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LETTER TO EDITOR

Granulocytic sarcoma and mediastinal germ cell tumor: A common cell of origin?

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To the Editor,

The rare association between mediastinal germ cell tumors (MGCT) and acute megakaryoblastic (M7) leukemia has been previously reported [1]. We present a case of MGCT with subsequent development of acute M7 leukemia presenting as diffuse granulocytic sarcoma.

A previously healthy 20-year-old man presented to the hospital complaining of worsening shortness of breath and cough for 1 month. In the emergency room, a computed tomography (CT) scan of the chest showed a mediastinal mass and right-sided pleural effusion (Fig. 1A). Further workup revealed an elevated alpha-fetoprotein (AFP) of 13,424 ng/mL. Results of testicular ultrasound, CT of the abdomen and pelvis, and magnetic resonance imaging of the brain were unremarkable. Biopsy of the mass was consistent with a yolk sac tumor. The patient underwent chemotherapy with two cycles of VIP (cisplatin, etoposide, and ifosfamide). Two months after the diagnosis, the mediastinal mass was surgically resected (Fig. 1B). Pathology was consistent with a mixed germ cell tumor with extensive necrosis. After the surgery, the patient completed two more cycles of VIP, for a total of four cycles, and he achieved complete remission. AFP after chemotherapy and resection remained low (<5 ng/mL). Three months after surgery, he presented with severe arthralgia and worsening bilateral hip pain. Laboratory workup revealed new onset thrombocytopenia, and chest imaging showed a recurrent mediastinal mass (Fig. 1C). His AFP level was 4.2 ng/mL. He underwent a bone marrow biopsy, which showed replacement of the marrow by atypical mononuclear cells in a background of extensive necrosis (Fig. 1E). Flow cytometry revealed a blast population that expressed CD41, CD61, CD45, partial CD34, and CD56, consistent with the diagnosis of M7 leukemia. There was no evidence of marrow involvement by metastatic germ cell tumor. Biopsy of the mediastinal mass showed recurrence of the germ cell tumor with an immunophenotype similar to the original biopsy (pan-cytokeratin positive, CD30 and PLAP negative). Induction chemotherapy with idarubicin, cytarabine, and cladribine was initiated. After chemotherapy, the bone marrow remained necrotic with no evidence of hematopoiesis. A repeat CT scan of the chest in the setting of worsening shortness of breath showed a rapidly enlarging mediastinal mass (Fig. 1D). The patient never regained his marrow function and became transfusion-dependent. He passed away of

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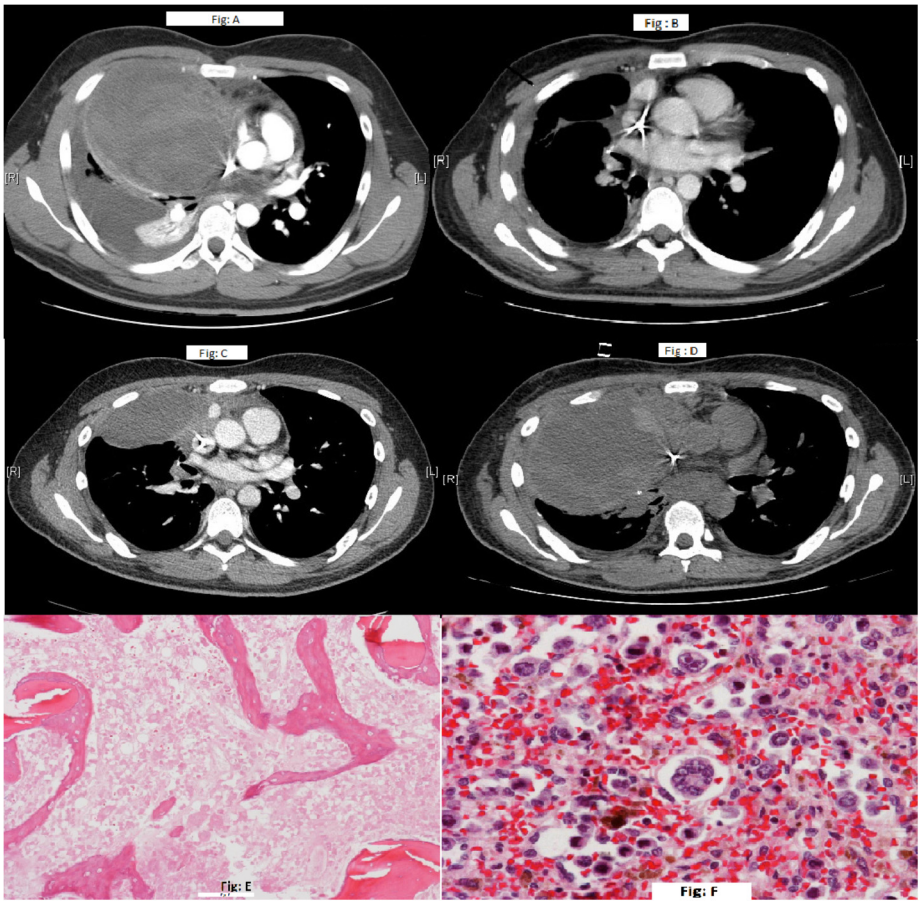

Fig. 1 (A) Computed tomography (CT) chest scan showing mediastinal mass at initial presentation. (B) CT chest scan after mediastinal mass resection. (C) CT chest scan 3 months after resection showed tumor recurrence. (D) Repeat CT chest scan within 6 weeks of recurrence showing an enlarging mediastinal mass. (E) Bone marrow biopsy showing extensive necrosis. Atypical mononuclear cells were focally present (not pictured). Flow cytometric immunophenotyping revealed a blast population that coexpressed CD41 and CD61, consistent with the diagnosis of acute megakaryoblastic leukemia. (F) Autopsy section of spleen showing dysplastic megakaryocytes and atypical mononuclear cells. Tumor cells were positive for factor VIII and CD117.

Klebsiella pneumoniae bacteremia 7 months after the initial diagnosis. Additional sampling of the mediastinal mass at autopsy revealed a minor component of germ cell tumor within the tumor, but it was mostly composed of megakaryocytes and blasts. There was evidence of diffuse metastases in the diaphragm and multiple organs including liver, spleen, stomach, kidneys, adrenals, mediastinum, and aortic and mesenteric lymph nodes (Fig. 1F).

This case demonstrates the unique association between MGCT and M7 leukemia. We previously reviewed this association in 26 reported cases in the literature [2] and highlighted the evidence to support that these cancers arise from a common progenitor cell. The low AFP level at recurrence in this case suggests that the mediastinal mass was dominated by leukemic cells as revealed at autopsy. The overall prognosis of M7 leukemia occurring after MGCT remains very poor. A low index of suspicion and awareness of the association might lead to an earlier diagnosis of this aggressive leukemia, allowing for consideration of allogeneic stem cell transplant as a treatment option.

Conflicts of interest

The authors declare no conflict of interest.

Authors' contributions

All authors had access to the data and a role in writing the manuscript.

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