OPEN ACCESS

GAVIN PUBLISHERS

Annals of Case Reports

Petrov I, et al. Ann Case Report 11: 221.

DOI: 10.29011/2574-7754/100221

Case Report

Seventeen Years' Follow-Up of a Patient with Rescue Endovascular Treatment of Complicated Type "A" Aortic Dissection

Ivo Petrov[1], Silvia Pavlova[3], Zoran Stankov[1], Iveta Tasheva[1], Galina Kozareva[2], Gloria Adam[2]

[1]Department of Invasive Cardiology, "Acibadem City Clinic" University Hospital, Sofia, Bulgaria

[2]Department of Diagnostic Imaging, "Acibadem City Clinic" University Hospital, Sofia, Bulgaria

[3]Department of Cardiology, "Acibadem City Clinic" University Hospital, Sofia, Bulgaria

[*]**Corresponding author:** Ivo Petrov, Head of Cardiology, Angiology and Electrophysiology Department Acibadem City Clinic Cardiovascular Center, ul. "Okolovrasten pat" 127, 1700 Sofia, Bulgaria. Tel: +359-888 720014; Email: petrovivo@hotmail.com

Citation: Petrov I, Pavlova S, Stankov Z, Tasheva I, Kozareva G, Adam G (2019) Seventeen Years' Follow-Up of a Patient with Rescue Endovascular Treatment of Complicated Type an Aortic Dissection. Ann Case Report 11: 221. DOI: 10.29011/2574-7754/10022

Received Date: 23 June, 2019; **Accepted Date:** 02 August, 2019; **Published Date:** 06 August, 2019

Abstract

Type A Aortic Dissection (TAAD) is a critical medical condition which requires emergent surgical intervention. Here we present a complex clinical case (done 17 years ago) of acute TAAD, which received lifesaving endovascular intervention immediately after primary surgical treatment. Due to complicated dissection with additional tears and extreme true lumen compression, the postoperative physical condition of the patient was rapidly worsening, which posed the question for immediate resolution of the life-threatening symptoms. Endovascular treatment with non-covered stents implantation in the compressed true aortic lumen lead to immediate visceral and renal ischemia improvement and excellent post-procedural clinical course. This initial experience proved that in critically ill patients with complicated aortic dissection with visceral and renal ischemia endovascular treatment with non-covered stents implantation can be a low-risk, successful and durable alternative method of treatment.

Keywords: Critical Visceral Ischemia; Endovascular; Non-Covered Stent Implantation; Type A Aortic Dissection

Abbreviations

AD: Aortic Dissection; TAAD: Type A Acute Aortic Dissection; Ao: Aorta; CTA: Computed Tomography Angiography; TEVAR: Thoracic Endovascular Aneurysm Repair

Introduction

While Thoracic Endovascular Aneurysm Repair (TEVAR) for type B AD has emerged as a first line treatment, still surgery remains the gold standard for type A. When left untreated, about 33% of patients with type A AD die within the first 24 hours and 50% die within 48 hours [1]. Despite the continuous improvements in imaging techniques, surgical management and medical therapy, early in-hospital mortality in patients undergoing Type a Acute Aortic Dissection (TAAD) surgical repair still remains high, ranging from 17% to 26% [1-3]. The principal independent pre-operative predictors of mortality identified in the International Registry of Acute Dissection (IRAD) are history of aortic valve replacement (OR, 3.12), migrating chest pain (OR, 2.77), pre-operative limb ischemia (OR, 2.10), hypotension during presentation (OR, 1.95) or shock/cardiac tamponade (OR, 2.69) [1]. Mesenteric ischemia is often an insidious end-organ malperfusion complication occurring in 3.7% of IRAD patients and is an important predictor for in-hospital mortality (OR, 2.5) [4]. Although mesenteric ischemia (malperfusion) is a relatively rare complication of surgically corrected TAAD, it is very often associated with clinical or imaging signs of visceral organ injury making the prognosis really unfavorable [4,5]. In-hospital mortality of patients with mesenteric malperfusion receiving medical, endovascular and surgical/hybrid therapy was 95.2%, 72.7%, and 41.7% respectively ($P < .001$). However, IRAD data showed that hybrid management was applied in few cases and that immediate surgical repair of the proximal dissected aorta still represents the most common therapeutic approach for patients with TAAD complicated by mesenteric malperfusion [4].

Case Report

Our case represents a 54 years old male patient with a clinical history of arterial hypertension, diabetes mellitus and

smoking. He was admitted in critical condition and cardiogenic shock with anuria and pulmonary edema. The CT aortography showed acute Stanford Type A aortic dissection and third degree aortic regurgitation. Therefore, an urgent surgical treatment of the ascending Aorta (Ao) was performed with Unigraft No30 interposition and preservation of the aortic valve. In the immediate post-operative period, the patient remained in critical condition and life-threatening ischemia of the abdominal Ao branches (malperfusion syndrome) manifested by anuria, ileus, inferior paraparesis and livedo reticularis of the lumbar area and lower extremities. An urgent Computed Tomography Angiography (CTA) examination was performed and several additional entry tears were detected along the thoracic aorta leading to false lumen predominance and severe compression of the true lumen and the ostia of the visceral and lower leg branches.

On a Heart team discussion, a repetitive open surgical procedure was estimated to be with a prohibitive risk and a decision for rescue endovascular treatment was undertaken (Figure 1). With right femoral percutaneous approach (for stent implantation) and left radial approach (for angiographic control) an implantation of two non-covered self-expandable Wallstents, each 20x55 mm in diameter, in the aortic true lumen was performed. This procedure was followed by a post dilatation with balloon Symmetry 18x40 mm, at 6 atm. The final angiogram showed centralized true lumen flow, restored abdominal branches' flow and immediately decreased flow in the false lumen.

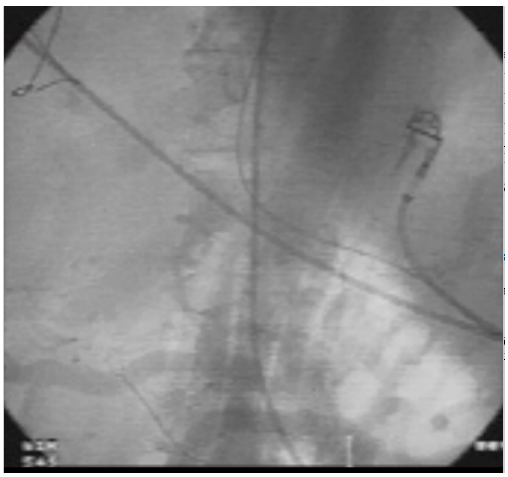

Figure 1: Severe compression of the true lumen caused by the over expanded false lumen: true lumen in the middle (red arrow), surrounded by the false lumen (blue arrows).

Result

The clinical result achieved was as follows: immediate stabilization of the general condition, immediate recovery of the renal function, almost immediate recovery of the intestinal function and complete recovery of the pulsations of lower extremities bilaterally. The following CT revealed excellent result with completely centralized blood flow into the true aortic lumen and restored flow in all the target branches (Figure 2).

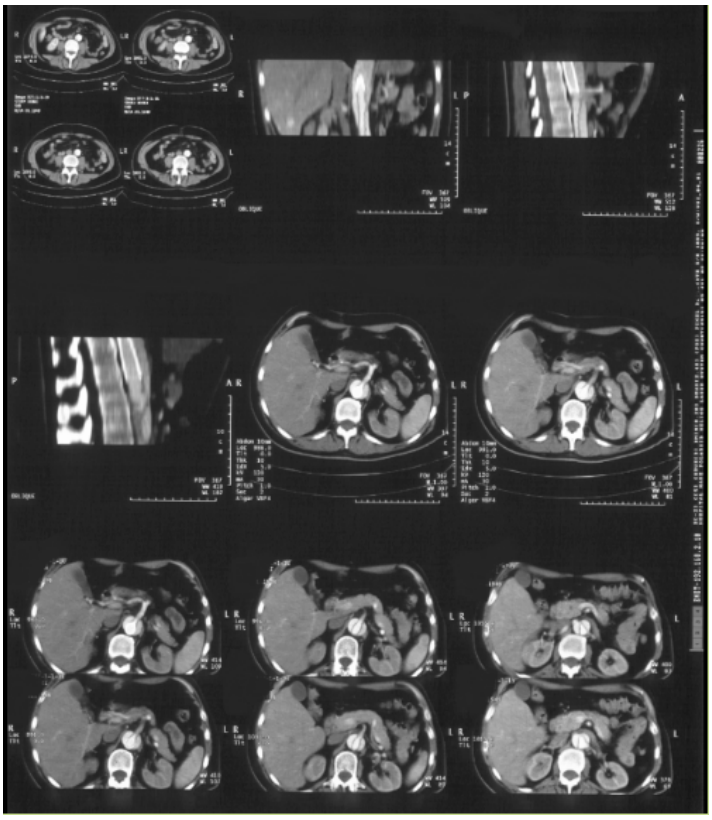

Figure 2: Completely centralized blood flow after endovascular procedure on CT.

For 17 years (2002-2017) of follow-up the patient remained asymptomatic, without any aorta related clinical events. CTA follow-up was performed demonstrating excellent positive aorta remodeling with complete healing of the aorta in its thoracoabdominal suprarenal part. In the sub-renal segment coexistence of the true and false lumen were noted with normal true lumen flow in the aorta and its branches (Figure 3 and 4). A comparison between the last two CT aortography in 2012 and 2017, showed no changes (Figure 5).

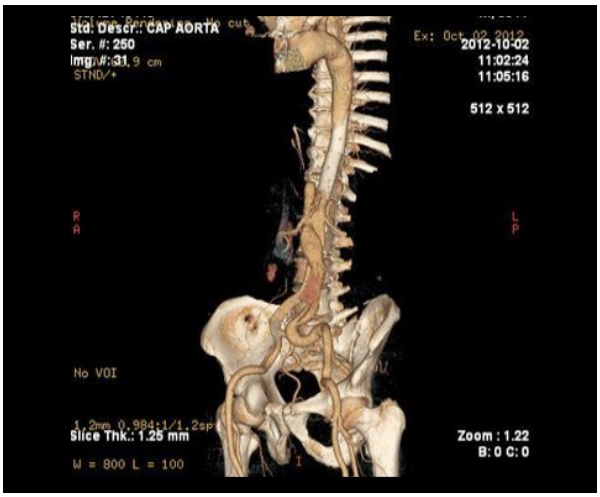

Figure 3 and 4: CTA 10 years later shows patent stents with complete expansion of true lumen and partial thrombosis of false lumen.

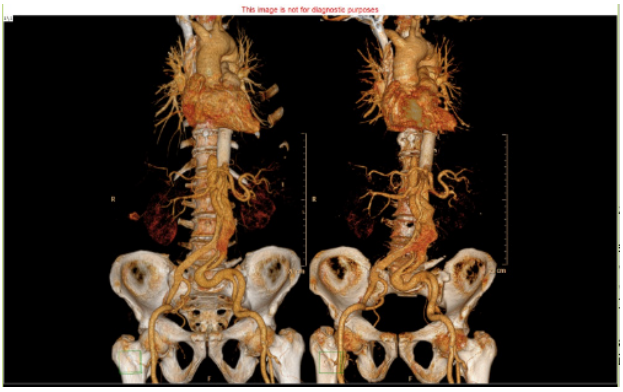

Figure 5: Comparison of CT aortography in 2012 and 2017

Discussion

Mesenteric malperfusion caused by type A Acute Aortic Dissection (AAD) is rare and associated with high in-hospital mortality rate of over 60%, which may be related to the difficulty of accurate diagnosis and prompt treatment [6]. Once malperfusion is diagnosed, it needs to be restored by either a surgical or endovascular approach. Each approach has its advantages and disadvantages, and, therefore, both should be considered in selecting the appropriate treatment strategy. The first reported small series of hybrid treatment included 6 patients with type A chronic or type B acute and subacute AD whose severe visceral malperfusion was treated by endovascular approach [7]. Another reported cases for hybrid treatment with either endovascular stenting (Palmatz or Wallstent) and Balloon Fenestration (BF) of intimal flaps for the management of lower extremity, renal and visceral ischemia in acute or chronic type A and type B aortic dissection was published in 1997 in Journal of Vascular Surgery. The results showed this alternative innovative treatment is a safe and effective percutaneous method for managing peripheral ischemic complications of aortic dissection [8].

Nowadays, simimlar to our innovative strategy (applied 17 years ago), there are series of patients with TAAD treated safely by endovascular or hybrid treatment. Ascending aorta surgical treatment, followed by endovascular stenting of the arch and the descending aortic segments, elephant trunk technique or Provisional Extension to Induce Complete Attachement (PETTITCOAT concept) which elminiates the entry tear and increases the true lumen diameter in the distal aorta trough a combination of stent graft and bare metal stenting of the vicseral and infrarenal segments are all therapeutic options to deal with the false lumen and hence open dynamic peripheral and visceral arterial occlusions [9-11]. Recently a published discussion reised even the question of the timing of aortic surgery and revascularization of the visceral ischemia. Some recent publications state that if visceral ischaemia is severe and extensive in patients with TAAD, visceral ischemia has to be corrected (preferably by endovascular methods) prior to open surgery [12].

In Conclusion

The optimal technique for treating organ malperfusion both during and after repair of an acute TAAD continues to evolve. Our case of emergent endovascular treatment of complicated by visceral malperfusion surgically corrected TAAD resulted successful which is proved by the clinical and imaging follow-up examinations. Moreover, the 17 years excellent clinical and vascular result (positive aorta remodeling) is illustrating that this strategy can be accepted as an effective, low-risk and durable method of treatment.

Acknowledgement

We would like to acknowledge the help provided by Dr Gloria Adam for the diagnostic imaging process.

Conflict of interest

None declared.

References

1. Trimarchi S, Nienaber CA, Rampoldi V, Myrmel T, Suzuki T, et al. (2005) Contemporary results of surgery in acute type A aortic dissection: The International Registry of Acute Aortic Dissection experience. J Thorac Cardiovasc Surg 129: 112-22.
2. Conzelmann LO, Weigang E, Mehlhorn U, Abugameh A, Hoffmann I, et al. (2016) Mortality in patients with acute aortic dissection type A: analysis of pre- and intraoperative risk factors from the German Registry for Acute Aortic Dissection Type A (GERAADA). Eur J Cardiothorac Surg 49: e44-e52.
3. Knipp BS, Deeb GM, Prager RL, Williams CY, Upchurch GR Jr, et al. (2007) A contemporary analysis of outcomes for operative repair of type A aortic dissection in the United States. Surgery 142: 524-528.
4. Di Eusanio M, Trimarchi S, Patel HJ, Hutchison S, Suzuki T, et al. (2013) Clinical presentation, management, and short-term outcome of patients with type A acute dissection complicated by mesenteric malperfusion: observations from the International Registry of Acute Aortic Dissection. J Thorac Cardiovasc Surg 145: 385-390.
5. Pacini D, Leone A, Belotti LM, Fortuna D, Gabbieri D, et al. (2013) Acute type A aortic dissection: significance of multiorgan malperfusion. Eur J Cardiothorac Surg 43: 820-826.
6. Di Eusanio M, Trimarchi S, Patel HJ, Hutchison S, Suzuki T, et al. (2013) Clinical presentation, management, and short-term outcome of patients with type A acute dissection complicated by mesenteric malperfusion: observations from the International Registry of Acute Aortic Dissection J Thorac Cardiovasc Surg 145: 385-390.
7. Walker PJ, Dake MD, Mitchell RS, Miller DC (1993) The use of endovascular techniques treatment of complications of aortic dissection. J Vasc Surg 18: 1042-1051.
8. Suzanne M. Slonim, Ulf Nyman, Charles P. Semba, D. Craig Miller, R. Scott Mitchell, et al. (1996) Aortic dissection: Percutaneous management of ischemic complications with endovascular stents and balloon Journal of Vascular Surgery 23: 241-253.
9. Yilmaz AT, Senay S, Ucak A (2012) Minimally invasive hybrid treatment of acute type I aortic dissection: a single-stage technique without circulatory arrest. Tex Heart Inst J 39: 405-407.
10. Jakob H, Tsagakis K (2010) DeBakey type I dissection: when hybrid stent-grafting is indicated? J Cardiovasc Surg (Torino) 51: 633-640.
11. Nienaber CA, Kische S, Zeller T, Rehders TC, Schneider H, et al. (2006) Provisional extension to induce complete attachment after stent-graft placement in type B aortic dissection: the PETTICOAT concept. J Endovasc Ther 13: 738-46.
12. Yamashiro S, Arakaki R, Kise Y, Inafuku H, Kuniyoshi Y (2017) Management of visceral malperfusion complicated with acute type A aortic dissection. Interactive CardioVascular and Thoracic Surgery 21: 346-351.