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Pedicled Omentoplasty for Treatment of Rheumatoid Nodule Pneumothorax: A Case Report

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Abstract

Background No consensus exists regarding surgical intervention for rheumatoid nodule–related pneumothorax. Clinical policy decisions rely on individual clinicians' experience and are usually intractable.

Case Description A 50-year-old man with a difficult-to-treat rheumatoid arthritis–related pneumothorax was successfully treated with pedicle omentoplasty without recurrence at approximately 2 years posttreatment. To the best of our knowledge, this is the first report of a patient where pneumothorax did not recur due to firm adhesions despite fluctuating postoperative rheumatoid nodules, as captured by regular computed tomography imaging follow-ups.

Conclusion Pedicled omentoplasty is effective for rheumatoid nodule–related pneumothorax as it reduces pneumothorax recurrence.

Keywords
- pedicled omentoplasty
- omentum
- rheumatoid pleural nodules
- intractable secondary pneumothorax
- rheumatologists

Introduction

Approximately 1% of patients with rheumatoid arthritis have pleuropulmonary lesions. Rheumatoid arthritis–related pulmonary nodules tend to necrose and rupture, leading to the development of pneumothorax or, more severely, bronchopleural fistula.[1] Rheumatoid nodule–associated pneumothorax usually recurs and requires repeated intervention, and is sometimes refractory to treatment.[2] This report describes a case of successful pedicle omentoplasty for difficult-to-control rheumatoid nodule–associated pneumothorax. Routine follow-up with computed tomography (CT) imaging revealed repeated increases and decreases in postoperative rheumatoid nodules. However, the pneumothorax did not recur, suggesting that a strong adhesion had been achieved.

Case Description

In 2020, a rheumatologist referred a male patient in his 50s to our thoracic department for a first right pneumothorax caused by a rheumatoid nodule rupture (►**Fig. 1**). He was being administered methotrexate and steroids to manage rheumatoid arthritis that started 10 years earlier. No other preexisting conditions were noted. The patient presented with pneumothorax in addition to rheumatoid arthritis symptoms and exhaustion.

The pneumothorax cavity gradually enlarged over 2 months, and the patient underwent thoracic drainage. Repeated pleurodesis was performed because of the presence of leaks; however, it was ineffective. The patient expressed a preference for the treatment to be completed in one operation as much as possible.

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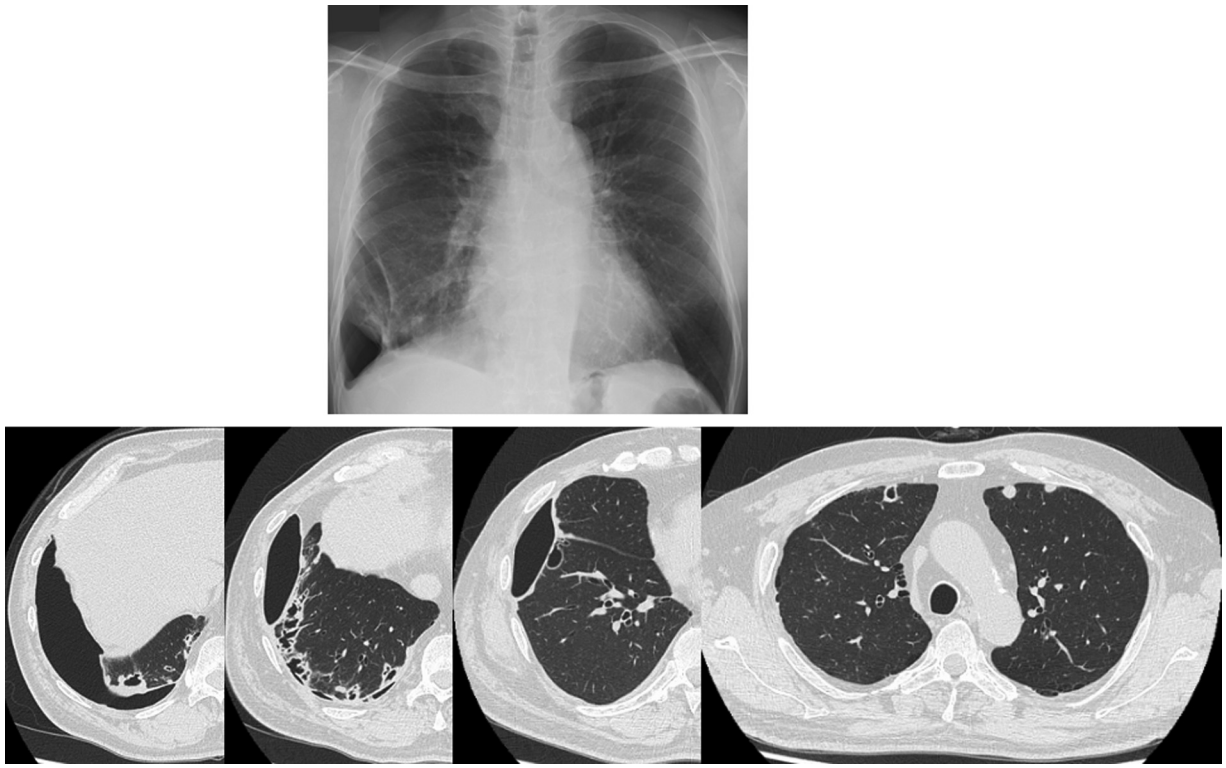

Fig. 1 Chest radiograph at the time of referral to our department. The right pneumothorax is presented here. Computed tomography image showing multiple rheumatoid nodules. The rheumatoid nodules around the pneumothorax cavity were contiguous.

Spigot filling is generally used when pleurodesis fails. However, in this case, the nodules were widely contiguous, and the feasibility of Spigot filling was uncertain; therefore, it was not performed.

The patient underwent surgery 3 months after the referral to our department under general anesthesia. Although a pleural defect was identified (►**Fig. 2**), the surrounding area was fragile, and direct suturing was not performed because it was judged to increase the wound size. Due to the expectation of widespread adhesion, we performed parietal pleural covering.[3] A TachoSil covering was placed over the fistula (►**Fig. 2**), and the parietal pleura was dropped over the TachoSil. The patient remained in good condition for approximately 2 weeks, after which the pneumothorax recurred.

A Clagett window and an Eloesser flap were not selected for the next course of action because of the requirement for long-term dressing changes. Similarly, conventional thoracoplasty was not selected because of its impact on appearance.

Although no obvious intrathoracic infection was observed at this stage, we performed pedicled omentum filling. This choice was driven by several factors, including the

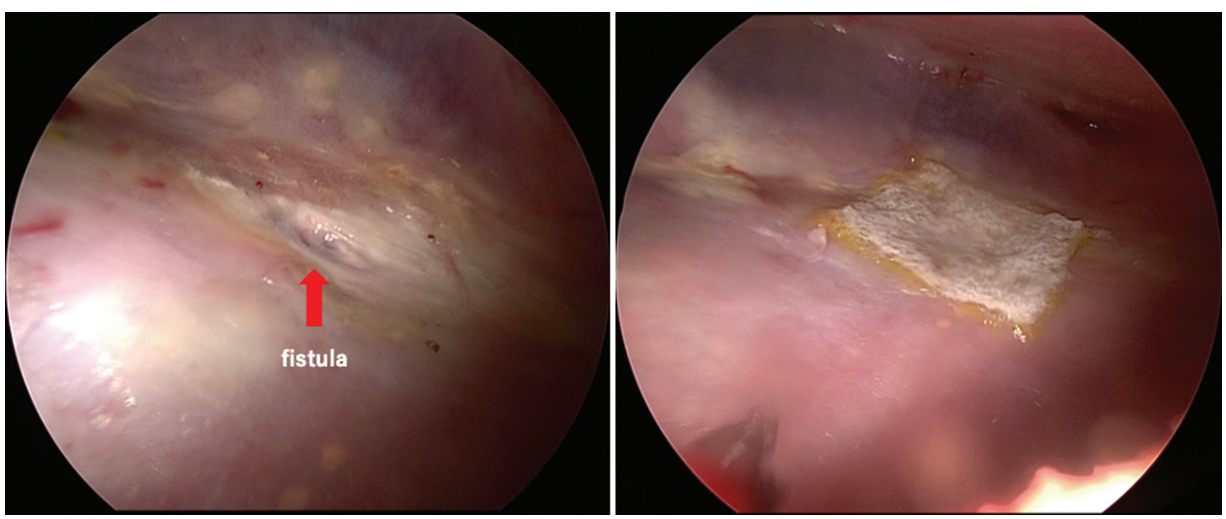

Fig. 2 Initial intraoperative findings are presented here. A pleural defect was observed, and TachoSil was applied. (Red arrow)

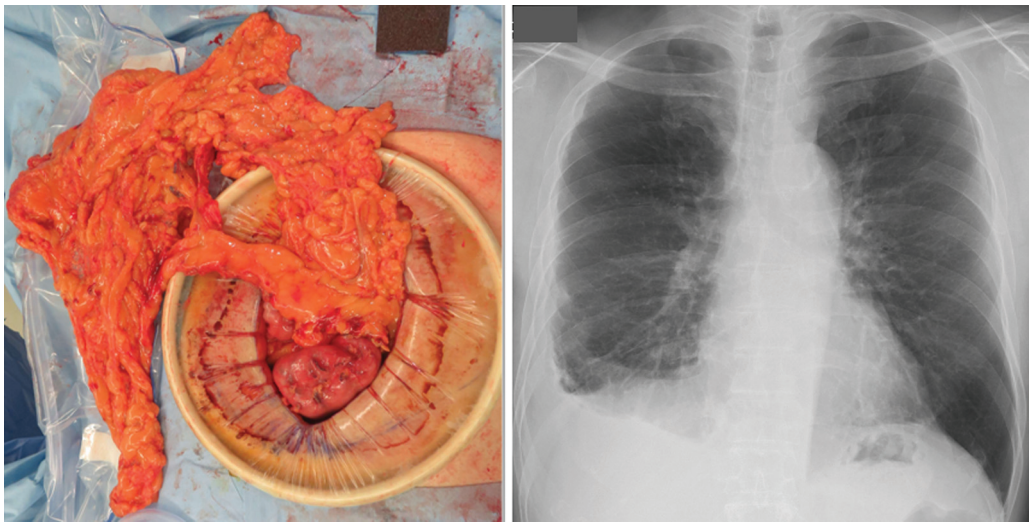

Fig. 3 Harvested pedicled omentum. Chest radiograph after filling of the pedicled omentum.

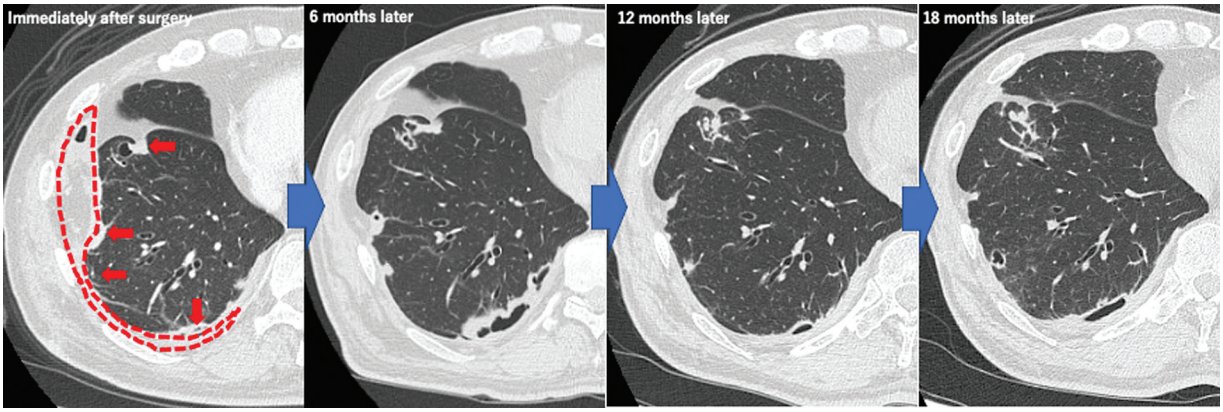

Fig. 4 Computed tomography scan of the patient after the omentum filling. Some rheumatoid nodules are enlarged, while others are small. Despite repeated increase and decrease in the nodules, no recurrence of pneumothorax is observed, probably because the nodules adhered firmly (*dotted line*: pedicled omentum-filling area; *red arrows*: rheumatoid nodules over time).

expectation of strong adhesion, the patient's immunosuppressed state, concerns regarding future infection, and the rheumatologist's intention to use more potent antirheumatic drugs (Janus kinase inhibitors)[4] in the future.

A second surgery was performed approximately 1 month after the initial surgery. The pedicled omentum was harvested in a stemlike manner through a median incision in the upper abdomen and guided into the thoracic cavity via a hole created in the diaphragm (►**Fig. 3**). The patient was discharged without major adverse events postoperatively on postoperative day 15 after pain control and rehabilitation. Regular follow-up was conducted every month, and approximately 2 years have passed since the treatment. During the postoperative period, the rheumatoid nodule increased and decreased repeatedly; however, we believe that due to its firm adhesion, the pneumothorax did not recur (►**Fig. 4**).

Discussion

Rheumatoid arthritis presents with different symptoms in patients. Immunosuppressive agents and other drugs used in its treatment can lead to direct pulmonary toxicity, making patients susceptible to opportunistic infections and inhibiting wound repair and healing.[5] Therefore, pneumothorax caused by rheumatoid nodule disruption in the lungs is likely to be resistant to standard treatment,[2] and the treatment strategies are controversial.

In this case, the leak was initially considered to be a single point based on the pleural findings during the initial surgery. However, CT images revealed fragility in the surrounding area; therefore, direct suturing was deemed to be difficult. Moreover, the rheumatoid nodules were widely contiguous, and the suitability of using Spigot filling was uncertain. Furthermore, we applied a TachoSil + parietal pleura covering, although it failed due to lack of firm adhesion.

The patient refused to undergo open window thoracotomy or disfigurement. Therefore, we did not use an Eloesser flap or perform thoracoplasty. Instead, we performed pedicled omentoplasty with the patient's consent to ensure firm adhesion of the pleura and resistance to infection.

Pedicled omentoplasty is highly invasive because of the abdominal incision and is not the first choice for an

uninfected pulmonary fistula. However, direct suturing is difficult for intractable pulmonary fistulas, such as that in this case, where the surrounding lung tissue is fragile. Even if various materials are used to cover the fistula, its closure cannot be achieved. Therefore, using pedicled omentum may be an effective option since strong adhesion can be expected.

Rheumatoid medications were increased to control rheumatism even after filling the omentum. However, the course of the rheumatoid nodules was mixed. No recurrence of pneumothorax was observed approximately 2 years after omentum filling, and the patient was satisfied with the progress. The omentum promotes angiogenesis, supplies fibroblasts, and possesses abundant lymphatic vessels, which contribute to its strong anti-inflammatory and self-cleansing effects. Consequently, it effectively protects against infection. Additionally, its excellent ability to adhere to and repair adjacent tissues further enhances its effectiveness in protecting against infection.[6,7]

Postoperative abdominal symptoms may occur because of the abdominal incision involved in the omentum-filling procedure; however, in this case, none occurred.

Moreover, one problem with this treatment strategy is that it makes reopening the chest difficult and impractical because of firm thoracic cavity adhesions. Patients with rheumatoid arthritis are at a higher risk of pulmonary malignancy than the general population[8]; therefore, they require careful follow-up imaging of the nodules.

In conclusion, pedicled omentoplasty is effective for rheumatoid nodule–related pneumothorax, which differs from common pneumothorax. To the best of our knowledge, this is the first report of a patient where pneumothorax did not recur due to firm adhesions despite repeated increases and decreases in postoperative rheumatoid nodules, as captured by regular CT imaging follow-ups.

Authors' Contribution

H.M., K.K., T.H., and F.T. were directly involved in the treatment of the patient. H.M. obtained patient data and wrote the first version of the manuscript. All the authors critically revised the manuscript.

Ethical Approval

This case report was approved by an independent medical ethics committee, and written informed consent was obtained from the patient.

Funding

None.

Conflict of Interest

None declared.

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