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

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 undecided 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.

© 2020 The Authors. Published by Elsevier Ltd on behalf of IJS Publishing Group Ltd. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

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 prosthesis 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
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,
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 laparotomy.

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 laparotomy 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 laparotomy 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.
[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) 48–50.

[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. Kölbl, 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.