SUBMANDIBULAR MYELOID SARCOMA PRESENTING AS AN INITIAL MANIFESTATION OF ACUTE MYELOID LEUKEMIA: A CASE REPORT

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Abstract: Myeloid sarcoma is a rare extramedullary tumor composed of immature myeloid cells, often associated with acute myeloid leukemia (AML). We report a case of a 38-year-old female who presented with painful swelling in the right submandibular and parotid regions initially diagnosed as an abscess. Further evaluation revealed severe anemia, leukocytosis, thrombocytopenia, and an elevated erythrocyte sedimentation rate. Peripheral blood smear and bone marrow studies confirmed a diagnosis of acute myeloblastic leukemia classified as M4/M5 by the French-American-British criteria. Biopsy of the submandibular mass demonstrated myeloid sarcoma, representing an initial extramedullary manifestation of the patient's underlying AML. The patient was started on intravenous antibiotics and supportive care before being referred to a regional cancer center for definitive AML treatment with systemic chemotherapy and potential radiation for the myeloid sarcoma lesion. This case highlights the importance of considering myeloid sarcoma in the differential diagnosis of unexplained head and neck masses, especially when accompanied by cytopenias or signs of a hematological malignancy. Early recognition allows for prompt initiation of appropriate leukemia-directed therapy and local treatment of extramedullary disease.

INTRODUCTION:

Chloroma, also known as granulocytic sarcoma or myeloid sarcoma, is a solid tumor mass composed of immature myeloid cells. It represents an extramedullary manifestation of acute myeloid leukemia (AML) or myeloproliferative neoplasm. The formation of these tumor masses outside the bone marrow is an uncommon clinical presentation, occurring in approximately 3-9% of patients with AML. Chloroma can arise in various anatomical sites, including the skin, lymph nodes, gastrointestinal tract, and less frequently, the head and neck region. They are characterized by the proliferation and accumulation of leukemic myeloblasts or immature myeloid cells, which can precede the development of systemic leukemia or occur concurrently with it. The presence of a chloroma is considered an initial manifestation of AML and warrants prompt evaluation and appropriate management[1]. The chloroma is also called extra medullary myeloid tumor, granulocytic sarcoma, and myeloid sarcoma. The common location for chloroma is the bone, periosteum, skin, soft tissues, lymph nodes, and visceral organs [2]. The incidence of chloroma, also known as granulocytic sarcoma or myeloid sarcoma, ranges from 3% to 9.1% among patients with acute myeloid leukemia (AML). It is an infrequent occurrence for chloroma to manifest in individuals without concurrent clinical evidence of leukemia. In the majority of cases where chloroma is initially diagnosed, the development of overt AML ensues within a period ranging from 1 to 48 months. While chloroma can present as an isolated finding, it is often considered an extramedullary manifestation and potential harbinger of underlying AML, necessitating comprehensive evaluation and appropriate management[3].

The pathophysiology of sub-mandibular chloroma involves the infiltration and proliferation of immature myeloid cells in the soft tissues of the sub-mandibular region. These myeloid cells are typically blast cells, which are undifferentiated and abnormal. The exact cause of sub-mandibular chloroma is not fully understood, but it is believed to arise from the clonal expansion of a single leukemic cell in the sub-mandibular region. Genetic abnormalities, such as chromosomal rearrangements and mutations, play a significant role in the pathogenesis of sub-mandibular chloroma. These genetic abnormalities can alter the normal functioning of myeloid cells and promote their uncontrolled proliferation and
infiltration into the sub-mandibular region. The lesions in sub-mandibular chloroma can resolve with chemotherapy, but the prognosis for patients with this condition is very important. Overall, the pathophysiology of sub-mandibular chloroma involves the infiltration and proliferation of blast cells in the soft tissues of the sub-mandibular region, driven by genetic abnormalities, leading to the formation of a solid tumor [4-9].

CASE PRESENTATION:

A 38 year old female patient was admitted under the department of general medicine with the complaints of pain and inflammatory swelling present over parotid region & tender swelling present over right sub-mandibular region for 10 days. On examining oral cavity tonsils were normal and there were no posterior pharyngeal bulge, no voice changes and swallowing also normal. The condition was initially diagnosed as right sub-mandibular abscess. She had no medical or medication history.

Based on the differential diagnosis, the patient presented with the following laboratory findings; hemoglobin: 5g/dL (indicating severe anemia), total white blood cell count: 32,500 cells/cumm (significantly elevated), polymorphonuclear cells (neutrophils): 28%, lymphocytes: 26%, monocytes: 25% (increased), platelet count: 60,000/cumm (thrombocytopenia) and erythrocyte sedimentation rate (ESR): 105 mm/hr (significantly elevated). Ultrasonography of the neck revealed a right cervical abscess in the submandibular region. Additionally, the peripheral blood smear study suggested a hematological malignancy, possibly acute myeloid leukemia (AML), classified as M4/M5 according to the French-American-British (FAB) classification system (fig.1). The WBC count of 32,500 with a cytological examination positive for leukaemic blasts.

The diagnosis of acute myeloid leukemia (AML) was made based on the bone marrow aspirate results. The bone marrow showed a large number of abnormal blast cells, which were small to medium-sized immature cells with little blue-colored cytoplasm without granules. The nuclei of these cells had loosely distributed chromatin (the material that carries genetic information) and prominent nucleoli (dense regions within the nuclei). The immunophenotypic study, performed on either the peripheral blood or the bone marrow, confirmed the diagnosis of acute myeloblastic leukemia, classified as M4/M5 according to the French-American-British (FAB) classification system (fig.2). The blasts display scant cytoplasm with prominent nuclei and nucleoli, consistent with the immature myeloid lineage cells seen in these AML variants. The background also shows mature red blood cells, providing contrast to the leukemic blast infiltration. The French-American-British (FAB) classification system is a way to categorize different types of acute myeloid leukemia (AML) based on the appearance of the abnormal cells under the microscope and their stage of maturation[10]. AML M4 refers to a subtype of AML where the abnormal cells are immature myeloid cells called myeloblasts. These cells have the potential to develop into various types of white blood cells, such as neutrophils, basophils, or eosinophils. AML M5 is a subtype where the abnormal cells are immature monocytic cells called monoblasts. These cells have the potential to develop into monocytes, which are a type of white blood cell involved in the immune system[11].

Acute myeloblastic leukemia M0 by French-American-British (FAB) classification (McGrunwald-Giemsa stain, 100 X magnifications): Bone marrow aspirate demonstrates a homogeneous infiltration by a population of small to intermediate-sized blasts. Acute myeloblastic leukemia M0 according to the French-American-British (FAB) classification system refers to a rare subtype of acute myeloid leukemia (AML)[12]. These blasts exhibit scant basophilic agranular cytoplasm and nuclei with dispersed chromatin pattern and prominent nucleoli (fig.3). No evidence of myeloid differentiation is appreciated.
The patient was initiated on intravenous antibiotic therapy antibiotics Inj. CEFOPERAZONE+SULBACTUM 1.5g BD, analgesics Inj. ACETAMINOPHEN 1g sos and other supportive measures. Following the diagnosis, the patient and relatives were counseled regarding the disease condition and the necessity for specific treatment. Subsequently, with informed consent from the relatives, the patient was referred to a regional cancer center for comprehensive evaluation and to explore optimal therapeutic options.

DISCUSSION:

Myeloid sarcoma can involve various anatomical sites, including the skin, lymph nodes, bones, soft tissues, and even the central nervous system. This diverse presentation can mimic other malignancies, such as lymphoma, sarcoma, or metastatic solid tumors, leading to misdiagnosis and inappropriate treatment. Failure to recognize myeloid sarcoma early can result in delayed diagnosis and treatment, potentially allowing the disease to progress and become more difficult to manage. Early diagnosis is crucial because myeloid sarcoma often precedes or coincides with the development of systemic acute myeloid leukemia\textsuperscript{[13]}. Patients with no prior history of hematological malignancies are particularly at risk of misdiagnosis, as the presence of an unexplained mass may not immediately raise suspicion for a hematological malignancy. In such cases, a high index of suspicion and appropriate diagnostic workup, including immuno-histo chemistry and cytogenetic/molecular studies, are essential. Prompt initiation of appropriate systemic chemotherapy and radiation therapy has been shown to improve overall survival and reduce the risk of relapse in patients with myeloid sarcoma\textsuperscript{[14]}. Delaying treatment or pursuing inadequate therapies can lead to disease progression and a poorer prognosis.

The utility of advanced imaging techniques, such as functional imaging or molecular imaging, in the early detection and monitoring of myeloid sarcoma lesions is an area of active research and holds significant potential. These imaging
modalities such as PET scan, MRI scan, CT scan and molecular imaging can provide valuable information beyond the anatomical details obtained through conventional imaging methods, offering insights into the metabolic and molecular characteristics of the tumor. While advanced imaging techniques hold promise, further research is needed to establish their diagnostic accuracy, sensitivity, and specificity in the context of myeloid sarcoma\textsuperscript{[15,16]}. Additionally, standardization of imaging protocols and interpretation criteria will be essential for widespread clinical implementation. It is important to note that these advanced imaging techniques should be used in conjunction with other diagnostic modalities, such as histo-pathological evaluation and molecular analysis, to ensure accurate diagnosis and optimal management of myeloid sarcoma patients\textsuperscript{[17]}.

CONCLUSION:

This case highlights the importance of considering myeloid sarcoma in the differential diagnosis of unexplained masses, particularly in the head and neck region. Myeloid sarcoma can present as an initial manifestation of acute myeloid leukemia, preceding the development of systemic disease and bone marrow involvement. Early recognition and prompt diagnosis through comprehensive workup, including histo-pathological evaluation, immuno- histo chemistry, and molecular studies, are crucial. Failure to recognize myeloid sarcoma can lead to delayed initiation of appropriate therapy and potentially worse outcomes. Once diagnosed, a multimodal treatment approach involving systemic chemotherapy directed at the underlying acute myeloid leukemia, in combination with radiation therapy for the local control of the myeloid sarcoma lesion, should be initiated promptly. Close collaboration between hematologists/oncologists, pathologists, and radiation oncologists is essential for optimal patient management\textsuperscript{[18,19,20]}. This case also underscores the need for continued research into advanced imaging techniques, such as functional and molecular imaging, which may aid in the early detection, staging, and monitoring of myeloid sarcoma lesions. Furthermore, ongoing investigations into the molecular pathogenesis and targeted therapies for myeloid sarcoma and acute myeloid leukemia are warranted to improve patient outcomes. Awareness of this rare entity and a high index of suspicion are critical for healthcare professionals, as early diagnosis and appropriate treatment can significantly impact the prognosis and quality of life for patients with myeloid sarcoma and associated acute myeloid leukemia.

REFERENCES:


