CASE REPORT – OPEN ACCESS

International Journal of Surgery Case Reports 78 (2021) 326–330

Contents lists available at ScienceDirect

International Journal of Surgery Case Reports

journal homepage: www.casereports.com

Case report: Keeping a cool head - A delayed open repair of a ruptured TAAA

Panagiotis Doukas*, Alexander Gombert, Drosos Kotelis, Michael Jacobs

Department of Vascular Surgery, University Hospital RWTH Aachen, 52074, Aachen, Germany

ARTICLE INFO

Article history:
Received 28 November 2020
Received in revised form
21 December 2020
Accepted 21 December 2020
Available online 25 December 2020

Keywords:
Thoracoabdominal aortic aneurysm repair
Open aortic surgery
Emergency admissions
Weekend days
Night shift
Case report

ABSTRACT

INTRODUCTION: The limited resources available for complex surgical procedures during the nightshift can influence the postoperative outcome and are associated with increased complication rates and 30-day mortality. On the other hand, cases of the nightshift are often urgent and demand prompt reaction.
PRESENTATION OF CASE: Hereby we report a patient with a ruptured thoracoabdominal aortic aneurysm, who was admitted during nightshift and was operated 12 h later to gain optimal conditions for such a complex surgical treatment and bypass the nightshift-effect.
DISCUSSION: A review of the literature shows a significant short-term mortality increase on elective procedures performed during the weekend or during the nightshift, however it remains undecisive on the impact of the weekend-effect on emergent procedures.
CONCLUSION: The fortunate recovering of the patient during his hospital stay as well as in the following months emphasizes the importance of critical risk assessment during emergency management, which may justify a delayed surgical treatment.

1. Introduction

An occult ruptured thoracoabdominal aneurysm of the aorta (TAAA) is associated with dismal survival rates and devastating complications [1]. The short and long-term consequences of this pathology are well documented, and patients are treated immediately after their emergent admission. Endovascular and open anatomic reconstructions of the diseased aortic segments are both offered as alternative therapeutic options, with the trend inclining towards the endovascular treatment [2,3], although open surgical procedures in experienced centres show comparable results. Evidence regarding a preferable treatment modality under elective and emergent conditions are scarce [4,5]. Surgical repair during the nightshift is related to poor outcome compared to daily routine procedures [6]. In this article we report the case of a patient who was urgently admitted with a ruptured TAAA involving the aortic arch on the grounds of a type B dissection and Full list of author information is available at the end of the article previously underwent open reconstruction of the aortic valve and ascending aorta. Because of the nature of the aortic dissection, the endovascular approach was not an option and open reconstruction was the treatment of choice. Under controlled vital parameters and monitoring in the intensive care unit, he was stabilized during the night of admission and the operation took place 12 h later in the daily hospital routine with the optimal and experienced team. Informed consent was obtained from the patient for the publication of this case report. This work is reported in line with the SCARE 2020 criteria [7].

2. Case

The TAAA of the 56-year-old male patient developed over time after a type B aortic dissection, beginning with its entry 2 cm below the left subclavian artery and ending in both common iliac arteries. Except for his antihypertensive medication he did not take any drugs and there was no evidence of family or genetic predisposition. The dissection was primarily treated conservatively, until it reached a diameter of 6 cm and its surgical elimination became necessary. The diseased aorta below the kidneys was reconstructed with a Y-prosthesis previously the same year (2019). During the preoperative workup, an aortic valve insufficiency (grade 2–3) along with a 41 mm dilatation of the aortic bulb was diagnosed and treated by means of a Bentall procedure with a biological valve and a partial reconstruction of the aortic arch using a 28 mm prothesis and re-implantation of the brachiocephalic trunk. The patient was included in a rehabilitation program, before the second step of his aortic treatment [8].

Three weeks later and while still in the rehabilitation centre, he complained about acute back- and flank-pains. A CT-scan was conducted at a regional hospital and a similar situation regarding his aortic pathology was assessed (Fig. 1 left row). Pain remained constant and around early afternoon became more intense. Our clinic

* Corresponding author at: Department of Vascular Surgery, University Hospital RWTH Aachen, Pauwelsstrasse 30, 52074, Aachen, Germany.
E-mail address: pdoukas@ukaachen.de (P. Doukas).

https://doi.org/10.1016/j.ijscr.2020.12.070

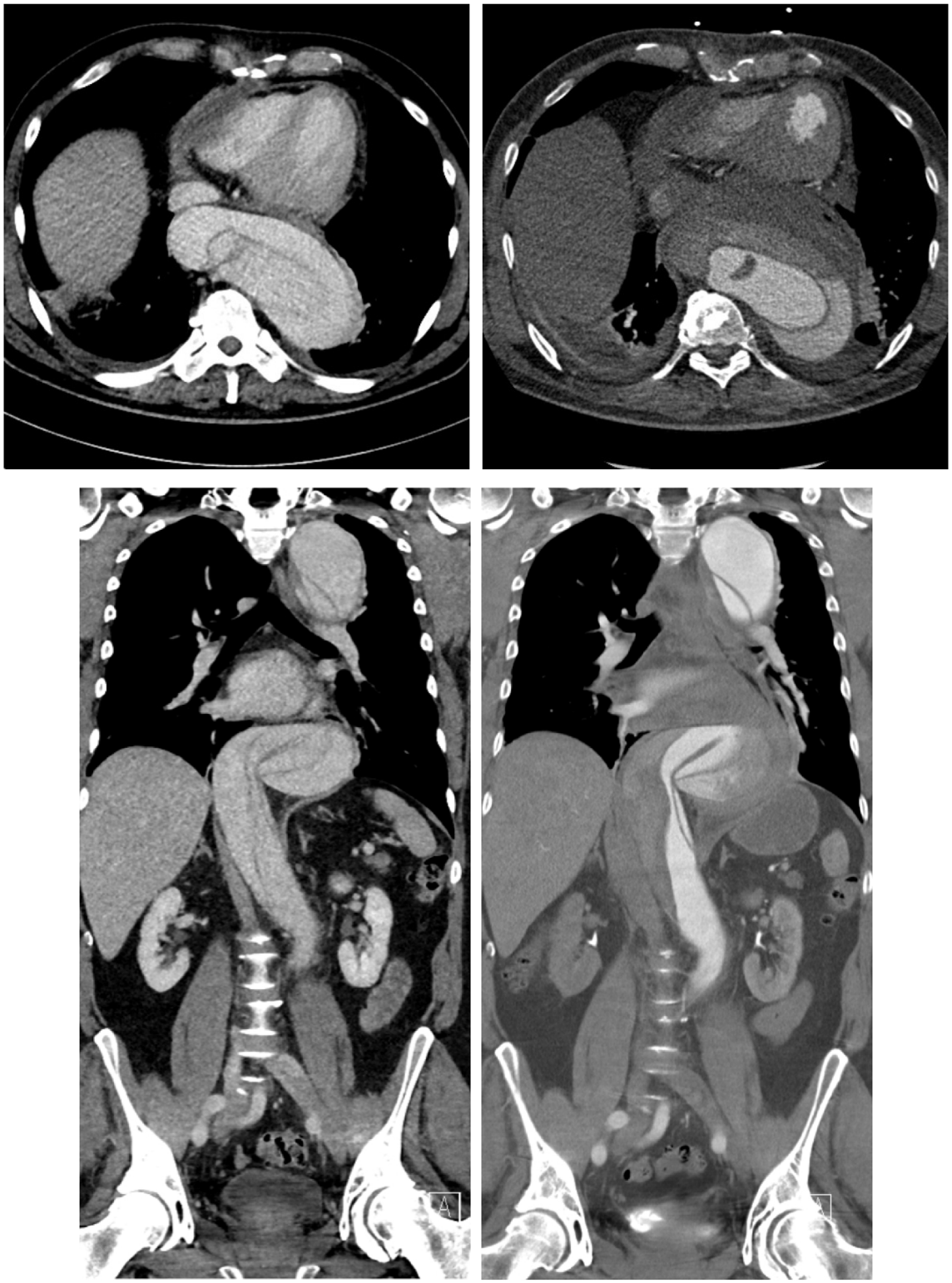

Fig. 1. Left row: early CT-angiography, arterial phase. Pictures taken directly after the patient presented symptoms in the morning.
Right row: CT-angiography, arterial phase. Pictures taken directly after the emergent admission.

was contacted by the rehabilitation centre and the patient was urgently referred with a helicopter to our emergency department. At the time of arrival, he was hemodynamically stable, without dyspnoea, no signs of enteral ischemia, adequate urine flow and his pains were reduced to the flanks. The emergency CT-scan revealed a contained rupture of the TAAA (Fig. 1 right row). The time of the diagnosis confirmation was 21:30. All the essential, preparatory steps for an urgent, open, complete reconstruction of the aorta were taken, which, if necessary, would take place during the night shift. However, it was decided that the survival chances of the patient in sense of mortality and postoperative complications, were better if he would be operated on the first operation slot of the next day,

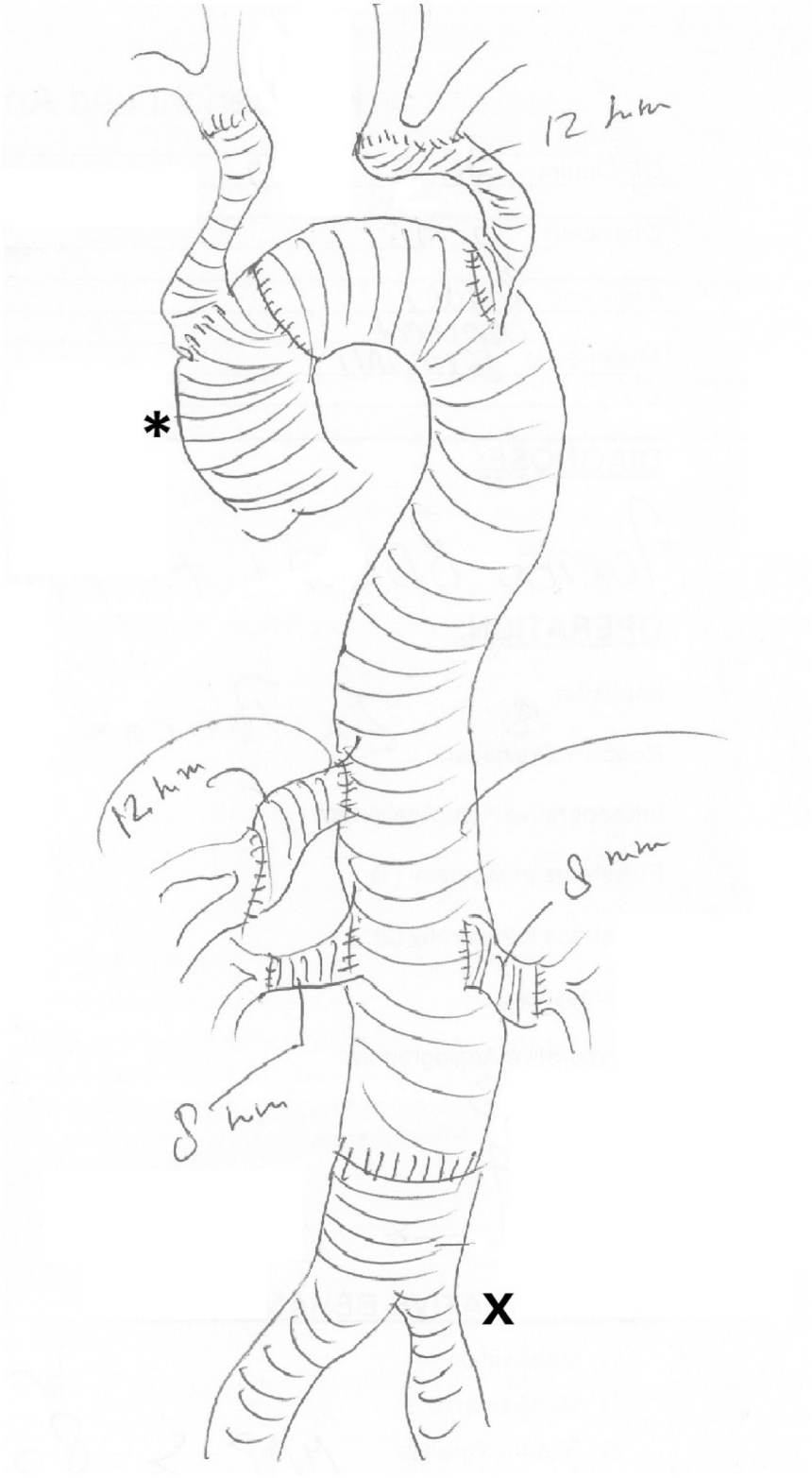

Fig. 2. Sketch of the aortic repair. (*) indicates the previously performed repair of the ascending aorta with bypass to the branchiocephalic trunc. (x) indicates the previously placed Y-Prosthesis.

almost 12 h after admission, with a full interdisciplinary team of experienced surgeons, surgical assistants, perfusionists and anaesthesiologists. The patient remained under constant monitoring of his vital parameters and his systolic blood pressure was strictly kept under 120 mmHg. The next morning, he went to the OR in stable condition. A spinal drain was placed for spinal cord protection and the operation was carried out under spinal cord monitoring and extracorporeal circulation (heart-lung machine). After the thoraco-

laparotomy and the dissection of the thoracic aorta, the ascendant aortic graft provided the proximal clamping spot. A 28 mm prosthesis was anastomosed by an end-to-end anastomosis. The antegrade perfusion of the left carotid and subclavian arteries was achieved firstly through selective cannulation and afterwards via a 12 mm prosthesis connected to the new graft. The distal perfusion was provided retrograde with the cannulation of the left femoral artery. Moving further down, the huge hematoma around the rupture was carefully removed and the intercostal arteries were ligated. No signs of spinal cord ischemia were registered at our motor evoked potential monitoring [9]. For the abdominal repair the clamp was placed on the Y-prosthesis. The coeliac trunk and the mesenteric superior artery were revascularized by a 12 mm bypass and both kidneys received an 8 mm bypass. This completed the reconstruction and the patient was warmed back to a body temperature of 36 degrees. (Fig. 2). Later the same day, a revision was necessary because of a major bleeding from the spleen and a splenectomy was necessary. The elevated bowel tension was relieved through a laparostomy.

At the intensive care unit, the patient was weaned from catecholamines and on the second postoperative day the tracheal tube was removed. No neurological deficits were observed, and the patient was early mobilized. The postoperative phase was uneventful. The secondary healing of the laparostomy wound showed at the time of discharge already adequate granulation.

In the community follow-up after 4, the patient had completed his rehabilitation program and the secondary healing of the laparostomy wound was progressing well. No further complications occurred, and the patient resumed gradually his everyday life without feeling challenged through his wound.

3. Discussion

Elective vascular surgery during the weekends is associated with higher short-term mortality in comparison to procedures performed on weekdays [6]. This observation, also known as the weekend-effect, has been the subject of studies trying to evaluate the perioperative management of patients during these days. The available resources in terms of medical personnel and organization of the hospital during the weekend is comparable to night-time operating, so the weekend-effect is comparable to the night-shift effect. In fact, Alhsson et al. investigated the impact of week-end and night-time operations on the 30-day mortality after Type A aortic dissection and, although no weekend-effect was observed, they registered a significant risk correlation to procedures performed during night-time [10]. Behrendt et al. found weekend repairs of ruptured aortic aneurysms showing worse in-hospital survival than weekday repairs and underlined specifically the worse outcome of rupture thoracic or thoracoabdominal aneurysms in comparison to ruptured abdominal aneurysms [11]. The weekend-effect on ruptured or symptomatic aortic aneurysms was not confirmed by O'Donnell et al., but they showed a significant higher mortality of transferred symptomatic aortic aneurysms on the weekend [12].

4. Conclusion

In the case of the transfer of a ruptured TAA, the surgeon is faced with the dilemma of the emergent operation versus the increased mortality rates associated with night-time procedures. As the case reported above demonstrates, critical patient evaluation and optimization of the preoperative management can justify a longer time-window of an emergent operation. Therefore, decision-making on this formidable challenge should be managed primarily by high-volume, experienced centres.

Declaration of Competing Interest

The authors have no competing interests.

Funding

No sponsors were involved in this work.

Ethical approval

The study is exempt from ethical approval.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Author contribution

Doukas: Conception and Design, Analysis and Interpretation, Data Collection, Writing the Manuscript, Critical Revision, Approval of the Manuscript, Agreement to be Accountable

Gombert: Conception and Design, Analysis and Interpretation, Writing the Manuscript, Critical Revision, Approval of the Manuscript, Agreement to be Accountable

Kotelis: Conception and Design, Critical Revision, Approval of the Manuscript, Agreement to be Accountable

Jacobs: Conception and Design, Critical Revision, Approval of the Manuscript, Agreement to be Accountable

Registration of research studies

Not applicable.

Guarantor

Panagiotis Doukas.

Educational message

Critical risk assessment of urgent and emergent cases during the nightshift in experienced centers can justify a delayed treatment to obtain optimal technical conditions and by-pass the weekend effect.

Provenance and peer review

Not commissioned, externally peer-reviewed.

References

[1] E.S. Crawford, R.W. DeNatale, Thoracoabdominal aortic aneurysm: observations regarding the natural course of the disease, J. Vasc. Surg. 3 (4) (1986) 578–582.

[2] H. Eggebrecht, C.A. Nienaber, M. Neuhäuser, D. Baumgart, S. Kische, A. Schmermund, U. Herold, T.C. Rehders, H.G. Jakob, R. Erbel, Endovascular stent–graft placement in aortic dissection: a meta-analysis, Eur. Heart J. 27 (4) (2005) 489–498.

[3] M. Czerny, J. Schmidli, S. Adler, J.C. van den Berg, L. Bertoglio, T. Carrel, R. Chiesa, R.E. Clough, B. Eberle, C. Etz, et al., Current options and recommendations for the treatment of thoracic aortic pathologies involving the aortic arch: an expert consensus document of the European Association for Cardio-Thoracic Surgery (EACTS) and the European Society for Vascular Surgery (ESVS), Eur. J. Cardio-thoracic Surg. 55 (1) (2018) 133–162.

[4] K.G. Moulakakis, G. Karaolanis, C.N. Antonopoulos, J. Kakisis, C. Klonaris, O. Preventza, J.S. Coselli, G. Geroulakos, Open repair of thoracoabdominal aortic aneurysms in experienced centers, J. Vasc. Surg. 68 (2) (2018) 634–645.

[5] S.A. LeMaire, M.D. Price, S.Y. Green, S. Zarda, J.S. Coselli, Results of open thoracoabdominal aortic aneurysm repair, Ann. Cardiothorac. Surg. 1 (3) (2012) 286.
[6] G. Galyfos, F. Sigala, G. Bazigos, K. Filis, Weekend effect among patients undergoing elective vascular surgery, J. Vasc. Surg. (2019).
[7] R.A. Agha, T. Franchi, C. Sohrabi, G. Mathew, A. Kerwan, SCARE Group, The SCARE 2020 guideline: updating consensus surgical CAse REport (SCARE) guidelines, Int. J. Surg. (2020), http://dx.doi.org/10.1016/j.ijsu.2020.10.034, Nov 9:S1743-9191(20)30771-30778.
[8] A. Gombert, L. Kirner, S. Ketting, M.V. Rückbeil, B. Mees, M.E. Barbati, P.R. Keschenau, J. Kalder, G.W. Schurink, D. Kotelis, et al., Editor's choice–outcomes after one stage versus two stage open repair of type ii thoraco-abdominal aortic aneurysms, Eur. J. Vasc. Endovasc. Surg. 57 (3) (2019) 340–348.
[9] M.J. Jacobs, S.A. Meylaerts, P. de Haan, A. Bas, C.J. Kalkman, Strategies to prevent neurologic deficit based on motor-evoked potentials in type i and ii thoracoabdominal aortic aneurysm repair, J. Vasc. Surg. 29 (1) (1999) 48–59.
[10] A. Ahlsson, A. Wickbom, A. Geirsson, A. Franco-Cereceda, K. Ahmad, J. Gunn, E.C. Hansson, V. Hjortdal, K. Jarvela, A. Jeppsson, et al., Is there a weekend effect in surgery for type a dissection? –results from the norcaad database, Ann. Thorac. Surg. (2019).
[11] T.F. O'Donnell, C. Li, N.J. Swerdlow, P. Liang, A.B. Pothof, V.I. Patel, K.A. Giles, M.B. Malas, M.L. Schermerhorn, The weekend effect in aaa repair, Ann. Surg. 269 (6) (2019) 1170–1175.
[12] C.-A. Behrendt, A. Sedrakyan, T. Schwaneberg, T. Kölbel, K. Spanos, E.S. Debus, H.C. Rieß, Impact of weekend treatment on short-term and long-term survival after urgent repair of ruptured aortic aneurysms in germany, J. Vasc. Surg. 69 (3) (2019) 792–799.