Short-term and Midterm Treatment Results in Stanford Type-B Acute Dissection Patients

Deniz Demir*, Nail Kahraman

DOI: 10.17944/mkutfd.499838

Deniz Demir*: MD. Spec., Bursa Yüksek İhtisas Training and Research Hospital, Department of Cardiovascular Surgery, Bursa
Email: denizzdr@msn.com
ORCID iD: https://orcid.org/0000-0003-2169-7647

Nail Kahraman: MD. Spec., Bursa Yüksek İhtisas Training and Research Hospital, Department of Cardiovascular Surgery, Bursa
Email: nailkahraman1979@yahoo.com
ORCID iD: https://orcid.org/0000-0001-9343-0947

Bildirimler/Acknowledgement

Yazarlar bu makale ile ilgili herhangi bir çıkar çatışması bildirmemişlerdir.
The authors declare that they have no conflict of interests regarding content of this article.
Yazarlar bu makale ile ilgili herhangi bir finansal destek bildirmemişlerdir.
The Authors report no financial support regarding content of this article.

Geliş/Received: 21.12.2018
Kabul/Accepted: 05.03.2019

e-ISSN: 2149-3103
Web: http://dergipark.gov.tr/mkutfd

Öz

Stanford Tip B Akut Aortik Diseksiyon Hastalarında Kısa-Orta Dönem Tedavi Sonuçlarımız

Amaç: Stanford Tip B akut aortik diseksiyonu (Tip B-AAD) kardiyovasküler hastalıklar içinde yüksek ölüm oranına sahiptir ve tedavisinin karmaşıklığı da önemli bir sorundur. Hastalığın tedavisinde diseksiyonun süresi, komplike ya da unkomplike olması belirleyici rol oynamaktadır. Bu çalışmada Tip B akut aortik diseksiyon sebebi ile takip ve tedavi ettiğimiz hastaların sonuçlarını değerlendirdik.
Gereç ve Yöntem: Çalışma tek merkezli ve retrospektif olarak yapılmıştır. Hastaların tedavi stratejisi diseksiyonun akut, kronik olması ve komplike ya da unkomplike olmasına göre belirlendi. Hastalar medikal, TEVAR ya da açık cerrahiyle tedavi ve takip edildiler. Hastalara ait mortalite ve morbidite sebebleri kaydedildi.
Bulgular: Toplamda 23 hasta Tip B akut aortik diseksiyonu sebebi ile tedavi edildi. Hastaların yaş ortalaması 58.21±14.17 yıl idi. Takip edilen hastaların büyük çoğunluğu medikal tedavi 16 (%69.5) ile takip edildi. TEVAR tedavisi ile takip edilen hastalar ise ikinci sıklıktaydı. TEVAR hastaları 5 (%21.7) oranında idi. İki hasta ise açık cerrahi ile tedavi edildi. Otuz günlük sağkalım 20 hastada (%86,9) oranında gözlendi. Toplam mortalite ise 3 hastada (%13) oranında görülmüştür.
Tartışma: Tip B-AAD ile başvuran hastaların yaklaşık %25'i hastaneye malperfüzyon sendromu veya hemodinamik instabilite ile başvurmaktadırlar. Organ malperfüzyonu ve hemodinamik instabilite bu hastaların ölümlerinde en önemli sebeblerdir. Bundan dolayı hastalığın erken tanısı ve optimal tedavisi hayat kurtarıcı olmaktadır. Tip B-AAD sebebi ile tedavi edilen hastalar unkomplike tipte ise konvansiyonel medikal tedavi ön plandadır. Komplike hastalarda ise TEVAR tedavisi ya da açık cerrahi önerilmektedir. Bizim 23 hastadan oluşan hasta grubumuzdaki toplam mortalite oranımız 3 (%13) hastada oranında görülmüştür. Böbrek yetmezliği ve pleji oranları ise %4.3 oranında saptandı. TEVAR hasta grubunda mortaliteye rastlanmadı.
Sonuç: Sonuç olarak Tip B-AAD hastalarının tedavisinde unkomplike tipteki hastalar için öncelikle konvansiyonel medikal tedaviyi öneriyoruz. Komplike tipteki hastalarda TEVAR tedavisini öneriyoruz. TEVAR için gerekli ekipman temin edilemediği acil durumlarda ise açık cerrahiyi öneriyoruz.
Anahtar Kelimeler: Tip B akut aort diseksiyonu, torasik endovasküler aort onarımı, cerrahi

Abstract

Short-term and Midterm Treatment Results in Stanford Type-B Acute Dissection Patients

Aim: Stanford Type B acute aortic dissection (Type B-AAD) has a higher mortality among the cardiovascular diseases and the complexity of its treatment is an important challenge. The duration of dissection, whether it is complicated or uncomplicated play a determinant role in the treatment of the disease. In this study, we evaluated the results of the patients that we followed and we treated due to the Type B acute aortic dissection.
Materials and Methods: The study was conducted in a single center and retrospectively. The treatment strategy of the patients was determined with respect to be acute or chronic and to be complicated or uncomplicated. The patients were treated via medical treatment, thoracic endovascular aortic repair (TEVAR) or open surgery and then they were followed. The mortality and the morbidity causes of the patients were recorded.
Result: Totally, 23 patients were treated due to Type B acute aortic dissection. The mean age of the patients was 58.21±14.17. The majority of the followed patients (16 patients (69.5%)) were followed with medical treatment. The patients who were followed with TEVAR treatment were in the second rank. The number of the TEVAR patients was 5 (21.7%). Two patients were treated with open surgery. 30-day survival was observed in 20 (86.9%) patients. The total mortality was seen in 3 (13%) patients.
Conclusion: The twenty five percent of the patients who refer due to Type B acute aortic dissection admit due to malperfusion syndrome or hemodynamic instability. Organ malperfusion and hemodynamic instability are the most important causes of deaths of these patients. Hence, the early diagnosis of the patient and its optimal treatment is life-saving. If the patients who are treated due to the Type B acute aortic dissection are in uncomplicated type, medical treatment is in the forefront. In complicated patients, TEVAR or open surgery are recommended. In our Type B acute aortic dissection group which consists of 23 patients, the total mortality ratio was seen in 3 (13%) patients. The ratios for renal failure and for plegia were found as 4.3%. In thoracic endovascular aortic repair, no mortality was found.
In conclusion, we primarily recommend conventional medical treatment for the patients in uncomplicated type in the treatment of the Type B acute aortic dissection patients. In the patients in complicated type we recommend TEVAR treatment. Since the necessary equipment for the TEVAR could not be ensured, we recommend open surgery for the emergency cases.
Keywords: Type B acute aortic dissection, thoracic endovascular aortic repair, surgery

1. INTRODUCTION

Stanford Type B acute aortic dissection (Type B-AAD) is described as a dissection which begins from distal of the left subclavian artery and which can extend toward the iliac arteries. Those which have symptom time for more than fourteen days are described as chronic dissection and those which have less than fourteen days are described as acute dissection. In the presence of the rupture, malperfusion syndrome, refractory pain or quick aortic expansion it is considered as complicated Type B-AAD. If these are not present, it is specified as uncomplicated Type B-AAD (1-2). Aorta dissection has the highest mortality among the cardiovascular diseases and the complexity of the treatment is also an important challenge. From the first definition of the TEVAR, the treatment of Type B dissections are increasingly performed through endovascular way. Besides, the discussions about the optimal treatment strategy for Type B aorta dissection are still continuing (3).

Nowadays, the current general opinion is about that the patients with Type B-AAD can be treated TEVAR and that they have better hospital survival compared to open surgery (OS). The treatment of uncomplicated type B acute aorta dissection is ensured via conventional medical treatment (CMT). However, the option of medical treatment may sometimes be suboptimal (1). In cases in which TEVAR or medical treatment remain insufficient classical OS is an important treatment option. In this study, we evaluated the short-term and midterm mortality and morbidity results in Type B-AAD patients which we performed CMT, OS and TEVAR.

2. MATERIALS AND METHODS

The study was conducted in a single center and retrospectively between January 2014 and December 2018. The whole of the patients consist of Type B-acute aorta dissection patients. The patient records were taken from the medical record system of the hospital or by telephone. The study protocol was approved by the Ethics Committee of Bursa Yüksek İhtisas Hospital. The study was conducted in accordance with the principles of the Declaration of Helsinki. The study group consists of totally 23 patients who have been treated by means of CMT, OS or TEVAR due to the Type B-AAD.

Stanford classification was used in the classification. Thus, the dissections being at the proximal of subclavian artery were assessed as Type A and those being at the distal were assessed as Type B. Those which had symptoms time for more than fourteen days were described as chronic dissection and those which had less than fourteen days were described as acute dissection. The situations such as the presence of organ malperfusion in the patient, the ruptured dissection or resistant pain were evaluated as complicated type B dissection. The patients who were in the contrary situation were uncomplicated Type B dissection (4-5). The diagnoses and the monitoring of the patients were performed by means of computerized tomography angiography (CTA). The treatment strategy of the patients was determined with respect to be acute or chronic and to be complicated or uncomplicated The cases in which the dissection were extending as retrograde to ascendant aorta, those who had symptom more than fourteen days and those whose records could not be reached were excluded from the study. The patients in whom CMT, OS and endovascular procedure was applied were included into the study. The demographic data and risk factors were recorded. Conventional medical treatment method was used for the uncomplicated Type B-AAD patients. Our priority target in medical treatment was the control of the hypertension. The systolic pressure was regulated as 100 to120 millimeters of mercury (mmHg) and the diastolic pressure was regulated as it will not exceed 70 mmHg. In the regulation of the blood pressure, primarily in the control of the acute period, angiotensin-converting enzyme inhibitors, angiotensin-receptor blockers, β-blockers or calcium canal blockers were preferred following the intravenous nitroglycerin infusion. The patients were invited for the control one week later, one month later, at sixth month following the treatment and then once every six months. In the controls, scanning via CTA was performed in terms of the progression of the dissection and in terms of the expansion of the aorta. In the patients with complicated Type B-AAD treatment was ensured primarily via TEVAR application (Medtronic TEVAR System USA. Cardiatis, Multilayer Flow Modulator, Isnes, Belgium.) (Figure 1).

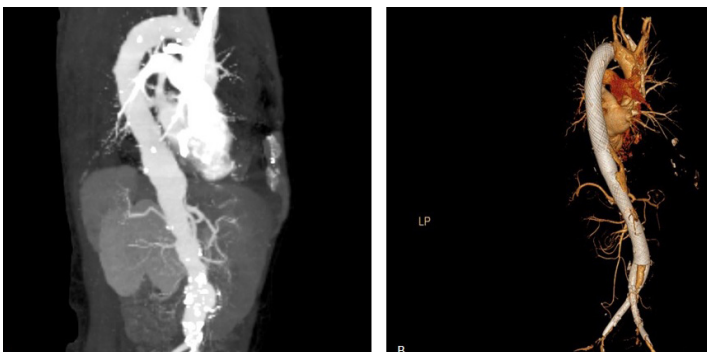

Figure 1. Image of a patient before (A) and after (B) TEVAR treatment

In these patients also, the controls in outpatient clinic was made in similar frequency to that of the uncomplicated patients. Surgical Type B-AAD patients constituted a patient group which no benefit had been obtained from the medical treatment, in which the patients were urgently oriented to the surgery and in which we could not have

the possibility of performing TEVAR. Open surgery with left thoracotomy was established under the general anesthesia for the patients in this group. In all patients, mortality and morbidity (cerebrovascular accident (CVA), paraplegia, paraparesis) were recorded as aortic complications. Complications were classified as early (<30 days) and late complications (≥30 days).

2.1. Statistics

SPSS 15.0 (SPSS, Chicago, IL, USA) was used in the evaluation of the results. All the data are presented as mean ± SD or proportions as appropriate.

3. RESULTS

Totally, 23 patients were treated due to Type B-AAD. The mean age of the patients was 58.21±14.17. Fifteen (65.3%) of the patients were males. Hypertension was detected in 20 (86.9%) patient. Diabetes mellitus was detected in 9 (39.1%) patients. Eighteen (78.2%) patients were consuming tobacco products. The demographic data and the risk factors belonging to the patients were given in Table 1.

Table 1. Preoperative demographic data.

Age mean ± SD	58.21±14.17
Gender male n (%)	15 (65.3)
Hypertension n (%)	20 (86.9)
Diabetes Mellitus n (%)	9 (39.1)
Smoke n (%)	18 (78.2)
CMT n (%)	16 (69.5)
TEVAR n (%)	5 (21.7)
OS n (%)	2 (8.6)

SD: Standard Deviation, CMT: Conventional Medical Treatment, OS: Open Surgery

The majority of the followed patients 16 (69.5%) patients were followed with CMT. The patients who were treated with TEVAR were the second most frequent 5 patients (21.7%). The number of the patients who were surgically treated was 2 (8.6%). Mortality was seen in two patients (8.6%) who were followed by medical treatment. Plegia and renal failure were developed in the follow-ups of one patient who were followed by medical treatment. This patient was died due to the multiple organ failure in the follow-ups in the intensive care unit. Other patient who was died was lost due to the dissection rupture once was hospitalized in the intensive care unit. One of two patients who were treated by surgical method was died due to the hemorrhages and cardiogenic shock in the postoperative period. No complication or mortality was detected in five patients in whom TEVAR was performed. The patients were monitored in the intensive care unit as 1.74±0.68 days in average. The mean of total length of hospital stays was 5.13±1.69 days. 30-day survival was observed in 20 (86.9%) patients. Total follow-up duration has been found as 11.65±6.38 months in average. The post-operative data belonging to the patients are given in Table 2.

Table 2. Postoperative data and complications.

Paralysis n (%)	1 (4.3)
Renal Failure n (%)	1 (4.3)
ICU day mean ± SD	1.74± 0.68
Hospital Stay mean ± SD	5.13±1.69
30 Day Survival n (%)	20 (86.9)
Death n (%)	3 (13)
Follow up time mean ± SD	11.65±6.38

ICU: Intensive Care Unit

4. DISCUSSION

According to the published literature twenty five percent of the patients who refer due to Type B-AAD admit due to malperfusion syndrome or hemodynamic instability. If these patients are not treated, they have higher death risk (6-7). It has been reported that malperfusion syndrome is developed approximately in ten percent of the patients with Type B-AAD associated with the reduced perfusion of the aortic branches (spinal, iliac or visceral). This situation usually leads to paraparesis or paraplegia, lower extremity ischemia, abdominal pain, nausea and diarrhea. In addition, the early detection of the clinical findings of organ malperfusion may be difficult. CTA or Magnetic Resonance Imaging (MRI) scanning may be beneficial for the diagnosis of malperfusion (6-7). Organ malperfusion and hemodynamic instability are the most important causes of death of these patients. Hence, the early diagnosis of the patient and its optimal treatment is life-saving. The duration of dissection, whether it is complicated or uncomplicated is very important for the treatment strategy.

Complicated dissection term expresses the presence of the factors increasing the death risk such as the lower extremity and visceral organ ischemia, aorta rupture, refractory chest pain, hypertension which cannot be controlled and dissection progression. Complicated aortic dissection may emerge with paraplegia, absence of the peripheral pulse or with organ failures such as renal failure (8-9). The patients with uncomplicated Type B dissection are usually respond to medical treatment. Approximately two thirds of these patients can be discharged from the hospital without

problems. On the other hand, the patients with complicated aortic dissection have higher death risk. For the treatment of these patients, surgery or endovascular procedures are required (10-11).

The survival rates of the patients with uncomplicated Type B-AAD who are treated medically is defined in literature eighty nine percent at the first month, eighty four percent at the first year and, eighty percent at the fifth year (10-12). Medical treatment is quite effective in the survival of the patients. However, the biggest problem in medical treatment is the progression of the disease. Depending on the progression of the disease, late aneurysmal degeneration emerges approximately in 30 to 40% of the patients (13).

In the literature, the complications revealing in the first 30 days have been evaluated in patient group with 1480 people who had Type B-AAD and who had been treated with CMT. According to this study, early period cumulative mortality has been found as 6.4%, early period CVA rate has been found as 4.2% and early period spinal cord injury (SCI-paraplegia or paraparesis) has been detected as 5.3% (3).

In our study group, there were totally 23 Type B-AAD patients. Since 16 of these patients were uncomplicated patients, they were followed with CMT. Mortality was seen in early period in two (8.6%) patients who had been followed with CMT. Both patients had bad general status when they admitted to the hospital. Renal failure and lower extremity plegia were observed in 4.3%-ratio in one patient which we followed with medical treatment and who were exitus. Apart from this, no complication was seen in the patients who were followed with CMT. When we studied the mortality and the morbidity ratios of the patients that we followed with medical treatment, we suggest that this is similar to the literature (3-10-12). Nowadays, TEVAR is a preferred method to treat or to recover the complications which threaten the life in Type B-AAD patients. The success of the treatment in Type B-AAD patients depends on the anatomy, on the extent of the pathology and on the individual clinical experience. The retrospective studies about this issue demonstrate that TEVAR treatment gives more glamorous results compared to conventional surgery (14).

Qin et al. have followed 338 complicated and uncomplicated Type B-AAD patients in terms of TEVAR and in terms of medical treatment. According to this study, it has been proven that TEVAR has less aortic side effects and lower mortality rate compared to CMT for uncomplicated Type B-AAD in acute attack. However, Qin et al. have stated at the end of their study that TEVAR procedure does not lower significantly the morbidity and mortality in the first years of the follow-ups when compared with the medical treatment. They have recommended the TEVAR procedure to improve late period complications particularly in young adult patients and in patients with longer life expectations (1).

Nowadays, TEVAR treatment is quite effective and life-saving in complicated Type B-AAD patients. However, despite the developments in present day early cumulative mortality rate was detected as 10.2%, CVA rate was detected as 4.9% and SCI was detected as 4.2% (3).

In our patient group, since they were in complicated type, TEVAR procedure has been applied to 5 patients (21.7%). No complication has been seen in the patients in which TEVAR procedure has been applied. We suggest that the fewness in the number of patients may be influential in not seeing the complication.

In the patients experiencing open surgery, early mortality rates may rise up to forty percent in some series in the literature (15).

OS was applied urgently to two patients in our patient group. OS was applied to these patients due to the renal artery rupture, due to the fact that they were in shock status or due to the fact that we could not obtain urgently the TEVAR system. One of two patients in which OS was applied was died in the early period. When we evaluated according to the literature, our success rate is worst in the OS patients (15). We suggest that the fact that we operate the patients in emergency conditions and in shock status and the fact that the number of patients is limited are influential on the cause of this situation. In a latest meta-analysis evaluating the relationship between TEVAR, CMT and OS concerning Type B dissections on 2018, it has been reported that TEVAR procedure is favorable in long-term outcomes and that it has advantages when compared with CMT. However, it has been emphasized also that prophylactic precautions are required against to stroke. It has been stated that OS is more unsuccessful either in short-term or in long-term compared to TEVAR. In the conclusion of this study, it has been stated by the authors that especially randomized clinical studies are required in order to compare the effectivity between TEVAR and CMT (16).

Our total mortality rate in our patient group consisting 23 patients was seen as 13.1% in three patients. The ratios for renal failure and for plegia were found as 4.3%. 30-day survival was observed in 20 (86.9%) patients. Total follow-up duration has been found as 11.65±6.38 months in average. We suggest that our results are similar in general to the literature that we have studied (3-15). However, our number of patients and our follow-up duration are limited.

In conclusion, we recommend conventional medical treatment aiming primarily strict hypertension control for the patients in uncomplicated type in the treatment of Type B-AAD patients. In the patients in complicated type

we recommend primarily TEVAR treatment on the other hand, we recommend OS provided that the patient is not convenient for this treatment or in emergency cases that required equipment for TEVAR cannot be ensured.

Thanks

I would like to thank Prof. Dr. Mehmet Tuğrul Göncü and Associate Professor Arif Gücü for his valuable contributions.

References

1. Qin YL, Wang F, Li TX, Ding W, Deng G, Xie B, Teng GJ. Endovascular repair compared with medical management of patients with uncomplicated type B acute aortic dissection. Journal of the American College of Cardiology. 2016;67:2835-2842.

2. Scott AJ, Bicknell CD. Contemporary management of acute type B dissection. European Journal of Vascular and Endovascular Surgery. 2016;51:452-459.

3. Fattori R, Cao P, De Rango P, Czerny M, Evangelista A, Nienaber C, Rousseau H, Schepens M. Interdisciplinary expert consensus document on management of type B aortic dissection. Journal of the American College of Cardiology.2013;61:1661-1678.

4. Steuer J, Björck M, Mayer D, Wanhainen A, Pfammatter T, Lachat M. Distinction between acute and chronic type B aortic dissection: is there a sub-acute phase? Eur J Vasc Endovasc Surg. 2013;45:627-631.

5. Afifi RO, Sandhu HK, Leake SS, Boutrous, ML, Kumar III V, et al. Outcomes of patients with acute type B (DeBakey III) aortic dissection: a 13-year, single-center experience. Circulation. 2015;132:748-754.

6. Fattori R, Tsai TT, Myrmel T, Evangelista A, Cooper JV,et al. Complicated acute type B dissection: is surgery still the best option?: a report from the International Registry of Acute Aortic Dissection. JACC: Cardiovascular Interventions. 2008;1:395-402.

7. Trimarchi S. Eagle KA, Nienaber CA, Pyeritz RE, Jonker FH,et al. International Registry of Acute Aortic Dissection (IRAD) Investigators. Importance of refractory pain and hypertension in acute type B aortic dissection: insights from the International Registry of Acute Aortic Dissection (IRAD). Circulation. 2010;122:1283-9.

8. Numan F,Gülşen F, Arbatlı H, Yılmaz O,Solak S. Akut komplike tip B aortik diseksiyonların endovasküler tedavisi. Türk Göğüs Kalp Damar Cer Derg.2011;19:41-45.

9. Eggebrecht H, Lönn L, Herold U, Breuckmann F, Leyh R, Jakob HG, et al. Endovascular stent-graft placement for complications of acute type B aortic dissection. Curr Opin Cardiol. 2005;20:477-83.

10. Hagan PG, Nienaber CA, Isselbacher EM, Bruckman D, Karavite DJ, Russman PL, et al. The International Registry of Acute Aortic Dissection (IRAD): new insights into an old disease. JAMA. 2000;283:897-903.

11. Erbel R, Alfonso F, Boileau C, Dirsch O, Eber B, Haverich A, et al. Diagnosis and management of aortic dissection. Eur Heart J. 2001;22:1642-81.

12. Estrera AL, Miller CC 3rd, Safi HJ, Goodrick JS, Keyhani A, Porat EE, et al. Outcomes of medical management of acute type B aortic dissection. Circulation. 2006;114:384-9.

13. Yuan X, Mitsis A, Ghonem M, Iakovakis I, Nienaber CA. Conservative management versus endovascular or open surgery in the spectrum of type B aortic dissection. J Vis Surg. 2018;4:59

14. Yılmaz O, Arbatlı H, Numan F,Ardal H, Yağan NE,Gülşen F, Sönmez B. Akut komplike tip B aort diseksiyonlarında endovasküler tedavi: İlave işlemler. Türk Göğüs Kalp Damar Cerrahisi Dergisi. 2014;22: 312-319.

15. Zeeshan A, Woo EY, Bavaria JE, Fairman RM, Desai ND, Pochettino A, Szeto WY. Thoracic endovascular aortic repair for acute complicated type B aortic dissection: superiority relative to conventional open surgical and medical therapy. J Thorac Cardiovasc Surg. 2010;140 :109 -15.

16. Li FR, Wu X, Yuan J, Wang J, Mao C,Wu X. LI, Fu-Rong.Comparison of thoracic endovascular aortic repair, open surgery and best medical treatment for type B aortic dissection: A meta-analysis. International journal of cardiology. 2018;250:240-246