in our paper within the method part. Medical therapy using vasodilators and beta-blockers is preferred in patients with an uncomplicated course. Conversely to Winnerkvist et al. [3], Marui et al. [4] reported that 43% of patients initially medically treated for acute type B dissection progressed to have aortic enlargement. Dilatation to 6 cm or greater occurred in nearly 30% within a mean follow-up time of 59 months. Therefore life-long follow-up investigations and strict antihypertensive medication are mandatory even after successful initial stent graft therapy.

We agree with your statement that the initial act of retrograde dissection might be the 'stent-graft-procedure' itself. Wire and sheath handling during the endovascular procedure might cause localized intimal minimal tears in the extremely fragile and easily injured intimal flap and aortic wall. Balloon dilatation needs to be avoided whenever possible to avoid iatrogenic intimal injuries. Extremely careful handling of the endovascular devices by a widely experienced interventionalist is mandatory to contribute to a successful endovascular procedure in patients suffering from acute type B dissection. The device itself may have also contributed to the new onset dissection. It is well known that the Gore Excluder prosthesis has a better longitudinal flexibility that adapts better to the aortic curve of the distal arch than the Talent device, which has a semi-rigid design. However, both types of stent-grafts might require balloon dilatation to accommodate the curved geometry of the aortic arch and to form a tight seal. Intimal injuries directed by local forces against the intima may have occurred. In addition, routinely performed stent-graft oversizing may have contributed to the intimal injuries despite exact measurements and the use of stent-graft oversizes recommended by the manufactures were used. Our inserted stent-grafts are usually 10% larger than the diameter of the non-effected segment of the aorta proximal to the entry tear to achieve secure proximal sealing.

Acute surgical treatment in type B dissection is reserved for patients with a complicated course such as dissection