Case Report

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대한영상의학회지

Unusual Manifestation of Immunoglobulin G4-Related Disease Involving the Retroperitoneum: A Case Report

후복막강에 발생한 Immunoglobulin G4 연관 질환의 비전형적 발현: 증례 보고

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Immunoglobulin G4 (IgG4)-related disease is a systemic disease characterized by dense lymphoplasmacytic infiltrates with abundant IgG4-positive plasma cells and fibroblast proliferation. The retroperitoneal involvement of IgG4-related disease usually appears as a soft-tissue mass covering the abdominal aorta or entrapping the ureters, resulting in hydronephrosis. Here, we present a case of IgG4-related disease with retroperitoneal involvement in a 75-year-old woman with an unusual manifestation. A preoperative computed tomography (CT) scan revealed an irregular infiltrative retroperitoneal mass invading the normal anatomic barriers, raising the suspicion of malignancy or inflammation. Contrast-enhanced CT revealed a homogeneous progressive enhancement of the mass.

Index terms Immunoglobulin G4-Related Disease; Retroperitoneal Space; Computed Tomography, X-Ray

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INTRODUCTION

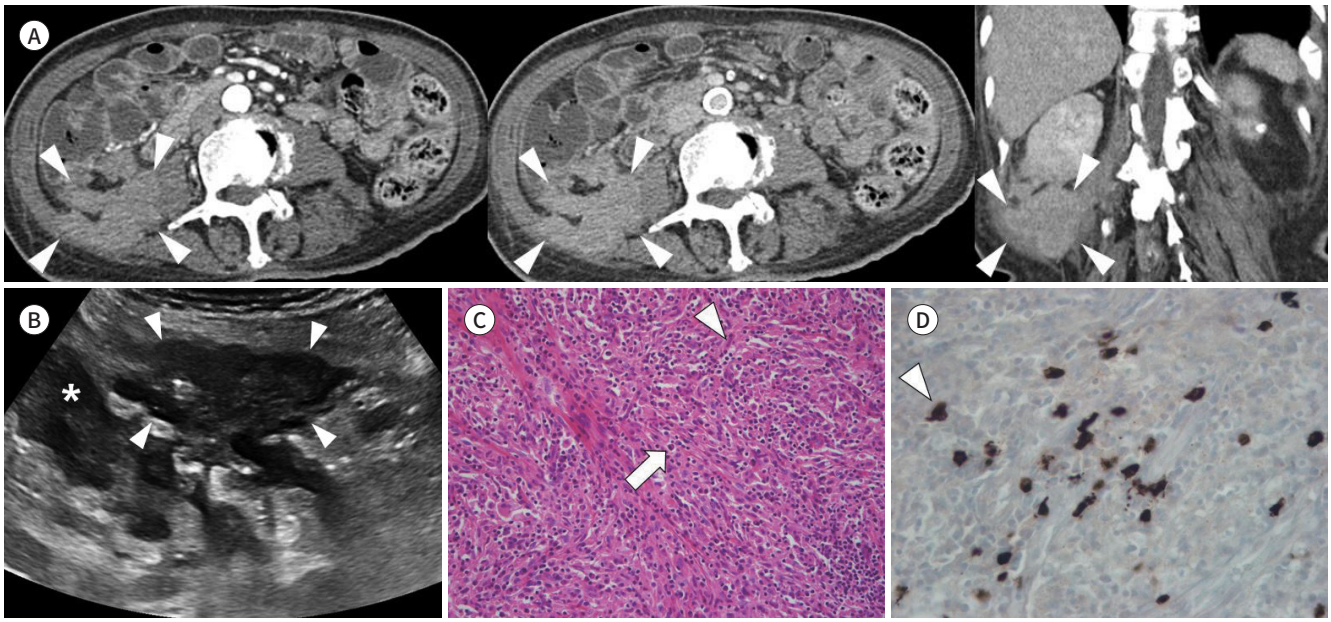
Immunoglobulin G4 (IgG4)-related disease is a systemic disease that can involve numerous organs and has a tendency to develop tumefactive lesions (1). There have been several case reports of IgG4-related disease involving the retroperitoneum (2); however, its manifestation as an irregular mass-like lesion arising from the posterior pararenal space crossing the normal anatomic barriers is rare. Herein, we report an unusual case of retroperitoneal IgG4-related disease mimicking an inflammatory or malignant condition in a 75-year-old woman.

CASE REPORT

A 75-year-old woman reported to our emergency department with fever and nausea that had lasted for 2 days. She had a 45-year history of hypertension and diabetes as well as a *Mycobacterium tuberculosis* infection that had successfully been treated 30 years before. Her vital signs included a body temperature of 38.2°C, blood pressure of 126/54 mm Hg, and a heart rate of 101 beats/min. Physical examination revealed tenderness in the right upper abdominal quadrant. Laboratory results revealed hemoglobin of 9.5 g/dL (normal 12.0–16.0 g/dL), white blood cells of 8240 /μL (normal 4000–10000/μL), C-reactive protein of 0.5 mg/dL (normal < 0.2 mg/dL), and an erythrocyte sedimentation rate of 57 mm/h (normal < 25 mm/h).

Computed tomography (CT) showed an ill-defined irregular retroperitoneal mass, approximate measuring 5.4 cm × 3.0 cm × 4.6 cm, which was in close contact with the lower pole of the right kidney, right psoas, quadratus lumborum, and transverse abdominal muscles (Fig. 1A). This lesion invaded the right transversalis and Zuckerkandl's fasciae and extended to the right posterior pararenal and perirenal spaces. Multifocal, internal, low-density portions were seen. Contrast-enhanced scans showed homogeneously progressive enhancement. Given the patient's history of long-term diabetes mellitus, a previous tuberculosis infection, and radiologic findings, particularly the aggressive invasion of the normal anatomic barriers, we considered the differential diagnoses of inflammatory conditions, such as acti-

Fig. 1. A 75-year-old woman with an unusual manifestation of retroperitoneal involvement of IgG4-related disease.
A. Contrast-enhanced abdominopelvic CT, from left to right: axial images taken 40 s and 160 s after contrast injection and a coronal image. The CT scan shows an ill-defined, irregular-shaped progressively enhancing mass (arrowheads) abutting the right kidney and several paraspinal muscles in the right posterior pararenal and perirenal spaces.
B. Ultrasonography reveals an irregular hypoechoic mass (arrowheads) abutting the lower pole of the right kidney (asterisk).
C. Histologic examination shows an admixture of proliferative spindle cells (arrowhead) with abundant lymphoplasma cells (arrow) (haemotoxylin and eosin stain, × 200).
D. Immunohistochemical staining of IgG4 shows more than 30/high-power field IgG4-positive plasma cells (arrowhead) (× 400).
IgG4 = immunoglobulin G4



nomycosis and tuberculosis, and tumorous conditions, such as lymphoma.

We performed ultrasonography for a core-needle biopsy and further characterization, and it revealed an irregular-shaped heterogeneous hypoechoic mass with subtle internal vascularity (Fig. 1B). The pathological analysis revealed chronic granulomatous inflammation with no evidence of malignancy, and a polymerase chain reaction assay was negative for tuberculosis. Although the biopsy result could not inform a definitive diagnosis, owing to the patient's old age and underlying medical history, the clinician decided to perform a short-term CT follow-up with observation rather than surgical resection. On follow-up CT after 1 month, the mass had decreased in size to approximately 4.3 cm × 1.9 cm × 4.1 cm. Due to the aggressive infiltrative nature and large size of the mass, a laparoscopic excisional biopsy was performed to arrive at the definitive diagnosis.

During the surgery, an irregular-shaped mass was located between the paraspinal muscles and the lower pole of the right kidney. Grossly, two irregular gray-red soft- tissue masses, measuring 2 cm × 1.5 cm × 1 cm and 3 cm × 2.2 cm × 1 cm, were observed. Microscopically, the tumor was composed of proliferative spindle cells and abundant lymphoplasma cells without malignant features, and immunohistochemical analysis revealed several IgG4-positive plasma cells (over 30 per high-power field) (Fig. 1C, D). Spindle cells were negative for anaplastic lymphoma kinase. These pathological features were consistent with IgG4-related disease. Postoperatively, she was transferred to the Division of Rheumatology and followed-up without corticosteroid treatment because of her diabetic status.

DISCUSSION

IgG4-related disease is a chronic fibroinflammatory condition with a tendency to develop tumefactive lesions. It is histologically characterized by storiform fibrosis, obliterative phlebitis, and dense lymphoplasmacytic cell infiltration dominated by IgG4+ plasma cells. It was first reported in the pancreas but has now been described in most organs (3). The histological features of IgG4-related disease show striking similarities, regardless of the site involved, indicating it to be a systemic disease. Since the systemic involvement of IgG4-related disease was first reported, many medical diagnoses previously regarded as being confined to a single organ have been identified as part of the spectrum of IgG4-related disease. In 2011, the international IgG4-related disease symposium proposed a new nomenclature for individual organ involvement, replacing previously recognized conditions, to offer more information on the pathophysiological mechanisms and patterns Table 1 (1).

Retroperitoneal involvement of IgG4-related disease usually manifests as soft-tissue masses covering the abdominal aorta and its branches, or involves the ureters or renal pelvis, resulting in hydronephrosis and hydroureter (4). A lesion may be detected accidentally, or it may present with symptoms related to mechanical compression exerted by the fibrotic mass on the neighboring structures. Imaging findings vary widely depending on the site of involvement. On CT, the lesions usually demonstrate soft-tissue densities with clear or vague boundaries. Enhancement patterns vary, possibly because of varying degrees of fibrosis, cellular infiltration, and dynamic changes that occur during the inflammatory process (5). Ultrasonography findings may show a variable pattern of echogenicity with ill-defined or well-de-

Table 1. Preferred Nomenclature for Individual Organ Manifestations of IgG4-Related Disease

Organ System	Preferred Nomenclature
Pancreas	Type 1 autoimmune pancreatitis (IgG4-related pancreatitis)
Retroperitoneum	IgG4-related retroperitoneal fibrosis
Bile ducts	IgG4-related sclerosing cholangitis
Salivary glands	IgG4-related sialadenitis
Thyroid	IgG4-related thyroiditis
Liver	IgG4-related hepatopathy
Lung	IgG4-related lung disease
Kidney	IgG4-related kidney disease
Orbital soft tissue	IgG4-related orbital inflammation (or IgG4-related orbital inflammatory pseudotumor)
Lacrimal glands	IgG4-related dacryoadenitis
Extraocular muscle disease	IgG4-related orbital myositis
Hypophysis	IgG4-related hypophysitis
Aorta	IgG4-related aortitis/periaortitis
Arteries	IgG4-related periarteritis
Mediastinum	IgG4-related mediastinitis
Mesentery	IgG4-related mesenteritis
Skin	IgG4-related skin disease
Lymph node	IgG4-related lymphadenopathy
Gall bladder	IgG4-related cholecystitis
Pleura	IgG4-related pleuritis
Pericardium	IgG4-related pericarditis
Breast	IgG4-related mastitis
Prostate	IgG4-related prostatitis
Pachymeninges	IgG4-related pachymeningitis

Adapted from Stone et al. Arthritis Rheum 2012;64:3061-3067 (1).
IgG4 = immunoglobulin G4

fined margins. MRI findings may reveal a hypointense lesion on T1- and various signal intensity patterns on T2-weighted images, possibly due to the fibrotic changes, with delayed gadolinium enhancement (6). Occasionally, it may be difficult to differentiate the lesions from malignancies, such as soft tissue sarcomas or lymphomas, particularly when they involve less common sites or are not accompanied by other organ manifestations of IgG4-related disease.

In our patient, sonography showed an ill-defined mass with a heterogeneous internal echotexture. CT scans revealed a poorly defined mass with internal low attenuated portions and progressive enhancement. In particular, the mass was infiltrative, as it invaded the normal anatomic barriers, suggesting malignancy or inflammation. Our initial differential diagnoses included actinomycosis, tuberculosis, and lymphoma. Actinomycosis is well-known for its aggressive infiltrative nature (7). In our case, the mass invaded the Zuckerkandl's and transversalis fasciae and abutted the posterior abdominal wall muscles. Tuberculosis is usually characterized by internal abscess formation with multiple enlarged lymph nodes with necrosis or calcification. In our patient, tuberculosis was considered because the mass was characterized by an ill-defined inflammatory process, and the patient had a previous medical

history of tuberculosis (8). Lymphoma was considered because it tends to manifest as an infiltrative solid mass with homogeneous enhancement, although lymph node enlargement was absent in our case (9).

In summary, we present a case of IgG4-related disease with unusual infiltrative retroperitoneal involvement mimicking malignant or inflammatory conditions. When a progressively enhancing mass in the retroperitoneal space shows an infiltrative margin that invades the normal anatomic barriers, a tumefactive manifestation of IgG4-related disease can be considered as a differential diagnosis as it can be managed conservatively with corticosteroids, and unnecessary surgical interventions can be avoided.

Author Contributions

Conceptualization, S.J.W.; data curation, S.J.W.; investigation, K.B.; project administration, S.J.W.; resources, S.J.W.; supervision, S.J.W.; visualization, K.B.; writing—original draft, K.B.; and writing—review & editing, S.J.W.

Conflicts of Interest

The authors have no potential conflicts of interest to disclose.

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Immunoglobulin G4 (이하 IgG4)연관 질환은 풍부한 IgG4 형질세포 형태의 림프형질 세포 침윤과 현저한 섬유아세포 증식을 특징으로 하는 전신 질환이다. 일반적으로 IgG4 연관 질환의 후복막강 발현은 복부 대동맥을 둘러싸거나, 요관을 압박하여 수신증을 일으키는 연조직의 형태로 나타난다. 우리는 75세 여성 환자에서 발생한 비전형적인 IgG4 연관 질환의 후복막강 발현에 대해 보고하고자 한다. 수술 전 전산화단층촬영에서 정상 해부학적 경계를 넘어서는 침윤성 성질을 가진 불규칙한 형태의 후복막강의 종괴가 관찰되었으며, 이는 악성 혹은 염증성 상태가 의심되었다. 조영증강 촬영에서 종괴는 균일한 점진적인 조영증강을 보였다.

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