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CLINICAL REPORT

Prevertebral Inflammatory Myofibroblastic Tumor Following COVID Vaccine Booster Dose

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Abstract
We report a case of a 30-year-old previously higid female presenting with dorsal pain and persistent fever after COVID-19 vaccine booster dose. CT and MR revealed a prevertebral heterogeneous and infiltrating mass, with spontaneous regression in control imaging which biopsy confirmed an inflammatory myofibroblastic tumor.

Keywords Inflammatory myofibroblastic tumor

Introduction

Inflammatory myofibroblastic tumor (IMT) are represented by a multicellular inflammatory infiltrate and spindle cell proliferation of uncertain pathogenesis but known association with viral infection and certain antigens [1–3].

It affects mainly the abdominal cavity, being rare in the spine. Clinical presentation may include systemic findings such as malaise and fever. Spontaneous regression is also described, but also a rare feature [1–4].

Case Report

A previously higid 30-year-old female patient presented with sudden and strong dorsal pain and persistent fever. She referred COVID-19 viral vector vaccine booster dose 10 days prior. Clinical and laboratory examinations had no particularities.

Computerized tomography (CT) revealed a heterogeneous and infiltrating paravertebral mass at the level of T2 and T3 vertebral bodies, with bone destruction in contact with the esophagus, trachea, and right lung (Fig. 1). Scintigraphy with MDP-99mTc demonstrated important radiopharmaceutical hyperconcentration within the lesion (Fig. 1).

Due to the high suspicion of neoplasm, percutaneous CT-guided biopsy was performed.

Biopsy specimen culture was negative. Histological findings included a fusiform small cell proliferation in a densely collagenized stroma with no significant mitotic activity or necrosis, and lymphoplasmacytic inflammatory infiltration foci with no signs of atypia. Immunohistochemistry was positive for smooth muscle actine, demonstrating a myofibroblastic nature. CD20 and CD3 stains were positive on the inflammatory infiltrate, confirming the benignity. ALK and CD34 stains were negative and IgG4/IgG relation was normal. Final diagnosis was of an inflammatory myofibroblastic tumor (IMT).

Control MR imaging four and eight months demonstrated progressive spontaneous regression of previous findings (Fig. 2).

Discussion

IMTs consist of myofibroblastic spindle cell proliferation with an inflammatory infiltrate of lymphocytes, plasmacytes and eosinophils [1–3].

Its pathogenesis remains uncertain, with evidence of relation to an exacerbated immune response to injuries, antigens and even infection. Most described associated agents are Epstein-Barr virus, cytomegalovirus and herpes virus 8 [1–3]. One isolated case of intracardiac IMT associated with

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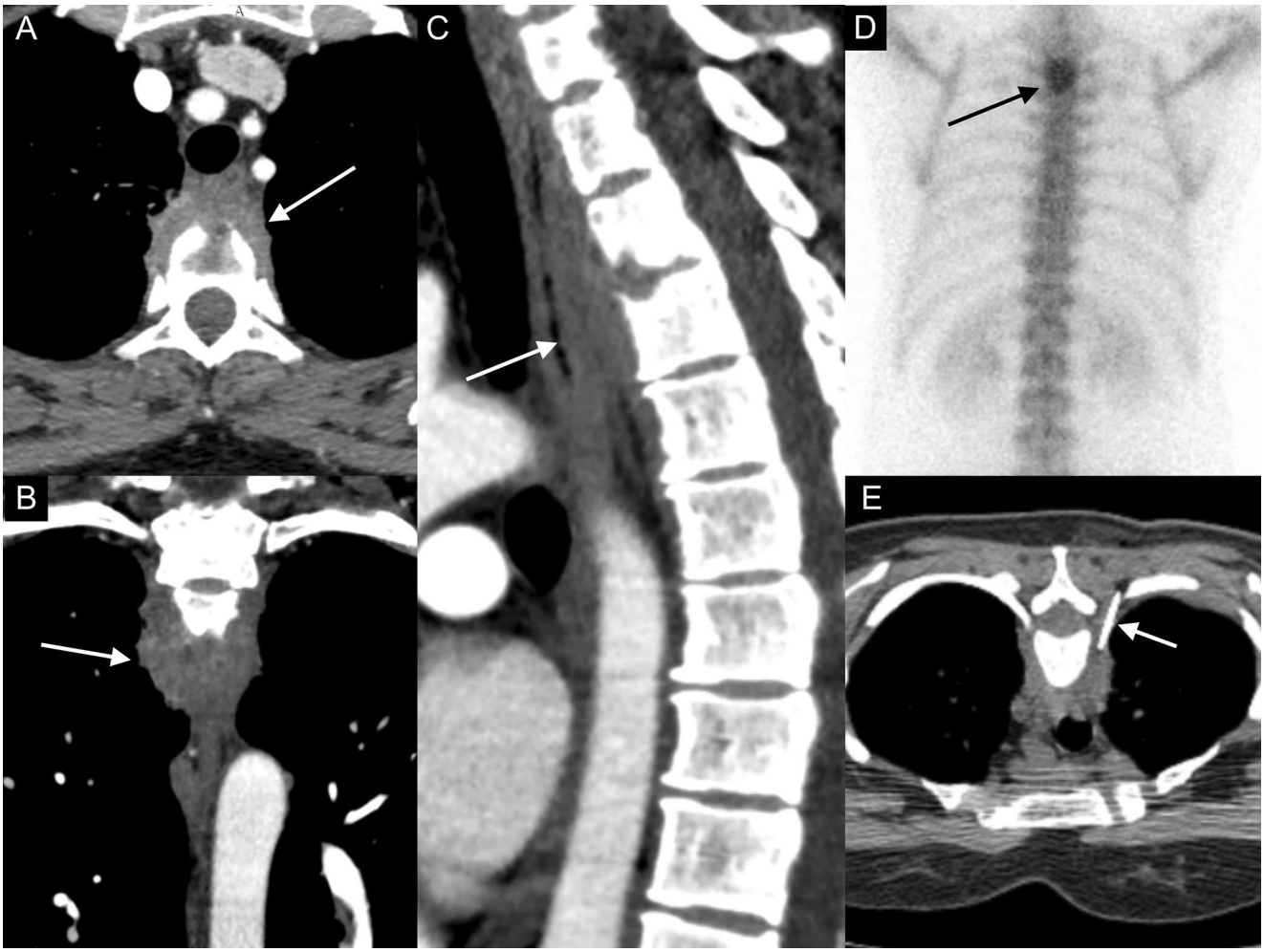

Fig. 1 **A-C**: Initial contrast-enhanced CT on axial, coronal and sagittal, respectively, demonstrating an infiltrating and destructive prevertebral heterogeneous mass (arrows). **D**: Scintigraphy shows hypercaptation of the radiopharmaceutical within the lesion. **E**: Axial CT on ventral decubitus of the guided biopsy. Notice the needle within the right aspect of the mass (arrow)

coronavirus has been reported, but no clear relation to vaccination has been described [4].

IMTs affect mostly children and young adults, and the most common location is the abdominal cavity, mainly the mesentery and retroperitoneum, followed by the head and neck region and lungs [1–3]. Clinical manifestations vary according to the lesion's site, but most patients refer mass effect, local inflammation. Constitutional symptoms like fever and weight loss might also be present [1–3].

Imaging findings are nonspecific, consisting of a mass of attenuation or signal intensity depending on the histological composition and proportion of collagen stroma, with variable enhancement behavior [1–3].

Definite diagnosis relies on histopathological proof of fibroblast and myofibroblast proliferation associated with a mixed inflammatory infiltrate and smooth muscle actin positivity in immunohistochemistry. Desmin and ALK stains might also be positive [1–3]. Main differential diagnosis includes inflammatory pseudotumor, desmoid fibromatosis and IgG4-related disease [3].

Treatment strategies include surgery, chemotherapy and radiation therapy, with variable recurrence [1–3].

Our case illustrates a very unusual presentation of IMT due to the well documented spontaneous regression in a rare location. Vertebral IMTs are extremely rare, with few reported cases, mainly affecting the intradural extramedullary compartment [2].

Spontaneous regression is also a rare, but well-established, feature of IMTs, described in association with hepatic lesions and in older and female patients, with no reported vertebral cases [5].

The exact cause, however, was not confirmed, but due to its relation to antigen aggression and viral infections we could not rule out vaccination-related etiology.

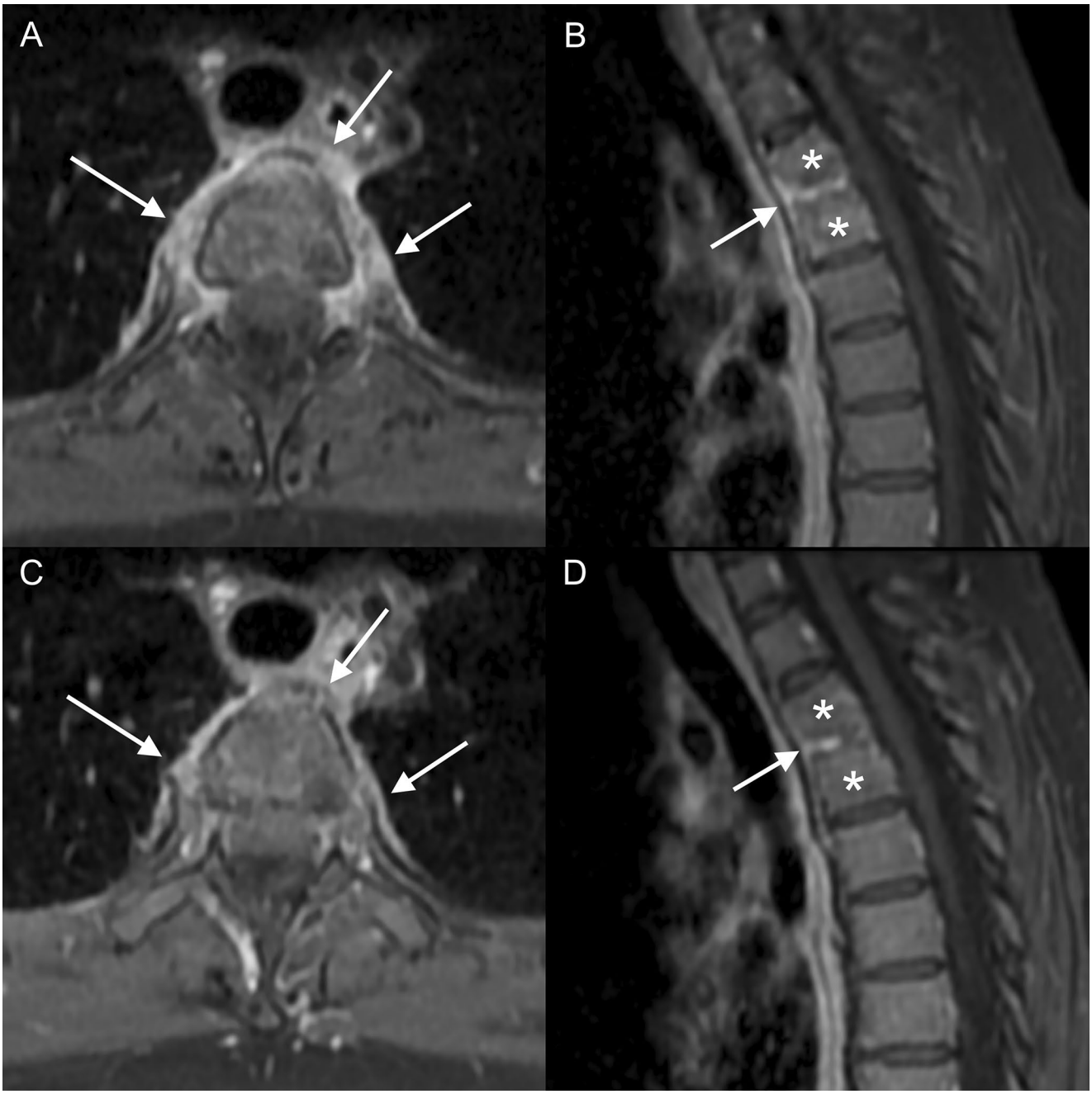

Fig. 2 **A-B**: MR control images four months after the biopsy on axial and sagittal, respectively, show marked reduced dimensions of the prevertebral mass (arrows), with moderate enhancement. Notice the collapse and enhancement of the T2-T3 disk space (arrow) and bone enhancement (asterisks). **C-D**: MR control eight months after the biopsy on axial and sagittal, respectively, shows progressive spontaneous regression of the lesion, with minimal residual prevertebral enhancement (arrows). Less enhancement of the T2-T3 disk (arrow) and vertebral bodies (asterisks) is also shown in D

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Declarations

Compliance with Ethical Standards All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Conflict of Interest None.

Ethical approval This study was approved by local's ethics committee.

Informed consent A signed informed consent was obtained from the patient.

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