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Case Report

Stanford Type A Aortic Dissection Complicated by Rupture in to the Pericardium a Case Report

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Abstract

We report the case of a 67-year-old man who presented to the emergency room for a Stanford A-rated thoracoabdominal aortic dissection. Aortic dissection it's defined by intimal detachment with the creation of a false circulating channel. The diagnosis it's based on transthoracic echocardiography and cross-sectional imaging for hemodynamically stable patients. The treatment is surgical; the prognosis is reserved.

Keywords: *Angio CT; Aorta; Dissection; Hemopericardium*

Introduction and Case Report

We report a case of a 67-year-old patient suffering from arterial hypertension under an unbalanced converting enzyme inhibitor, type II diabetes, dyslipidemia, obesity abdominal, he is also a long-term smoker. Who presented to the emergency room for intense chest pain, prolonged, oppressive, with a sudden onset exceeding 30 minutes. It radiates to the upper left limb, as well as to the lower limbs. Associated sweating and vomiting motivate the patient to consult at the first hour of the presumed onset of pain. In addition, the patient does not report intermittent claudication of the lower limbs or sensory-motor deficit. The clinical examination founds a conscious, eupneic patient with blood pressure asymmetry between the right upper limb: 140/70 and left upper limb: 115/60. The rest of the exam was normal.

Electrocardiogram demonstrates lateral ST segment deposition, left ventricular hypertrophy, fragmented QRS inferior, incomplete left bundle branch block, negative lateral, and flat T waves inferior. In the biological assessment: anemia at 11.2, troponin at 40 times the normal value, CRP at 67.

Transthoracic echocardiography shows a dilated ascending aorta and an echogenic pericardial effusion.

To support the diagnosis, a thoracoabdominal CT angiography was performed which finds a dissection of the thoracoabdominal aorta classified Stanford type A ruptured in the pericardium made of: Circumferential pericardial effusion of 28 mm of hematic nature (48 Hounsfield unity) of great abundance (Figure 1).

Figure 1: *Coronal CT-angiography reconstruction through the thoracic and abdomen in the arterial phase shows a false lumen with intimal flap synonym of aortic dissection.*

An intimal flap extended from the proximal ascending aorta to the abdominal sub-renal aorta (Figure 2) with an entrance gate at the level of the sino-tubular junction, and an extension to the supra-aortic trunk, in particular, the subclavian and the right common carotid arteries (Figure 3). Due to the presence of a dissection of the ruptured thoracoabdominal aorta in the pericardium and despite the resuscitation measures, the progression quickly leads towards death.

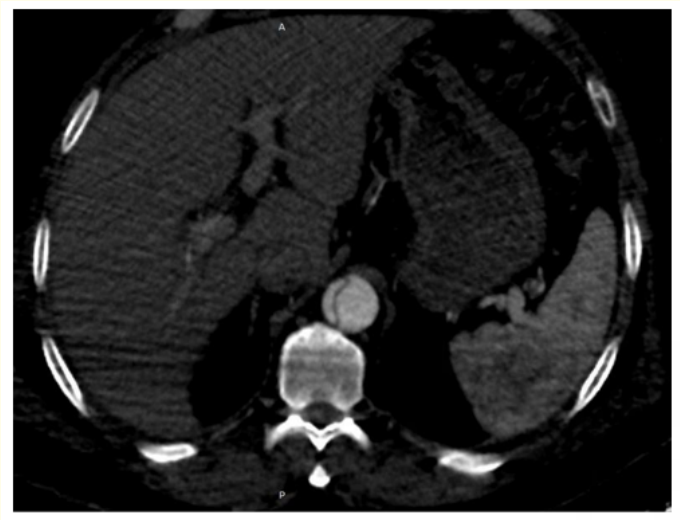

Figure 2: *Axial CT-angiography through abdomen in the arterial phase shows the false lumen with intimal flap.*

Figure 3: *Axial CT-angiography through thorax in the arterial phase shows a pericardial effusion of 40 Hounsfield unity characteristic of hemorrhagic nature.*

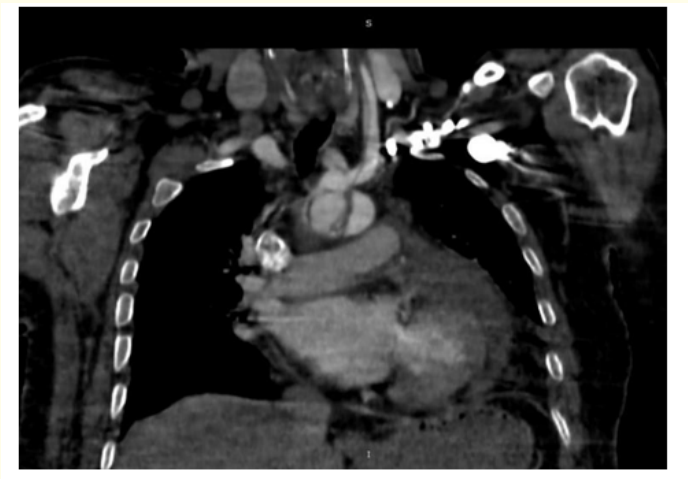

Figure 4: *Oblique CT-angiography reconstruction in the arterial phase demonstrate the extension of the dissection to the supra aortic vessels.*

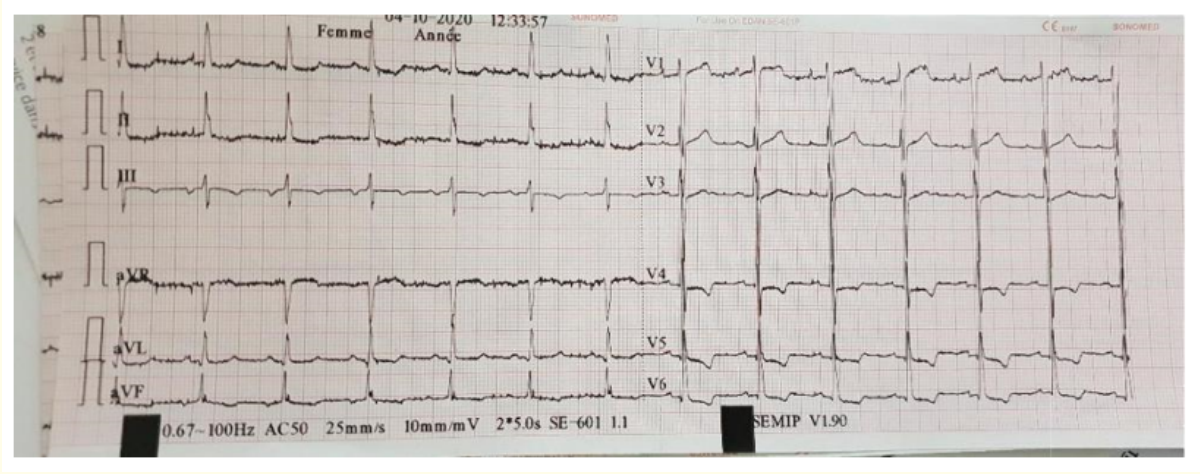

Figure 5: *Electrocardiogram finds a left ventricular hypertrophy, under declining of the ST segment laterally (V5, V6, D1, AVL). Negative T waves in low lateral apico V4 V5 V6, incomplete BBG.*

Discussion

Aortic dissection is secondary to an intimal tear that results in medial-intimal detachment and the creation of a true and false channel within the aortic lumen. The majority of aortic dissections are seen in elderly hypertensive patients. In a very small minority, an underlying connective tissue disorder may be present. Other conditions or predisposing factors may also be encountered, Including structural aortic abnormalities, bicuspid aortic valve, aortic coarctation, abnormal connective tissues (Marfan syndrome and Ehlers-Danlos syndrome), Turner syndrome, pregnancy, intra-aortic balloon pumps [1]. Aortic dissection is arbitrarily categorized into three phases [2,3]: acute: within 14 days of first symptom onset, subacute: between 14 days to 3 months, chronic: more than 3 months from the initial onset of symptoms.

Majority of Patients suffering from AD present with high blood pressure, anterior or posterior chest pain, oppressive chest pain. There may be a difference in blood pressure between the two arms depending on the location of the dissection. The extent of dissection to aortic branches is responsible for end-organ ischemia (seen in up to 27% of cases) [4]. Abdominal organ ischemia, limb ischemia, ischemic or embolic stroke, paraplegia (involvement of the artery of Adamkiewicz) are described. If the aortic dissection involves the aortic root it may result in involvement of the coronary arteries and can present similarly to ST-elevation myocardial infarction on an electrocardiogram. Some cases of aortic dissection may evolve to rupture, causing collapse and often death. Signs of cardiac tamponade (Beck's triad) may also be encountered if rupture occurs in the pericardial space.

There are four main imaging modalities used to diagnose aortic dissection: aortography, echocardiography, CT angiography, and magnetic resonance imaging. Aortography is traditionally considered the gold standard for diagnosing aortic dissection, it has been replaced by other tests due to its invasive nature.

Transthoracic sonography has low sensitivity for the diagnosis of Stanford type B dissection due to the limitations in visualizing the distal structures of the aorta (especially the thoracic aorta). On the other hand, its sensitivity is around 96% for the diagnosis of Stanford type A dissection. The left parasternal and right parasternal approach are particularly useful for this assessment. Independently of the visualization of the dissection (intimal Flap), the trans-thoracic sonography is useful in:

- Detection and the quantification of a possible aortic leak
- Presence of a pericardial effusion
- Visualization of abnormality of the segmental kinetics of the ventricular wall
- Criteria's of poor prognosis associating Stanford type A dissection such as severe dilation of the initial aorta, the presence of pericardial effusion (suggesting imminent rupture), the association of impairment of segmental kinetics (coronary occlusion by dissection extended to a coronary artery) and the presence of aortic leakage which thus guides the surgical strategy.

Other radiological examinations are also capable of providing precise information regarding the diagnosis of aortic dissection with good specificity and sensitivity. However, they have certain drawbacks limiting their availability in the emergency setting. More importantly, the trans-thoracic ultrasound can collect information regarding the anatomy and function of the heart that can only be provided by this exam [5].

CT angiography is an easy access and ideally suited imaging tool in emergency situations. It makes the diagnosis by direct and indirect signs and came to complete the information provided by sonographic examination in hemodynamic stable patients: Direct signs:

- The floating intimal membrane is the most important direct sign. It results in a thin hypodense band compared to the clouded blood. It reflects the limit of the cleavage in the aortic wall and separates a true channel and a false channel which can become opacified synchronously or most often asynchronously.
- Highlights one or more entry and exit doors.
- The displacement of intimal calcifications towards the aortic lumen.
- Increase in the caliber of the aorta.
- The presence of a hemopericardium type complication like our case, hemomediastinum or a hemothorax.

CT also assess the extent of the dissection which is the basis of the Stanford classification: Type A, Type B. Look for damage to the visceral arteries and the supra aortic trunks [6].

The three main complications specific to Stanford's type A dissections are: Intra pericardial rupture with cardiac tamponade which is the leading cause of death; Aortic valve insufficiency present in 30 to 50% with secondary left Ventricular failure is the second leading cause of death; Coronary insufficiency is responsible for ischemia or myocardial infarction. Right coronary artery ischemia is the most common, often with signs of inferior myocardial distress on ECG [7].

The treatment is surgical it's consists of replacing the weakened ascending aortic segment by the main entrance gate. The aorta is replaced with a woven Dacron tube.

A simple resuspension of the sigmoid commissures in the event of an isolated rollover. Valve replacement will be associated in the event of a congenital, degenerative disease or valve insufficiency.

On the other hand, in the presence of an attack of the Valsalva's or ascension of the coronary Ostia, it is necessary to carry out a replacement of the aortic root by a valve tube with reimplantation of the coronary ostium, as the technique is described in the Bentall's intervention.

If the valve does not oppose a contraindication to performing a plastic surgery, it is possible to keep this valve device and reinsert it into the Dacron tube as well as the two coronary Ostia using the Tyron David technique.

Postoperative monitoring of the dissection is clinical and iconographic. The follow-up is done by magnetic resonance imaging (MRI) or by aortic CT angiography. The control determines a new assessment at 3 months or 6 months, then systematically at 12 months, and annually. Transthoracic or transesophageal sonography of the aortic root and the cardiac mass if there is any doubt. The lesions primarily sought are a false aneurysm at the level of the distal and proximal sutures of the aortic tube, persistent leakage of the aortic valve as well as dilation of the remaining dissected aortic segment [8].

Conclusion

Aortic dissection is a diagnostic and therapeutic emergency diagnosed by imaging and treatment by surgery, with a poor prognosis despite the speed of treatment.

Conflict of Interest

The authors declare the absence of conflicts of interest.

Bibliography

1. Hurwitz LM and Goodman PC. "Intraaortic balloon pump location and aortic dissection". *American Journal of Roentgenology* 184.4 (2005): 1245-1246.
2. Dake MD., *et al*. "DISSECT: a new mnemonic-based approach to the categorization of aortic dissection". *European Journal of Vascular and Endovascular Surgery* 46.2 (2013): 175-190.
3. Saremi F., *et al*. "Image Predictors of Treatment Outcome after Thoracic Aortic Dissection Repair". *Radiographics* 38.7 (2018): 1949-1972.
4. Macura KJ., *et al*. "Pathogenesis in acute aortic syndromes: aortic dissection, intramural hematoma, and penetrating atherosclerotic aortic ulcer". *American Journal of Roentgenology* 181.2 (2003): 309-316.
5. Bouferrouk A., *et al*. Rôle de l'échocardiographie transthoracique dans le diagnostic de la dissection aiguë aortique type A de Stanford 24.5 (2012): 251-256.
6. El Hajjam M., *et al*. "Tomodensitométrie hélicoïdale et dissections aortiques". *Reanimation* 11.2 (2002): 125-131.
7. Macura KJ., *et al*. "Pathogenesis in acute aortic syndromes: aortic dissection, intramural hematoma, and penetrating atherosclerotic aortic ulcer". *American Journal of Roentgenology* 181.2 (2003): 309-316.
8. Verhoye JP., *et al*. "Chirurgie de la dissection aortique pour quel patient?" *Presse Medicale* 40.1 (2011): 72-80.

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