

Early View Article: Online published version of an accepted article before publication in the final form.

Journal Name: Journal of Case Reports and Images in Medicine

Type of Article: Clinical Images

Title: Aortic dissection contraindicates pericardiocentesis in cardiac tamponade: we know it, but do we look for it?

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doi: To be assigned

Early view version published: June 16, 2017

How to cite the article: OUZZANI JE, GHALEM A, ISMAILI N, OUAFI NE. Aortic dissection contraindicates pericardiocentesis in cardiac tamponade: we know it, but do we look for it?. Journal of Case Reports and Images in Medicine. Forthcoming 2017.

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22 **Short Running Title:** Aortic dissection CI pericardiocentesis

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24 **Guarantor of Submission:** The corresponding author is the guarantor of
25 submission.

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35 **CASE REPORT**

36 A 55-years-old female patient presented to the emergency department (ED) with
37 acute onset of chest pain irradiating to the back and orthopnea. Of relevant medical
38 history, the patient had a long standing uncontrolled arterial hypertension and
39 diabetes. On admission, the patient's vital signs revealed Asymmetric Brachial Blood
40 Pressure (Right arm: 95/50 mmhg, left arm: 110/60 mmhg), tachycardia (125
41 Beat/min), and tachypnea (25/min). Examination found
42 external jugular vein distension, hepato-jugular reflux, and cold sweaty extremities.
43 ECG showed sinus tachycardia with left ventricular hypertrophy. Transthoracic
44 echocardiography (TTE) revealed large pericardial effusion with signs of
45 hemodynamic compromise, right atrial and ventricular compression, inferior vena
46 cava plethora, and significant flow respiratory variations; it also revealed aortic
47 dilatation and mild central aortic insufficiency. Subsequent chest CT displayed type A
48 aortic dissection with pericardial effusion. The patient was transferred to the nearest
49 cardiovascular surgery capable hospital. Unfortunately, the patient died at arrival.

50

51 **DISCUSSION**

52 Although chest pain is frequent in the emergency department (ED), aortic dissection
53 is rare in clinical practice with an annual incidence of 2-16 cases / 100.000 [1].
54 However, this incidence is underestimated because many patients die before arrival
55 at hospital. In fact, autopsic series report a prevalence ranging from 0.2% to 0.8%
56 [2]. It is often a fatal disease with an overall hospital mortality rate of 27.4%, raising
57 to 58% (1% per hour) in the case of DEBAKEY's type A aortic dissection (AD) in the
58 absence of urgent surgical treatment [1, 3].

59 Cardiac tamponade occurs in 20% of type A aortic dissection. It is associated with a
60 two-fold higher mortality [4, 5], and is the leading cause of early hospital death in
61 patients with aortic dissection [6]. This association remains a very challenging
62 diagnostic and therapeutic problematic.

63 Dealing with a pericardial effusion, in ED setting, the physician strives to look for
64 clinical and echocardiographic signs of tamponade, and to carry out, when
65 appropriate a pericardiocentesis. Meanwhile, he/she may omit exploration of the
66 ascending aorta and fail to diagnose a type AAD ruptured in the pericardium, in
67 which case pericardiocentesis can be harmful and aggravate the leakage and
68 hemorrhage[7]. Transthoracic echocardiography is not the best imaging test for
69 studying the aorta, nonetheless it remains a valuable and largely available tool to
70 screen for Type A AD by looking for its indirect signs (Aortic regurgitation, pericardial
71 effusion and dilatation of the initial aorta) or the presence of an intimal flap in the
72 lumen of the ascending aorta, which will affirm the diagnosis, thus rendering
73 pericardiocentesis and pericardial drainage contraindicated.

74 In case of tamponade-complicated A-type aortic dissection, pericardial drainage and
75 pericardiocentesis are contraindicated due to a rebound increase in aortic pressure
76 that occurs after evacuation of the effusion leading to hemorrhage and tamponade
77 recurrence [8]. The treatment of choice, in this setting, is urgent surgical repair of the
78 aorta with pericardial drainage. Indeed, in the absence of surgical repair almost all
79 patients tamponade die during their first hospital admission [4]. In addition, surgery
80 reduces mortality at 1 month from 90% to 30% [9]. Some authors, however,
81 authorize pericardiocentesis when urgent cardiac surgery is not available [1, 10].

82

83 **CONCLUSION**

84 It is no exaggeration to say that type A acute aortic dissection ruptured in the
85 pericardium is the worst disaster that the human vascular network can experience.
86 This association poses a real challenge to the physician. Cardiac tamponade may
87 overshadow aortic dissection which contraindicates, in principle, pericardiocentesis.
88 We would like to emphasize, through this case, the crucial importance of searching
89 for direct and indirect echocardiographic signs of aortic dissection when managing
90 any pericardial effusion, let alone cardiac tamponade.

91

92 **Keywords:** cardiac tamponade, aortic dissection, echocardiography

93

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95 **CONFLICT OF INTEREST**

96 The authors declare no conflict of interests

97

98 **AUTHOR'S CONTRIBUTIONS**

99 All authors have contributed substantially in drafting the article or revising it critically
100 for important intellectual content. All authors have approved of the version to be
101 submitted.

102

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146 **FIGURE LEGENDS**

147

148 Figure 1: transthoracic echocardiography displays ascending aorta dilatation (A),
149 central aortic regurgitation (red arrow) with compressive pericardial effusion (blue
150 arrow) (B), and inferior Vena cava plethora (C)

151

152 Figure 2: axial chest CT displays type A aortic dissection with intimal flap (blue
153 arrow) and pericardial effusion (red arrow)

154

155 Figure 3: sagittal CT reconstructions showing type A aortic dissection extending to
156 the aortic arch and descending aorta (blue arrows) along with pericardial effusion
157 (red arrow)

158

159 **FIGURES**

160

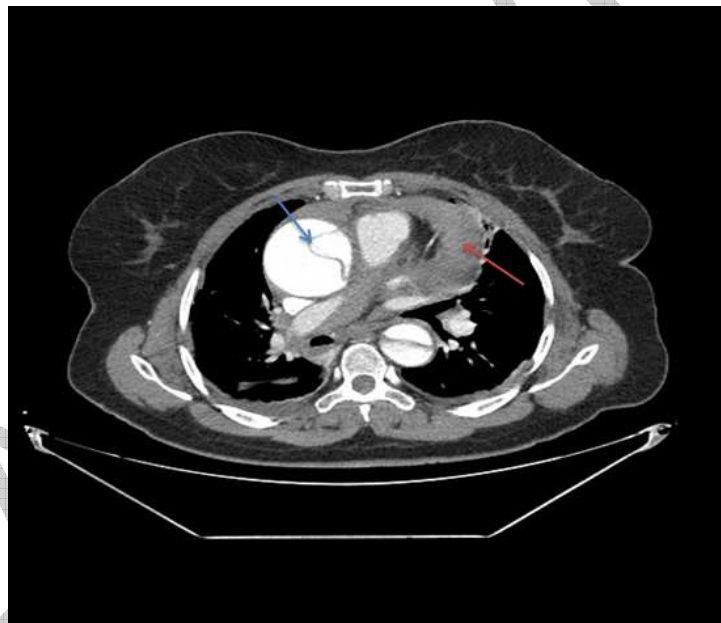


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