MEGA JOURNAL OF CASE REPORTS

Case Presentation

Compiled Date: April 27, 2023

Spontaneous Non-Traumatic Mediastinal Hematoma that Required Differentiation from Esophageal Rupture: A Case Report

Makoto Kobayashi, MD, PhD[1*], Hitoshi Yonezawa, MD[2], Kenji Murakami, MD[3], Koichi Osuda, RT[4], Kyohei Sakurai, MD[5], and Yoshimatsu Ehama, MD[5]

[1]Director of Surgical Division and Intensive Care Center, Hakodate Goryoukaku Hospital, 38-3 Goryoukaku-cho, Hakodate City, Hokkaido, 040-8611, Japan

[2]Division of Surgery, Hakodate Goryoukaku Hospital, 38-3 Goryoukaku-cho, Hakodate City, Hokkaido, 040-8611, Japan

[3]Chief of Radiological Division and Intervention Radiology Center, Hakodate Goryoukaku Hospital, 38-3Goryoukaku-cho, Hakodate City, Hokkaido, 040-8611, Japan

[4]Division of Clinical Radiology Services, Hakodate Goryoukaku Hospital, 38-3 Goryoukaku-cho, Hakodate City, Hokkaido, 040-8611, Japan

[5]Division of Emergency Medicine, Hakodate Goryoukaku Hospital, 38-3 Goryoukaku-cho, Hakodate City, Hokkaido, 040-8611, Japan

[*]**Corresponding author:** Makoto Kobayashi, Director of Surgical Division and Intensive Care Center, Hakodate Goryoukaku Hospital, 38-3 Goryoukaku- cho, Hakodate City, Hokkaido, 040-8611, Japan, Tel: +81-138-51-2295; Fax: +81-138-56-2695; E-mail: mobilecoba@me.com

Abstract

Background: This report describes a rare case of mediastinal hematoma that required differentiation from esophageal rupture. To the best of our knowledge, this case is the second report of a proper esophageal artery rupture, as well as the first reported case of a spontaneous cure for mediastinal hematoma without surgery or transcatheter arterial embolization.

Case presentation: A 64-year-old male presented with chest and back pain, but he had no symptoms of a sudden increase in internal pressure of upper digestive tract due to repeated vomiting. Multi-detector-row computed tomography (MDCT) revealed a massive inferior mediastinal mass, making it important to rule out an esophageal rupture. The images showed a hematoma caused by the proper esophageal artery raised from the thoracic aorta at the T10 level, but no mediastinal emphysema was observed. The patient's vital signs had been stable, and we did not perform further treatment using interventional radiology (IVR). No abnormalities were found on esophagography or endoscopy, and the patient was discharged after 12 hospital days. The patient has had no relapse in the one year since the last medical observation.

Conclusion: We have experienced a very rare case of mediastinal hematoma originating from the proper esophageal artery that was managed conservatively. It is important to distinguish them from esophageal rupture when deciding on a course of

treatment.

Keywords: The proper esophageal artery; Aneurysm; Interventional radiology; Multi-detector-row computed tomography

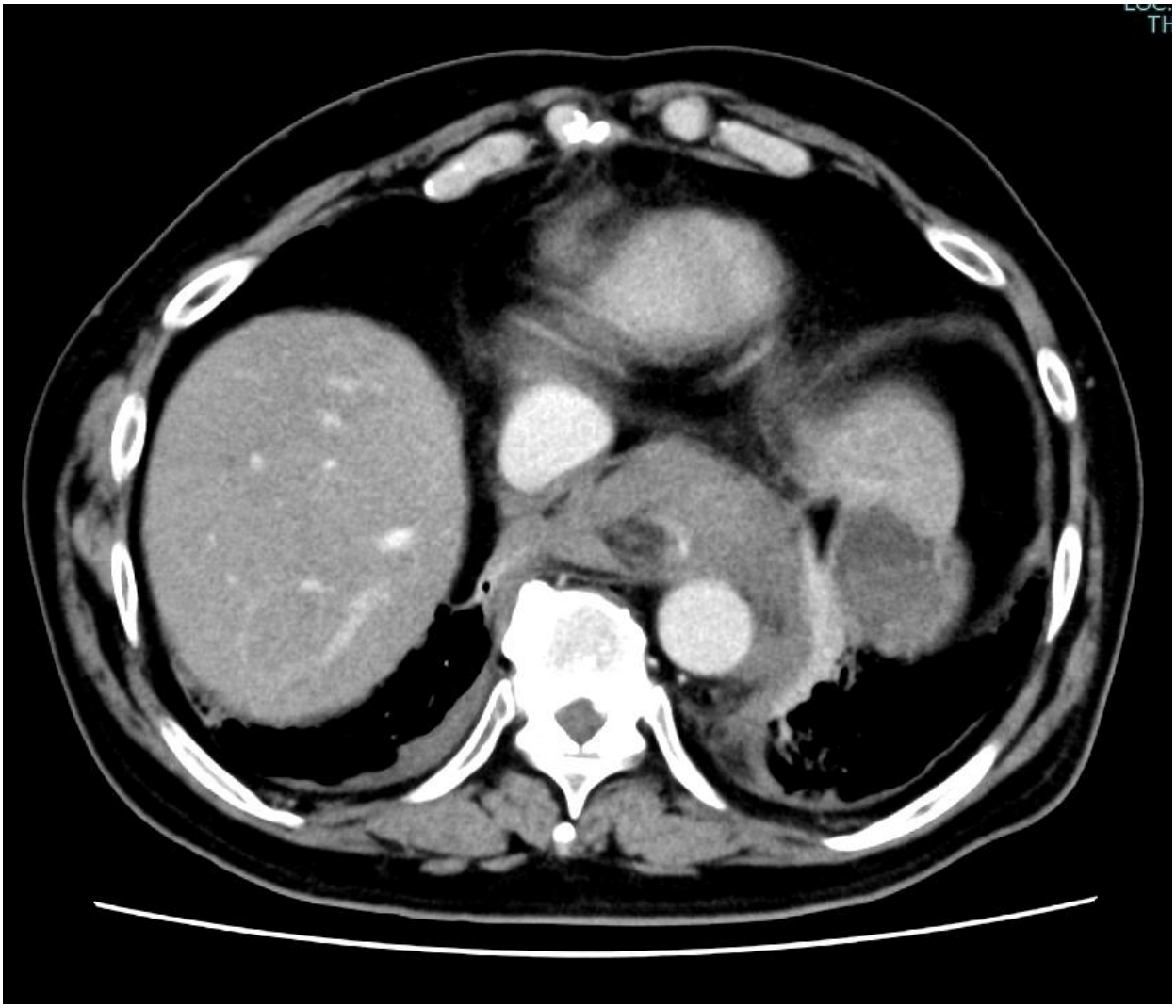
Introduction

Mediastinal hematoma is a rare disease, but the bronchial artery is usually responsible for this [1]. There has been only one other previous report of mediastinal hematoma caused by a ruptured aneurysm of the proper esophageal artery [2], which we experienced in this study. In general, the mediastinal hematoma from the bronchial artery forms a mass in the middle mediastinum. However, the mass in the case presented here was predominantly located in the inferior mediastinum, making it important to differentiate from an esophageal rupture. This is crucial because cases of esophageal rupture require emergency surgery within 24 hours [3,4]. On the other hand, Interventional Radiology (IVR) is usually preferred for vessel rupture [5], but open chest surgery or thoracic endovascular aortic repair may be necessary when IVR is not feasible [6]. To the best of our knowledge, this case is the second report of a rupture of proper esophageal artery, as well as the first reported case of a spontaneous cure for mediastinal hematoma without surgery or Transcatheter Arterial Embolization (TAE). This paper examines the diagnostic and treatment process in a very rare case of a ruptured proper esophageal artery.

Case Presentation

A 64-year-old male noticed acute chest and back pain when breathing in the morning. His medical history was significant for paroxysmal tachycardia treated with bisoprolol fumarate and aprindine hydrochloride. There was no history of anticoagulant or antiplatelet medication. When he visited the outpatient clinic of our hospital in the afternoon, he was conscious, with a blood pressure of 123/88 mmHg, heart rate of 72 beats/ min, and peripheral artery oxygen saturation of 96% on room air. A complete blood cell count showed a white blood cell count of 7800/lL, hemoglobin of 14.4 g/dL, hematocrit of 43.4%, and platelet count of 14.9 x 10^4/dL. There were no abnormal findings on chest radiograph and electrocardiogram, and thus he was allowed to return home temporarily.

Later that same night, he experienced respiratory distress and increasing pain radiating from the back of the lower to the upper chest. An ambulance was requested, and the patient came to our hospital. Upon arrival at the emergency department, he was still conscious and his vital signs were stable (blood pressure of 110/75 mmHg, heart rate of 70 beats/min, and peripheral artery oxygen saturation of 95% on room air). Complete blood cell count revealed hemoglobin of 13.7 g/dL and hematocrit of 41.6%, which is a slight decrease compared to the values from 10 hours earlier. Cardiac pathologies were ruled out after normal electrocardiography and echocardiography findings. Enhanced Multi-Detector-row Computed Tomography (MDCT) showed a large hematoma at the lower mediastinum extending upwards, as well as a left hemothorax, but aortic aneurysm rupture or dissection was ruled out. A small leakage of contrast medium into the hematoma was seen within the mediastinum at the T10 level. No mediastinal emphysema was observed **(Figure 1).**



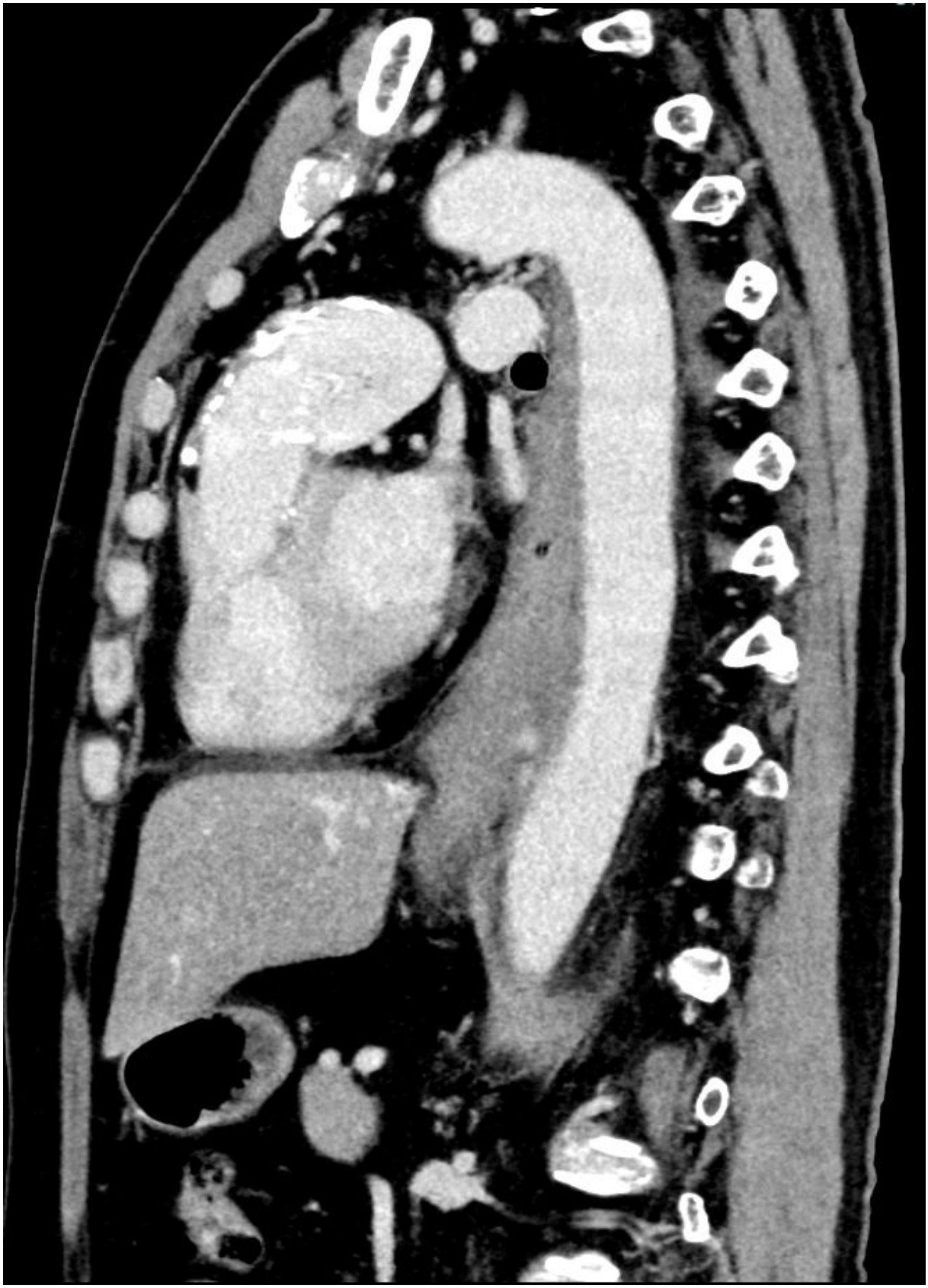


Figure 1: An enhanced computed tomography scan at the onset shows a massive hematoma in the inferior mediastinum. Emphysema is not observed within the mass (A). Mediastinal hematoma exists along ventral side of the descending aorta. The mass is large in the lower mediastinum and gradually decreases in size toward the upward (B).

Mediastinal hemorrhage was strongly suspected. While under observation in the intensive care unit, the patient's blood pressure and oxygen saturation did not deteriorate, and his back pain recovered after administration of acetaminophen.

On the following day, MDCT revealed no changes in the mediastinal mass, with no additional leakage of contrast medium. Within the mass, we identified a small aneurysm connected to a small artery that branched from the thoracic aorta at the Thoracic 10 level with an anastomotic branch to the bronchial artery peripherally (Figure 2). Based on its origin and distribution on imaging, we judged the artery to be the proper esophageal artery (Figure 3). At this time, a complete blood cell count showed hemoglobin of 13.3 g/dL, hematocrit of 40.7%, and platelet count of 14.3 x 104/dL. Because the patient's blood pressure and respiratory condition were not exacerbated and the patient suffered from no anemic state, we did not perform further treatment using IVR. Esophagography and endoscopy were performed to confirm the condition of the esophagus adjacent to the hematoma, but no abnormalities were found. The patient was able to leave the hospital 12 days after onset. After discharge from the hospital, there was no appearance of similar symptoms, and CT scan four months later showed that the mediastinal hematoma had disappeared (Figure 4). The patient has had no relapse in the one year since the last medical observation.

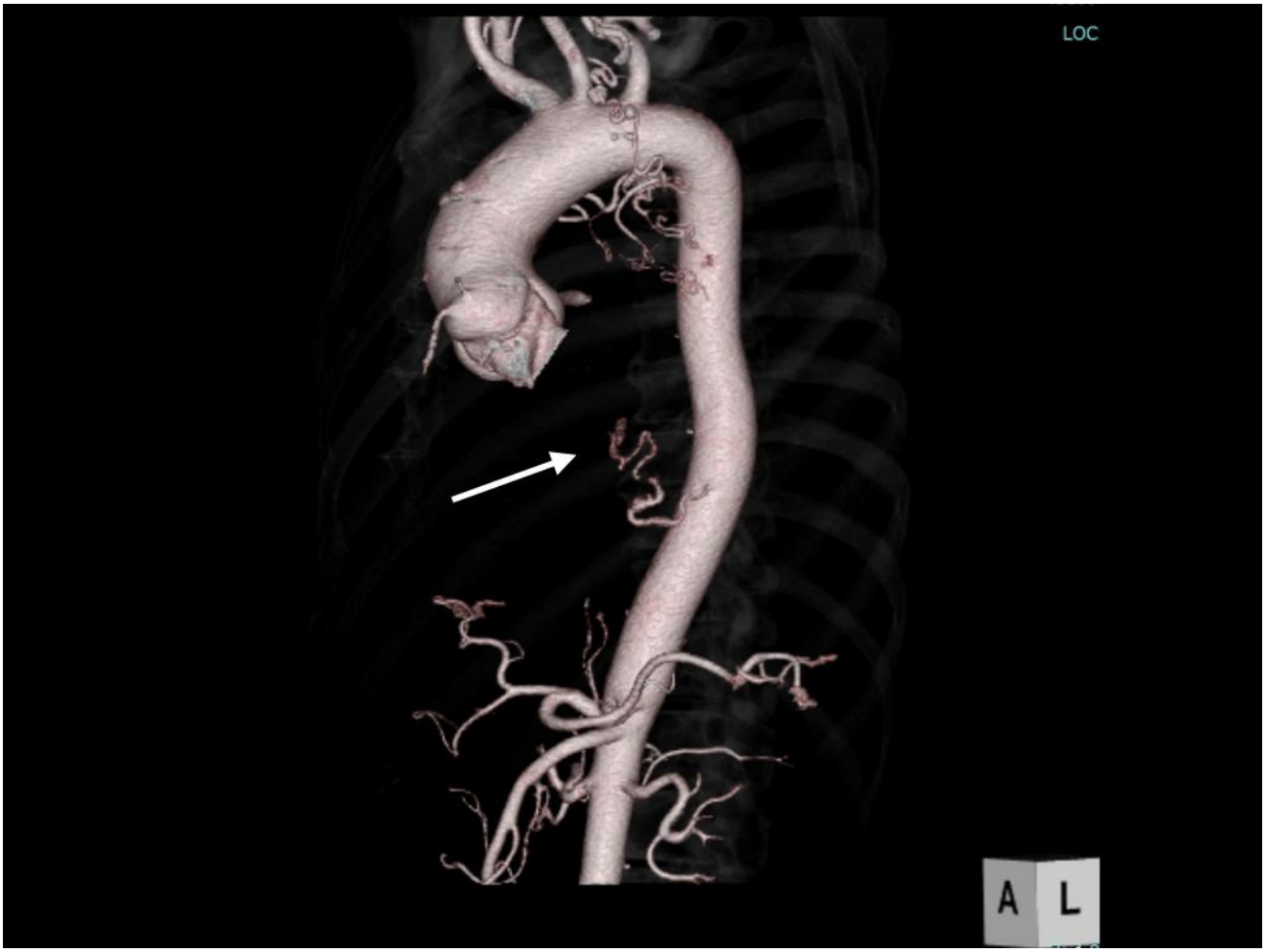


Figure 2: MDCT at the onset shows that the proper esophageal artery is partially aneurysmal (arrow) bifurcated from the descending aorta.

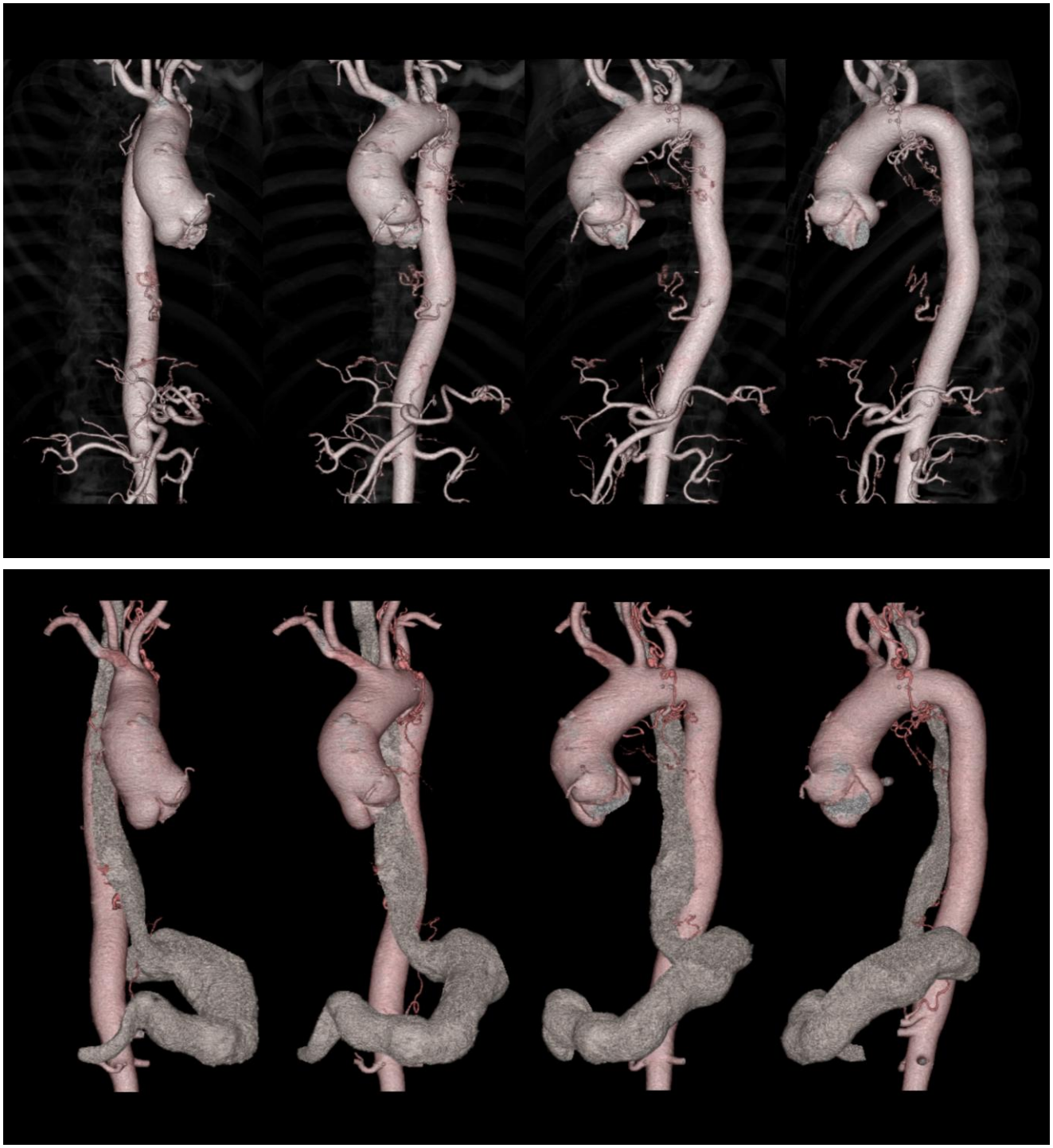
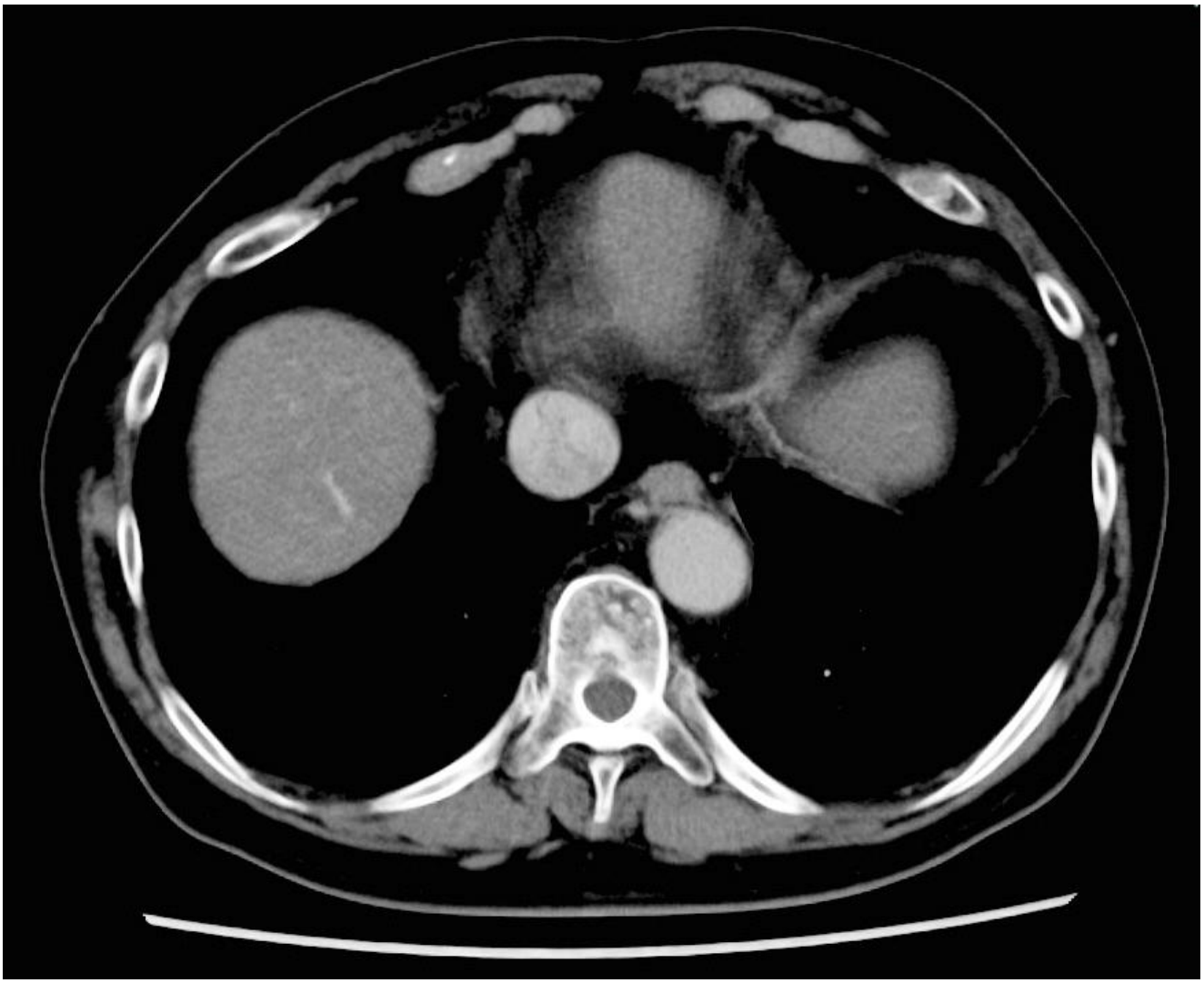


Figure 3: Series of a virtual 3-dimensionally constructed image clearly demonstrate the proper esophageal artery (A). Reconstructed image of esophageal structures is added on prior image, and it figures the artery flows into the lower esophagus (B).



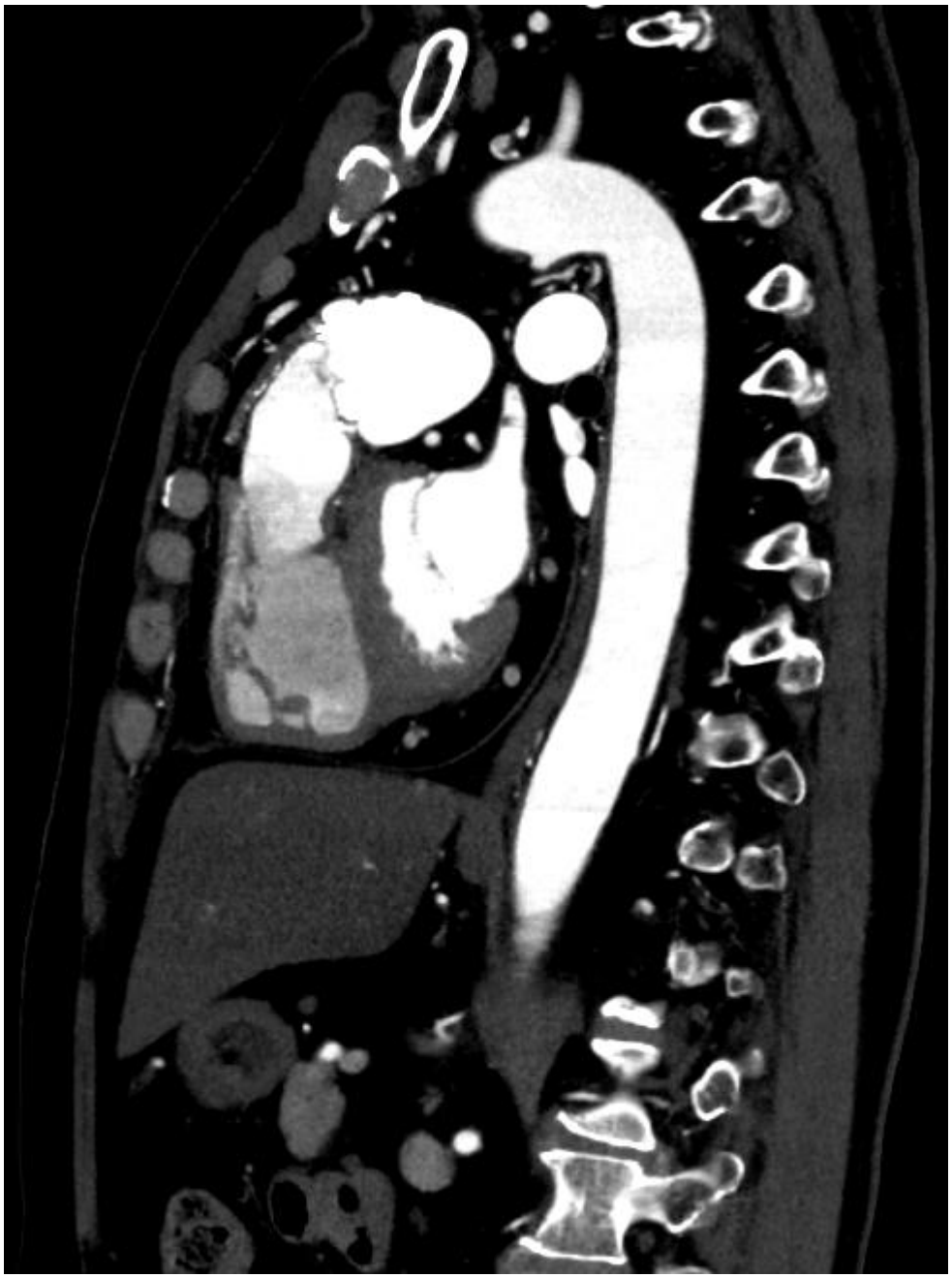


Figure 4: An enhanced computed tomography scan taken 4 months after onset shows no hematoma on the same slice view in the inferior mediastinum (A). A CT view shows no existence of unusual structures along ventral side of the descending aorta (B).

Discussion

In patients presenting with chest pain and respiratory distress, it is important to identify the disease that requires urgent attention. In particular, intra-thoracic diseases for which delayed treatment can be fatal include acute coronary artery syndrome, aortic dissection, ruptured aortic aneurysm, pulmonary embolism, esophageal rupture, and mediastinal hemorrhage. When mediastinal hematoma is found in the inferior mediastinum, such as in this, it is important to differentiate it from esophageal rupture. In the present case, the mediastinal hematoma was caused by a ruptured aneurysm of the proper esophageal artery, which could be treated conservatively. An accurate understanding of the anatomy of the mediastinum is important in order to infer the cause of a mediastinal hematoma. Organs within the mediastinum that may be of clinical concern include the esophagus, lungs, trachea, aorta, and heart. Among these, arteries

branching directly from the aorta include the intercostal artery, bronchial artery, and proper esophageal artery. When a mediastinal hematoma is suspected on CT imaging, the location of the hematoma should allow the responsible artery to be estimated. If the hematoma is located in the middle mediastinum, the bronchial artery is likely to be responsible, whereas if it is located in the inferior mediastinum, the proper esophageal artery is likely to be responsible. The high spatial and temporal resolution of MDCT allows for a diagnostic capability comparable to that of catheter angiography, making it an extremely useful modality even in the absence of an IVR specialist. However, IVR is useful for the definitive identification of the causative artery and the presence of active bleeding, and TEA can be added if there is persistent bleeding **[7].** In the present case, the absence of a history of anticoagulant or antiplatelet medication was also helpful, resulting in hemodynamic stability after the initial onset and no progression of anemia. MDCT on the day after onset showed no increase inhematoma, and the patient was discharged without additional IVR.

Mediastinal hematoma is a rare disease, but when the hematoma grows, there is a direct risk of affecting the heart and esophagus. Especially in cases of mediastinal hematoma with anticoagulant therapy, there is a high risk of continued bleeding and serious complications **[8].** If the hematoma compresses the heart and causes hemodynamic instability, removal of the hematoma is urgently needed. There have also been reports of esophageal perforation due to obstruction of blood flow in the esophageal wall caused by the hematoma, either directly or indirectly **[9].** A mediastinal hematoma caused by a bronchial artery is reported to occur in the middle mediastinum and thus needs to be differentiated from esophageal tumors **[10].** In particular, when a hematoma develops in the lower mediastinum, as in the case presented here, it is important to distinguish it from esophageal rupture, and the diagnosis can greatly influence the subsequent treatment plan. In our previous experience with four cases of esophageal rupture, the initial symptoms all included chest pain and respiratory distress. The most likely causative event was severe vomiting in three cases and a severe blow to the abdomen in one case. Emergency CT imaging revealed mediastinal emphysema and left intrathoracic effusion in all cases, with no cases of hematoma in the mediastinum. The initial symptom in our case presented here was also chest distress, which moved over time from the orbital region to the upper back of the chest. Such symptoms were not common in previous cases of esophageal rupture. CT images of the patient at the time of initial onset also showed only a hematoma involving the esophagus in the lower thoracic region and a left pleural effusion, with no mediastinal emphysema. As a result, the patient was discharged from the hospital without the need for additional treatment, as no abnormal findings involving the esophagus were observed on esophageal fluoroscopy or upper gastrointestinal endoscopy after the onset of the disease. Esophageal rupture is a perforation of the physiologic vulnerable portion of the lower esophagus induced bya sudden increase in internal pressure in the vicinity of the esophagogastric junction due to repeated vomiting **[11].** The swallowed food and air leak into the mediastinum at once, resulting in mediastinal emphysema with accumulation of food residues in the mediastinum and thoracic cavity on CT images. Because of the influx of gastric acid-containing fluid into the thoracic cavity, chest pain and respiratory distress are progressively persistent, leading to hemodynamic instability. The differential diagnosis of esophageal rupture is relatively easy to make based on the characteristic symptoms and specific CT findings prior to rupture. A meta-analysis of esophageal rupture found a mortality rate of 7.4% when esophageal rupture is diagnosed and treated within 24 hours, including emergency surgery, compared with a mortality rate of 20.3% when treatment is delayed **[3].** Therefore, when a lesion is present in the inferior mediastinum, a prompt differential diagnosis and precise treatment decision are required.

Conclusion

Mediastinal hematomas occurring in the inferior mediastinum are extremely rare. It is important to distinguish them from esophageal rupture when deciding on a course of treatment. We have experienced a very rare case of mediastinal hematoma originating from the proper esophageal artery that was managed conservatively, and we have reviewed the

diagnostic and therapeutic approach to such cases. Although MDCT in emergency situations can be useful in identifying the ruptured artery causing the hematoma, we suggest that in cases of hemodynamic instability, IVR should be performed without hesitation.

Ethics Approval and Consent to Participate

This case report was approved by the ethics committee of Hakodate Goryoukaku Hospital (Approval No. 2022-047), and the committee also verified that the data remained confidential by concealing the privacy of the patient. This study was compliant with the Declaration of Helsinki.

Consent for Publication

Consent for publications was obtained from the participant. Informed consent was obtained from the patient for publication of this case report and any accompanying images.

Acknowledgments

The authors would like to thank Enago (Crimson Interactive Japan Co., Ltd, Japan) for the English language review.

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Citation of this Article

Kobayashi M, Yonezawa H, Murakami K, Osuda K, Sakurai K, and Ehama Y. Spontaneous Non-Traumatic Mediastinal Hematoma that Required Differentiation from Esophageal Rupture: A Case Report. Mega J Case Rep. 2023; 6: 2001-2013.