Received: 4 March 2022 | Accepted: 12 April 2022

DOI: 10.1002/rcr2.958

CASE REPORT

Respirology Case Reports | WILEY

IgG4-associated fibrosing mediastinitis requiring differentiation from posterior mediastinal tumour: A case report

Yoshimitsu Hirai[1] | Ryuta Iwamoto[2] | Hideto Iguchi[1] | Aya Fusamoto[1] | Yumi Yata[1] | Takuya Ohashi[1] | Yoshiharu Nishimura[1]

[1]Department of Thoracic and Cardiovascular Surgery, Wakayama Medical University, Wakayama, Japan

[2]Department of Human Pathology, Wakayama Medical University, Wakayama, Japan

Correspondence
Yoshimitsu Hirai, Department of Thoracic and Cardiovascular Surgery, Wakayama Medical University, 811-1 Kimiidera, Wakayama City, Wakayama 641-8509, Japan.
Email: mitsu@wakayama-med.ac.jp

Associate Editor: Sita Andarini

Abstract

A 71-year-old man, who was found to have a posterior mediastinal tumour, was referred to our hospital. Contrast-enhanced computed tomography (CT) showed a 15-cm soft tissue shadow in the posterior mediastinum, with many affected areas and a gradually increasing pattern. We also detected oligemic areas with poor contrast-filling. There was no invasion into the adjacent vertebral body and the blood vessels penetrating the interior were intact. Positron emission tomography–CT revealed a high maximum standardized uptake level of 4.53 in the mediastinal masses. We performed thoracoscopic surgery for the biopsy. Histological findings showed lymphoplasmacytic infiltration in the fibrous stroma as well as storiform fibrosis. Immunohistochemical examination revealed abundant infiltration of immunoglobulin G4 (IgG4)-positive plasma cells and 40% IgG4/IgG-positive plasma cells. Postoperative serum examinations showed a high serum IgG4 level (570 mg/dl). Accordingly, we diagnosed the patient with IgG4-related fibrosing mediastinitis, a rare manifestation of IgG4-related disease.

KEYWORDS

fibrosing mediastinitis, IgG4-associated disease, IgG4-related disease, IgG4-related fibrosing mediastinitis, posterior mediastinal tumour

INTRODUCTION

Immunoglobulin G4-related disease (IgG4-RD) is a systemic fibroinflammatory disease characterized by elevated serum IgG4 levels, infiltration of IgG4+ plasma cells in one or more organs and severe fibrosis in the affected tissues.[1] IgG4-RD has been reported in various organs, such as the pancreas, lacrimal glands, salivary glands, bile duct, kidneys, lungs and retroperitoneum. This disease can potentially affect any organ.[2] Herein, we report a rare case of IgG4-RD presenting as a set of paravertebral masses with characteristic imaging findings in the posterior mediastinum only.

CASE REPORT

A 71-year-old man was found to have a posterior mediastinal tumour during a preoperative examination for prostate cancer. He had a history of Parkinson's disease, asthma, chronic sinusitis and cataracts, and received appropriate medical treatment for these conditions. He had no systemic symptoms and no abnormal physical findings were detected upon a whole-body medical examination.

Contrast-enhanced computed tomography (CT) showed a 15-cm soft tissue shadow in the posterior mediastinum at the Th6–10 level with a multinodular conglomerate appearance (Figure 1A). The contrast showed many affected areas, exhibiting a gradually increasing pattern. There were also oligemic areas with poor contrast detected upon CT scanning. There was no invasion into the adjacent vertebral body and the blood vessels penetrating the interior were intact (Figure 1B, red arrow).

Positron emission tomography–CT (PET–CT) revealed no other affected organs upon whole-body imaging, with no evidence of other posterior mediastinal masses or prostate tumours. PET–CT showed a high maximum standardized

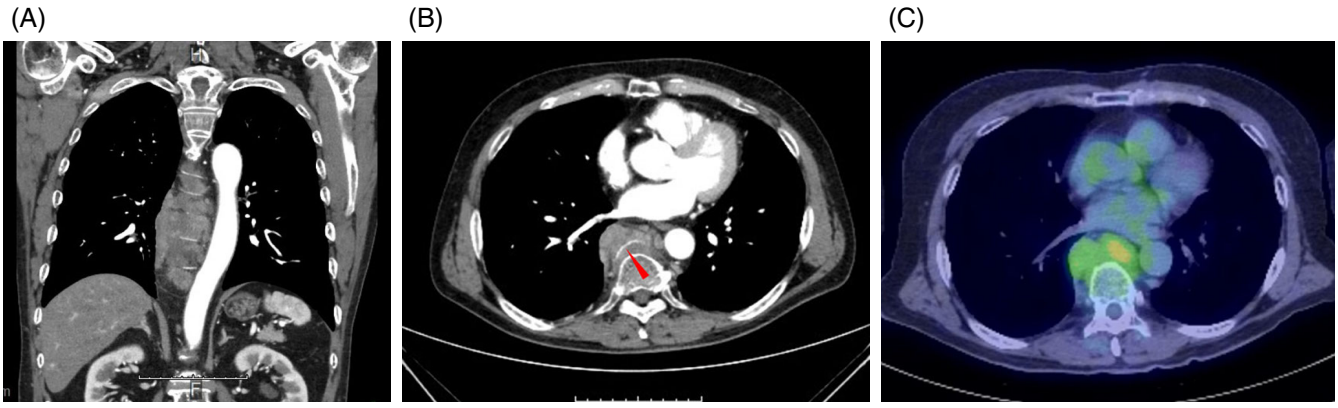

FIGURE 1 Radiological findings. (A) A 15-cm soft tissue shadow in the posterior mediastinum of Th6–10, which appears as a multinodular mass. (B) Thoracic paravertebral soft tissue mass in the axial view. (C) Image of positron emission tomography–computed tomography

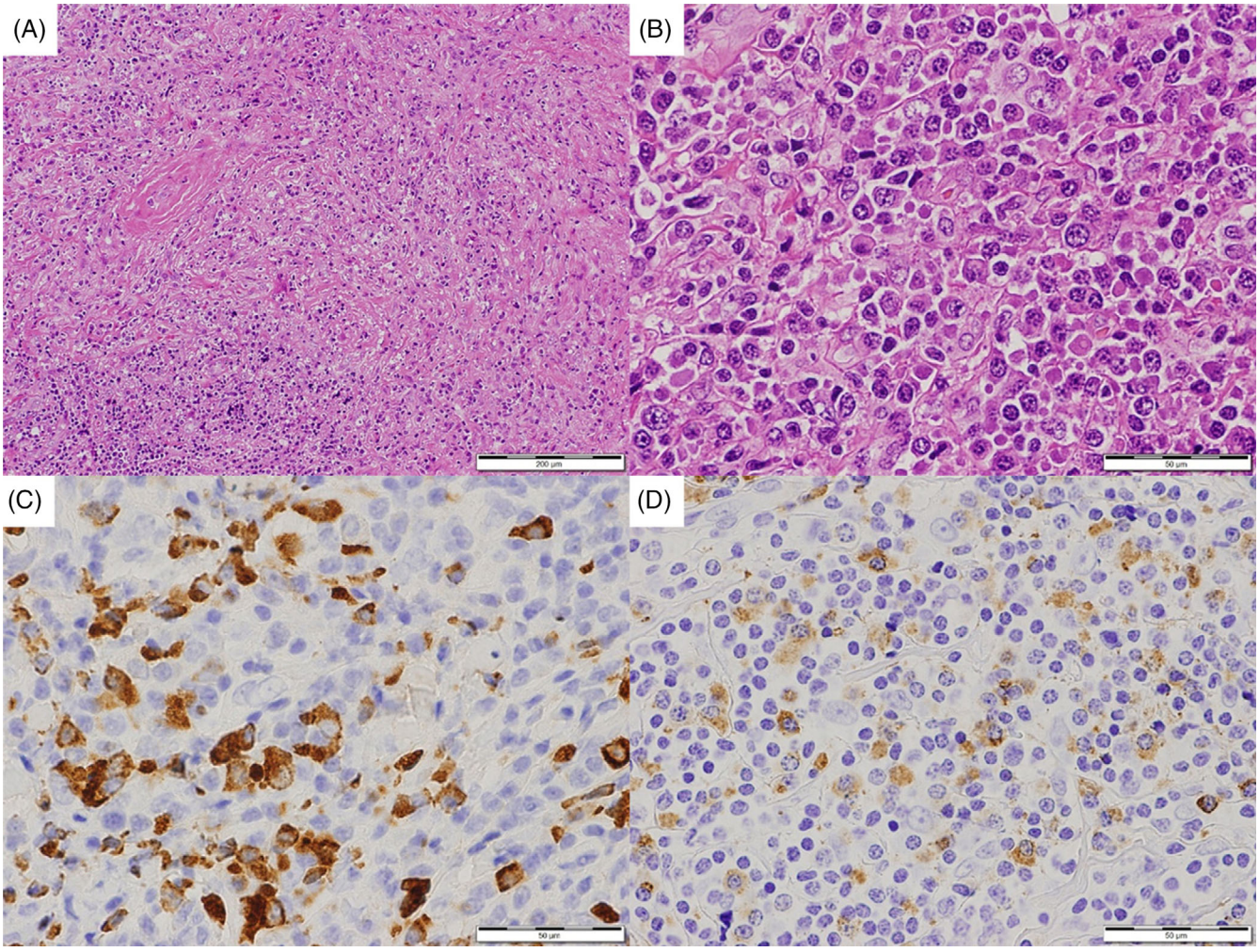

FIGURE 2 Histology. (A) Massive fibrosis with storiform pattern, typified by a cartwheel appearance of the arranged fibroblasts and inflammatory cells (HE stain, ×10). (B) Inflammatory cells are predominantly lymphocytes and plasma cells (HE stain, ×40). (C, D) Plasma cells are positive for (C) immunoglobulin G (IgG) and (D) IgG4 immunohistochemistry (×40)

uptake of 4.53 in the detected mediastinal masses (Figure 1C). The patient's serum markers for carcinoembryonic antigen, cytokeratin 19 fragments, beta-human chorionic gonadotropin, alpha-fetoprotein, soluble interleukin-2 receptor and serum C-reactive protein (CRP) levels were within the normal reference range.

We performed thoracoscopic surgery to conduct a biopsy in order to make a definitive diagnosis and determine an effective treatment plan. The surgery was performed using a complete thoracoscopic approach with three ports (7, 7 and 15 mm). The tumour, which was recognized as a hypertrophic lesion with vascularization around the vertebral body, was a solid fibrous lesion that could not be grasped with forceps. Thus, a biopsy was performed in two locations using scissors. The total operation time was 77 min and the bleeding amount was 15 ml. He had no postoperative complications and was discharged 4 days after surgery. Postoperative histological findings showed massive fibrosis with a characteristic storiform pattern (Figure 2A) as well as lymphoplasmacytic infiltration (Figure 2B).

An immunohistochemical examination revealed an abundant infiltration of IgG- and IgG4-positive plasma cells (Figure 2C,D). The IgG4/IgG ratio was 40%. Based on these findings, we strongly suspected a pathological diagnosis of IgG4-RD. Additional serum examinations demonstrated an IgG level of 1383 mg/dl (normal range, 861–1747) and an IgG4 level of 570 mg/dl (normal range, 11–121).

We diagnosed the patient with IgG4-RD according to the 2020 Revised Comprehensive Diagnostic (RCD) Criteria for IgG4-RD[3] based on the following three criteria: (1) - diffuse swelling of the mediastinum, (2) high serum IgG4 levels (570 mg/dl) and (3) storiform fibrosis. After this, the patient received brachytherapy for prostate cancer and the mediastinal tumour was followed up with imaging.

DISCUSSION

IgG4-RD was first reported in 2001 as a systemic disease with elevated IgG4 levels in a case with sclerosing pancreatitis.[4] In a report of 118 patients with IgG4-RD, rare disease manifestations include mediastinal fibrosis, skin lesions, sclerosing thyroiditis, pituitary inflammation, orchitis and colitis. Most cases of IgG4-RD demonstrate multiple lesions, with a small number of single lesions observed in the literature to date (4.2%).[5] Based on prior findings, it has been demonstrated that the characteristic imaging findings of IgG4-related fibrosing mediastinitis (IgG4-RFM) are periaortic masses (75.0%) and paraspinal masses (35.0%).[6] IgG4-RD is occasionally diagnosed as an isolated occurrence in the paravertebral region only.

A review of 15 cases of IgG4-RFM conducted by Takanashi et al. reported that only one of 15 profiled cases were asymptomatic and that CRP levels were consistently in the normal range for all 15 patients.[7] In our case, the patient was asymptomatic and had no CRP elevation. CT showed a 15-cm soft tissue tumour that appeared as a cluster of small multicentric tumours. The tumour was not invasive and had multiple blood vessels passing through it. We note that the lack of invasiveness and the intactness of multiple blood vessels presented herein may be characteristic of this condition.

The anatomical location of IgG4-RFM often makes it difficult to perform a biopsy. The aforementioned review by Takanashi et al. reported that needle biopsy was performed in five of the 15 profiled cases and surgical biopsy was performed in four cases.[7] Our intraoperative findings demonstrated that the lesion could be sharply separated with scissors, which was necessary for determining an accurate diagnosis. As the tumour was quite hard, we decided that even if a needle biopsy could reach the tumour (located at the centre of the body), it might be unlikely to obtain enough tissue.

IgG4-RD has been widely characterized; however, a disease manifestation of IgG4-RFM occurs rarely and has been comprehensively reported (in case reports and case series) even more rarely. Thus, many aspects of the IgG4-RFM disease manifestation remain unknown. IgG4-RFM is often asymptomatic, but there have been reports of superior vena cava stenosis and tracheal stenosis, which are difficult to treat.[8,9] Steroid therapy is effective for IgG4-RD, and it is important to diagnose IgG4-RFM in a timely manner and initiate treatment early. Therefore, it is important to determine the presence or absence of IgG4-RFM within differential diagnoses as well as to keep in mind its characteristic CT imaging findings when conducting differential diagnoses.

CONFLICT OF INTEREST

None declared.

DATA AVAILABILITY STATEMENT

Data sharing is not applicable to this article as no data sets were generated or analysed during the current study.

ETHICS STATEMENT

The authors declare that appropriate written informed consent was obtained for the publication of this case report and accompanying images.

ORCID

Yoshimitsu Hirai https://orcid.org/0000-0001-7428-9618
Hideto Iguchi https://orcid.org/0000-0002-9643-1475
Takuya Ohashi https://orcid.org/0000-0002-1880-4790

REFERENCES

1. Stone JH, Zen Y, Deshpande V. IgG4-related disease. N Engl J Med. 2012;366:539–51. https://doi.org/10.1056/NEJMra1104650
2. Rossi GM, Emmi G, Corradi D, Urban ML, Maritati F, Landini F, et al. Idiopathic mediastinal fibrosis: a systemic immune-mediated disorder. A case series and a review of the literature. Clin Rev Allergy Immunol. 2017;52:446–59. https://doi.org/10.1007/s12016-016-8584-1
3. Umehara H, Okazaki K, Kawa S, Takahashi H, Goto H, Matsui S, et al. The 2020 revised comprehensive diagnostic (RCD) criteria for IgG4-RD. Mod Rheumatol. 2021;31:529–33. https://doi.org/10.1080/14397595.2020.1859710
4. Hamano H, Kawa S, Horiuchi A, Unno H, Furuya N, Akamatsu T, et al. High serum IgG4 concentrations in patients with sclerosing pancreatitis. N Engl J Med. 2001;344:732–8. https://doi.org/10.1056/NEJM200103083441005
5. Lin W, Lu S, Chen H, Wu Q, Fei Y, Li M, et al. Clinical characteristics of immunoglobulin G4-related disease: a prospective study of 118 Chinese patients. Rheumatology (Oxford). 2015;54:1982–90. https://doi.org/10.1093/rheumatology/kev203

6. Zhang P, Han X, Li J, Liu Z, Lu H, Luo X, et al. IgG4-related fibrosing mediastinitis: clinical presentation, treatment efficacy and comparison with IgG4-RD without fibrosing mediastinitis. Clin Exp Rheumatol. 2020;38:1206–14.
7. Takanashi S, Akiyama M, Suzuki K, Otomo K, Takeuchi T. IgG4-related fibrosing mediastinitis diagnosed with computed tomography-guided percutaneous needle biopsy: two case reports and a review of the literature. Medicine (Baltimore). 2018;97:e10935. https://doi.org/10.1097/MD.0000000000010935
8. Arroyo Pareja L, Triviño A, España C. Tracheal stenosis due to IgG4-related fibrosing mediastinitis. Arch Bronconeumol (Engl Ed). 2019;55:533. https://doi.org/10.1016/j.arbres.2018.12.014
9. Khalid M, Weheba I, Abdelsayed A, Zeitouni LM, Saleemi S, Al Mutairy E, et al. Superior vena cava stenting in IgG4-associated mediastinal fibrosis. Ann Saudi Med. 2020;40:155–8. https://doi.org/10.5144/0256-4947.2020.155

How to cite this article: Hirai Y, Iwamoto R, Iguchi H, Fusamoto A, Yata Y, Ohashi T, et al. IgG4-associated fibrosing mediastinitis requiring differentiation from posterior mediastinal tumour: A case report. Respirology Case Reports. 2022;10:e0958. https://doi.org/10.1002/rcr2.958