Acute aortic dissection combined with cardiac tamponade in an elderly patient saved by pericardial drainage: a case report

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July 20, 2020

Abstract

Acute aortic dissection combined with cardiac tamponade is fatal. The radical treatment is an aortic replacement; however, the risk is high. The treatment method for elderly patients is difficult to determine. We suggest conservative treatment with pericardial drainage may be one of the treatment options in the elderly with comorbidities.

Title page

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Key Clinical Message

Acute aortic dissection combined with cardiac tamponade is fatal. The radical treatment is an aortic replacement; however, the risk is high. The treatment method for elderly patients is difficult to determine. We suggest conservative treatment with pericardial drainage may be one of the treatment options in the elderly with comorbidities.

Introduction

In Japan, aging is rapidly advancing and the ambulance transport cases of the elderly are increasing. Among them, acute aortic dissection (AAD) combined with cardiac tamponade has a high degree of urgency and

severity with an aortic replacement being the radical treatment. However, elderly patients who were difficult to treat surgically due to a decline in cognitive function and activities of daily living (ADL) are increasing. There are no clear guidelines in Japan. In the United States, it is advisable pericardial drainage (PD) should be performed only when circulation cannot be maintained before surgery. We reported a case of AAD with cardiac tamponade in an elderly patient who was treated by PD and had a good clinical course.

Case history/examination

[present history]

A 94-year-old female presented to the hospital with persistent back pain and transient left hemiparesis. The back pain began on the morning of October X. The medical examination at a family doctor revealed left hemiparesis and hypotension. Left hemiparesis improved in about 30 minutes, and no other neurological deficit was observed. After that, she was referred to our hospital.

[past history]

Dementia, chronic kidney disease

[vital signs and physical examination]

Conscious level: GCS14 (E3V4M6)

Neurologically, no paralysis or dysarthria was observed.

KT36.8, blood pressure 90/68mmHg, heart rate 112 bpm (sinus rhythm)

SpO2 95% (room air), respiratory rate 22 times/min

Differential diagnosis, investigations and treatment

Based on the blood pressure on arrival, it was considered a shock state and a cerebrovascular disorder was not strongly suspected. Echocardiography was performed to search the cause of shock state and pericardial effusion was found. The complaint of back pain was not strong but persistent, and transient neurological symptoms were documented, so we suspected a possibility of an aortic dissection. We hesitated to use contrast medium due to renal function and then planned non-contrast CT to evaluate aortic form. CT showed a false cavity filled with hematoma along the aortic wall; therefore, it was diagnosed as AAD combined with cardiac tamponade. Since the hemodynamics were unstable, surgical treatment had to be considered. However, due to various patient backgrounds, such as advanced old age, dementia, and chronic kidney disease, perioperative risks were to be very high. We discussed the treatment policy with the patient and family members. We thought it may be fatal since the aortic replacement requires extracorporeal circulation that will be overly invasive for the patient herself. Besides, even after surviving the surgery, it will be difficult to manage during the perioperative period, including rehabilitation. Ultimately, with the consent of the patient and her family, we decided to urgently perform PD, monitor, and treat circulatory state strictly without aortic replacement. Immediately, emergent PD was performed, blood pressure was monitored, and 30ml blood was drained twice. Heart rate decreased to 90 bpm and systolic blood pressure rose to 110 mmHg. After admitted to the intensive care unit, her blood pressure was controlled with a continuous antihypertensive drug under arterial pressure monitoring. PD was drained without raising blood pressure excessively and drainage of 250 ml/8h was observed on the first day. After that, the volume of drainage decreased, and from the 2nd day, only about 30 ml/day of drainage of pale serum was observed. Pericardial effusion was evaluated by ultrasonic examination everyday, confirming that there was no sudden increase.

Outcome and follow-up

Rehabilitation for disuse prevention was started on the 3rd hospital day, and a CT scan was performed on the 8th day to confirm the condition. It was confirmed that pericardial effusion decreased and dissection space of the ascending aorta was reduced. On the 13th day, CT evaluation was performed again, and the progress was favorable. She was then discharged from the ICU. The course continued steadily thereafter,

and she was transferred to a hospital for continual rehabilitation on the 62nd day. In a visit to our hospital 3 months after discharge, she was walking by using a walker. There was no deterioration shown on the CT image and we thought the clinical condition was good.

Discussion

Gilon et al. reported that 126 of the 674 patients (18.7%) enrolled in the International Registry of Acute Aortic Dissection were combined with cardiac tamponade, which resulted in 54% in-hospital mortality. The mortality was more than double compared to that of AAD alone.[1] In the present case, the patient was in a shock state on arrival with the possibility of a fatal course. Therefore, PD was performed as one of the effective methods for releasing cardiac tamponade, despite it is not always recommended for cardiac tamponade associated with AAD.

According to the US guidelines,[2] performing PD should be minimized, and should only be done when circulation cannot be maintained before surgery. This is believed to be because PD may increase fluid flowing into the pericardial space. Hayashi et al.[3] reported using a pigtail catheter to control the drainage volume and prevent blood pressure from rising. PD was performed in 18 patients whose blood pressure dropped due to cardiac tamponade associated with AAD during the preoperative period. Circulatory dynamics were improved in 10 patients with drainage of 30 ml, and they were able to be operated. Fujii et al.[4] also reported the importance of controlling the drainage volume while not raising blood pressures excessively. Honda et al.[5] proposed the PD volume in the elderly of average age over 80 years. In their study, to avoid a drop in pericardial intracavitary pressure and a rise in blood pressure, the volume of drainage was set to 10 ml and blood pressure was controlled under 100mmHg. They also reported that good results were obtained without surgery by repeating PD appropriately. As in our case, although a single drainage volume was 30 ml, a little volume of drainage was intermittently obtained under strict blood pressure control and had a good result. This provides an alternative treatment for AAD combined with cardiac tamponade in the elderly.

Aoyama et al.[6] reported a comparative study on surgical and conservative treatment for AAD patients over 80 years old in Japan. As a result, all in-hospital mortality rates were significantly decreased in patients who underwent surgery, but there was no significant difference in the event-free survival rate considering the presence or absence of complications. As in our case, complications such as dementia, chronic nephropathy, and the age of 94 made it difficult to decide on a treatment method. Finally, conservative treatment was decided with the consent of the patient and family members. As a result, the patient had a good clinical course, despite she was in a shock state due to cardiac tamponade, and the treatment policy must be decided in a short time including emergency treatment and family burden under an emergency situation. In Japan, where the number of patients with complications is expected to increase due to further aging of the population, it is necessary to make appropriate treatment decisions for emergent diseases based on the patient's background and continue to find appropriate policies. It seems imperative to accumulate such cases as much as possible.

Conclusion

With the aging population, the frequency of patients with highly severe urgency is expected to increase. For AAD with cardiac tamponade in elderly patients with advanced age, the treatment policy should be made carefully based on ADL and comorbidities. Performing conservative treatment with PD will be considered as one of the options.

Acknowledgment

We would like to thank Editage (www.editage.com) for English language editing.

Disclosure

Conflict of interest

The authors declare no conflicts of interest associated with this manuscript.

Ethical approval

All the procedures performed in this study were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Informed consent

Informed consent was obtained from the patient and family in the study.

Data Accessibility

The authors confirm that the datasets supporting the findings of this study are available from the corresponding author upon reasonable request.

Author contributions

Une is the first author, managed the patient in the emergency department, and drafted the manuscript. Hidaka, Maeda, and Kinoshita reviewed the manuscript and managed the patient in the intensive care department. Kodama and Sato supervised the writing and submitting process. All authors discussed and approved the submitted manuscript.

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Figure legends

Figure.1 Echocardiography on admission shows pericardial effusion.

Figure.2 Non-contract chest CT

a, b: Non-contrast chest CT on admission shows a hematoma-filled false lumen as a crescentic, high-attenuation region following the aortic wall (crescentic high-attenuation hematoma) and pericardial effusion at the descending aorta level.

c, d: Non-contrast chest CT 14 days after admission shows the absorption of hematomas around the ascending aorta and reduction in pericardial effusion.

CT: computed tomography

Table

Table.1 Laboratory data on admission

¡CBC¿	¡CBC¿	¡CBC¿	¡Biochemical Test¿	¡Biochemical Test¿	¡Biochemical Test¿
WBC	9900	/μl	T-Bil	0.78	mdl/dl
RBC	296	$10^4/\mu$l	AST	24	IU/L
Hb	9.1	g/dl	ALT	14	IU/L
Hct	27.9	%	LDH	184	IU/L
PLT	10.5	$10^4/\mu$l	CK	48	IU/L
¡Coagulation test¿	¡Coagulation test¿	¡Coagulation test¿	TP	5.8	g/dl
PT	71	%	ALB	3	g/dl
APTT	33	sec	UN	43.9	mg/dl
Fbg	146	mg/dl	Cr	2.03	mg/dl
D-dimer	25.2	ng/ml	UA	7.5	mg/dl
¡BGA¿(room air)	¡BGA¿(room air)	¡BGA¿(room air)	T-Chol	130	mg/dl
pH	7.425		Na	136	mEq/L
pO_2	87.1	mmHg	K	3.6	mEq/L
pCO_2	27.4	mmHg	Cl	105	mEq/L
HCO_3^-	17.6	mEq/L	Ca	9.7	mg/dl
BE	-5.4	mmol/L	CRP	2.10	mg/dl
Lac	2.3	mmol/L	HbA1c	5.7	%

CBC: complete blood cell count, WBC: white blood cell, RBC: red blood cell, Hb: hemoglobin, Hct: hematocrit, PLT: platelet, PT: prothrombin time, APTT: activated partial thromboplastin time, Fbg: fibrinogen, BGA: blood gas analysis, BE: base excess, Lac: lactate, T-Bil: total bilirubin, AST: aspartate aminotransferase, ALT: alanine aminotransferase, LDH: lactate dehydrogenase, CK: creatinine kinase, TP: total protein, ALB: albumin, UN: urine nitrogen, Cr: creatinine, UA: uric acid, T-Chol: total cholesterol, CRP: C-reactive protein, HbA1c: hemoglobin A1c.

Figures

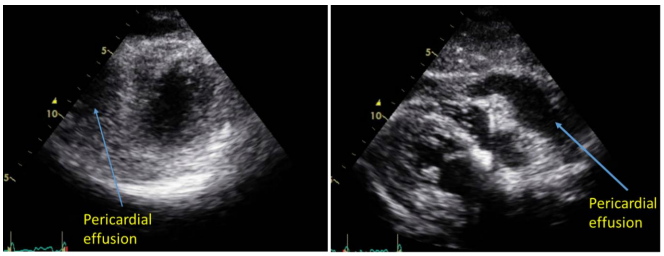

Figure. 1

Figures

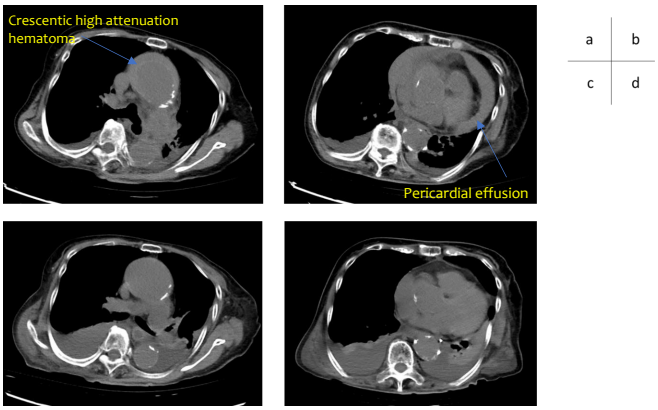

Figure. 2