Received: 15 December 2020 | Revised: 31 January 2021 | Accepted: 8 February 2021

DOI: 10.1002/ccr3.3961

CASE REPORT

Clinical Case Reports Open Access WILEY

A case of plastic bronchitis after mitral valve surgery in an adult

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Abstract

Plastic bronchitis is a rare and fatal disease that is characterized by the presence of long dendritic bronchial casts in the airway. It is encountered most frequently in children with congenital heart disease after correction surgery. We reported a case of plastic bronchitis after mitral valve surgery in a 70-year-old woman.

1 | INTRODUCTION

Plastic bronchitis is a rare and fatal disease that is characterized by the presence of long dendritic bronchial casts in the airway. It is encountered most frequently in children with congenital heart disease after correction surgery. We reported a case of plastic bronchitis after mitral valve surgery in a 70-year-old woman.

Plastic bronchitis is a rare disorder that had been associated with pediatric congenital heart disease.[1,2] Few cases of plastic bronchitis after adult cardiac surgery have been reported.[3-5] We presented a case of plastic bronchitis after mitral valve surgery in an adult.

2 | CASE PRESENTATION

A 70-year-old woman underwent mitral valve surgery for mitral stenosis with heart failure. The mitral valve replacement with bioprosthesis under cardiopulmonary bypass was uneventful. At 4 hours after arrival to the intensive care unit, she was withdrawn from the ventilator and had stable circulatory and respiratory conditions.

On postoperative day (POD) 1, wheezing was heard on the left lung field, and chest X-ray demonstrated opacity on the left lung (Figure 1A). She did not complain of dyspnea, and her oxygenation was kept normal; we placed her on non-invasive positive pressure ventilation to expand the left lung. On POD 2, computed tomography scan revealed collapse of the left lung and marked exudate in the left main bronchus (Figure 1B). Therefore, she was intubated and was placed on high positive pressure mechanical ventilation.

The first bronchoscopy on POD 3 showed secretions. Treatment with beta-agonist bronchodilator and inhaled mucolytic was continued for several days, but the left lung condition did not improve. On the second bronchoscopy on POD 8, there was a rubbery and mucinous bronchial cast, which was extracted (Figure 2A). On histologic examination (Figure 2B), the cast mainly comprised mucous material and few histiocytes; there was no eosinophils and neutrophils, which indicated acellular plastic bronchitis. Based on these findings, she was diagnosed as type 2 plastic bronchitis localized to the left lung.[1] Cultures taken from the cast were negative. We started steroid therapy and attempted sputum drainage by active postural changes for the next 2 weeks. Several casts were drained recurrently, but the air entry to the

Meeting presentation: No

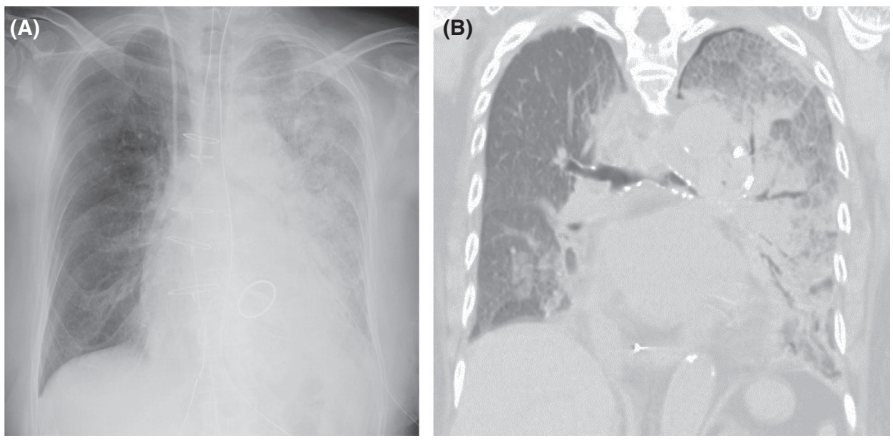

FIGURE 1 A, Chest X-ray on POD 1 demonstrates opacity on the left lung. B, Computed tomography on POD 2 reveals collapse of the left lung and marked exudate in the left bronchus

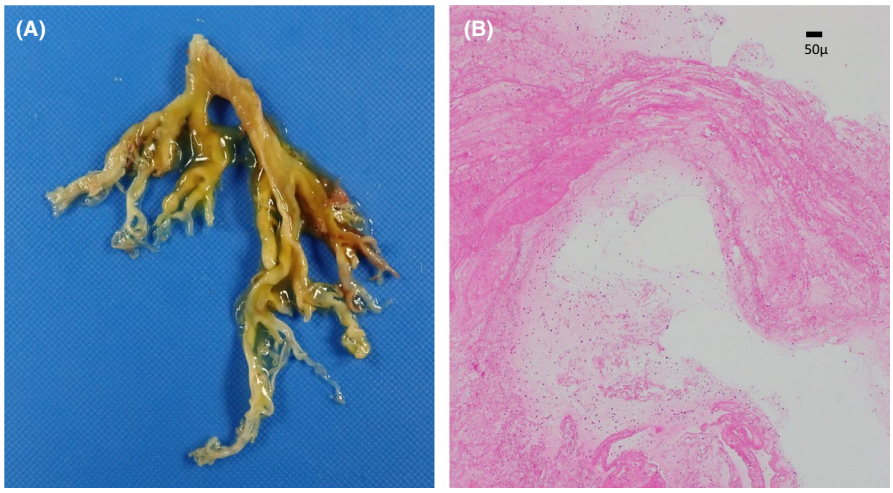

FIGURE 2 A, Gross findings of the dendritic cast in left bronchial tree during bronchoscopy. B, Histologic examination of the bronchial cast shows primarily fibrin with few histiocytes, which indicated acellular plastic bronchitis (hematoxylin-eosin, original magnification ×40). Scales bar: 50 μm

left lung did not improve and bacterial infection developed in the damaged left lung. We started her on culture-guided intravenous antibiotic therapy, but the infection spread to the right lung rapidly, causing critical hypoxia despite the maximum mechanical ventilator support. She died the following day. Postmortem examination was declined by the family.

3 | DISCCUSSION

Plastic bronchitis is a rare and life-threatening disease that is characterized by the presence of bronchial casts in the airway.[1] It is most frequently encountered in children with congenital heart disease after correction surgery and in few adults with various respiratory diseases.[2]

Plastic bronchitis is classified into two types based on histologic findings. Type 1 (inflammatory) casts mainly comprise fibrin with dense eosinophilic inflammatory infiltrates. Type 2 (acellular) casts mainly comprise mucin with small inflammatory infiltrates.[1]

On review of literature, we found only three adult cases of plastic bronchitis after cardiac surgery with cardiopulmonary bypass.[3-5] In the first case, the patient complained increased exertional dyspnea shortly after hospital discharge from the coronary bypass surgery.[3] She was treated with medicines and recovered. Last two cases were fulminant; the one was after bilateral lung transplantation,[4] and the other was after coronary bypass surgery combined with mitral valvuloplasty.[5] Both developed rapid respiratory collapse and required urgent extracorporeal membrane oxygenation (ECMO). After bronchoscopic removal of the casts, they liberated from the ECMO and survived. In present case, the plastic bronchitis was intractable and was treated with various medical methods. However, the patient died of secondary bacterial pneumonia.

Some recent reports suggested that abnormal pulmonary lymphatic flow can cause type 2 plastic bronchitis in children.[6,7] In those reports, the percutaneous lymphatic embolization was an effective treatment for plastic bronchitis. In this present case, we could not examine the pulmonary lymphatic flow because of equipment problems in this presenting case.

This case demonstrated that plastic bronchitis should be considered in a patient who develops acute respiratory failure after adult cardiac surgery and other various surgeries. Early diagnosis and treatment are most important to treat plastic bronchitis, and early fiberscoptic bronchoscopy intervention is the first choice. In addition, evaluation and medical

treatment of abnormal pulmonary lymphatic flow may be considered for intractable cases of plastic bronchitis.

CONFLICT OF INTEREST

None declared.

AUTHOR CONTRIBUTIONS

Masanori Ogiwara: revised and completed the manuscript and reviewed the literature. Maki Ichinose: drafted the initial version of manuscript and reviewed the literature. Yoshifumi Nishino, Masahiko Ozaki, and Takuya Miyahara involved in patient care and gathered all clinical materials and images. All authors reviewed and approved the final version of the manuscript.

ETHICAL APPROVAL

Informed consent was obtained from the patient's bereaved family. Local institutional ethics processes were followed.

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How to cite this article: Ogiwara M, Ichinose M, Nishino Y, Ozaki M, Miyahara T. A case of plastic bronchitis after mitral valve surgery in an adult. *Clin Case Rep*. 2021;9:2122–2124. https://doi.org/10.1002/ccr3.3961