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CLINICAL PATHOLOGY CONFERENCE CASE 5: BILATERAL MAXILLARY SINUS RESORPTIVE DISEASE WITH PALATAL ULCERATION IN A 42-YEAR-OLD PATIENT

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Clinical Presentation: A 42-year-old female presented with bilateral periodontal swellings of 6 months' duration in the maxillary area palatal to the maxillary molar and premolar teeth. The lesions had been treated by a general dentist as localized periodontal disease, and because of local pain, root canal treatment of tooth #2 was administered. As a result of medial expansion of the lesions toward the hard palate (Figure 1) over the next few months and the occurrence of pus-like discharge, orthopantomography (Figure 2) and computed tomography (CT) (Figure 3) were performed, and the examinations showed bilateral lytic lesions of the hard palate involving the roots of teeth # 4 to #14, respectively. The patient was then referred to the Odontostomatology Clinic of the University of Bari, where clinical inspection confirmed the presence of bilateral and slightly elevated, erosive lesions of the hard palate. In view of the radiologic features, total body CT was performed, and no additional lesions were identified. The remaining clinical history and laboratory tests were noncontributory, with values within normal limits.

Differential Diagnosis: On the basis of the presenting signs and symptoms, review of the medical history, and analysis of the available information, including the clinical and radiographic features, several entities were considered in the differential diagnosis of the current case.

The presence of an odontogenic infection with subsequent maxillary sinus extension, also referred to as *odontogenic sinusitis*, has been attributed to approximately 10% to 12% and up to 68% of all sinusitis cases.[1,2] It has variable clinical and radiographic features, ranging from minimal signs and symptoms with focal inflammation and radiograph evidence of sinus lining thickening (which can be further confirmed with advanced CT) to severe, full-blown, and progressive rhinosinusitis, with potential progression to orbital cellulitis, blindness, meningitis, and cavernous sinus fibrosis, among other complications.[3] The majority of cases of odontogenic sinusitis are triggered iatrogenically, secondary to injury of the mucoperiosteum and violation of the Schneiderian membrane lining of the maxillary sinus, or occur after dental procedures, such as extractions, implant placement, sinus augmentation surgery, and orthognathic surgery,

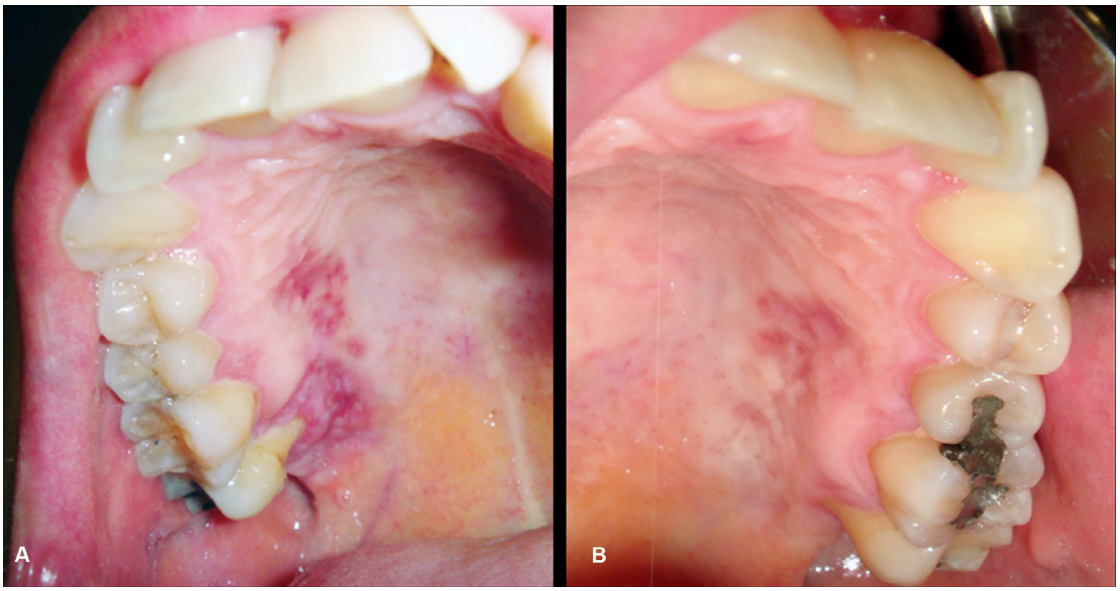

Fig. 1. Clinical presentation of slightly elevated, erosive, and multiple lesions, involving the gingival margins and the hard palate on the right **(A)** and left **(B)** sides.

among others. Patients typically complain of facial pain, pressure, and postnasal drip, as well as purulent discharge, which is often accompanied by a foul smell or taste.[1] Odontogenic sinusitis was initially considered in the differential diagnosis of the current case on the basis of the clinical and radiographic features and a history of root canal therapy, pain, and discharge, especially because both bilateral and unilateral swellings have been described in this condition; however, the absence of local instigating factors, such as periodontal disease, dental caries, and/or root canal procedures extending into the sinuses, coupled with confirmation of the tooth vitality status led to the confident diagnosis of this entity.[4]

Infectious rhinosinusitis may be also added to the list of differential diagnoses. The condition can be related to practically any type of microorganism, including bacteria, viral, fungal organisms, as well as protozoal organisms, with the extent of sinonasal involvement primarily dependent on the immune status of the patient and the virulence of the infection.[5] There may be significant delays in establishing an accurate diagnosis, primarily because of the nonspecific clinical features of the infection during the early stages of the disease, demonstrating chronic sinusitis, headaches, and facial discomfort with or without orbital swelling and vision disturbances, among others. CT showing opacification of the sinuses with or without bone destruction, coupled with histomorphologic confirmation, is considered the gold standard in the confirmation of infectious rhinosinusitis.[5,6] Although the possibility of infectious rhinosinusitis was also tentatively considered in the initial differential diagnosis because of the radiographic presentation of resorption detected within the sinus and the presence of the palatal ulceration; however, it was not favored as the final diagnosis because of the bilateral involvement of the maxilla.[6]

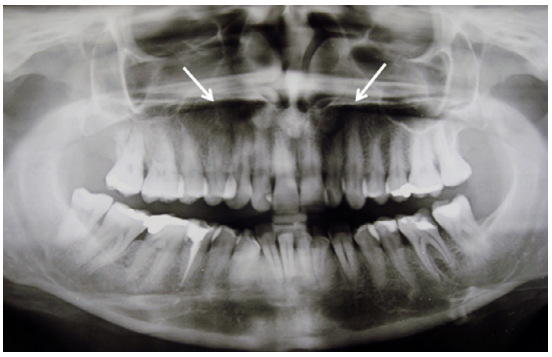

Fig. 2. Orthopantomogram showing barely evident lytic lesions of the hard palate, involving the roots of teeth # 4 to #14, respectively *(arrows)*, with slight gingival retraction, mimicking periodontal disease.

Ameloblastoma and other less common odontogenic tumors involving the sinonasal tract, including calcifying epithelial odontogenic tumor, calcifying odontogenic cyst, dentinogenic ghost cell tumor, and its malignant counterpart ghost cell odontogenic carcinoma, among others, were also considered in this case.[7,8,9] With rare exceptions, odontogenic tumors of the maxillary sinus are most likely to present as unilateral lesions, with or without evidence of calcification, depending on the tumor subtype. Histomorphologic confirmation is essential in excluding such entities. Several primary salivary gland tumors may also rarely arise within the maxillary sinus, constituting only 4% to 8% of all sinonasal malignant tumors. Adenoid cystic carcinoma is by far the most commonly reported within this category, followed by adenocarcinoma non otherwise specified, mucoepidermoid carcinoma, salivary duct carcinoma, myoepithelial carcinoma and polymorphous low grade adenocarcinoma.[10-14] Adenoid cystic carcinomas of the sinonasal region are most likely to be encountered during the fourth to sixth decades of life and demonstrate a female/male prevalence ratio of 3:2 and maxillary sinus involvement.[11,12] Generally, these tumors show worse behavior compared with other subtypes of salivary gland tumors in the head and neck, and this is primarily attributed to the aggressive nature of the tumor and the complex anatomy of the region; thus, the significant delay in diagnosis results from the hidden, closed anatomy of the sinonasal

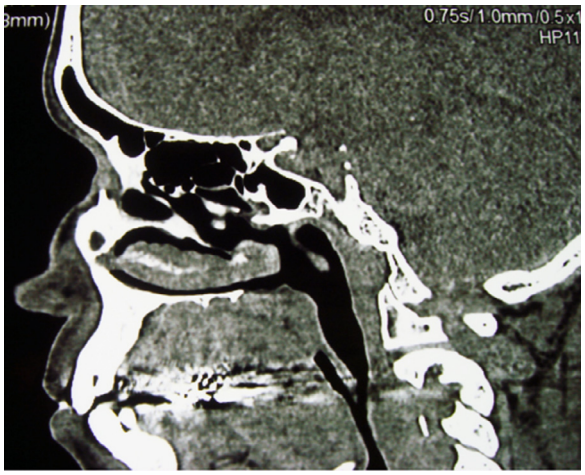

Fig. 3. Computed tomography (CT) scan demonstrating mild erosion of the palatine process of the maxillary bone, with scalloped borders.

area. Nevertheless, depending on tumor stage, treatment consists of surgical excision with attempts to achieve clear margins, followed by adjuvant radiotherapy and chemotherapy, as needed. The overall 5-year survival rate is approximately 42%.[12-14]

The multispectral group of lymphoproliferative and related disorders were also included in the differential diagnosis, mostly because of the radiographic features, including resorption around the radicular areas of teeth. In practical terms, the entire spectrum of lymphomas of B-cell, T-cell, and plasmablastic lineages have been documented in the sinonasal region. Lymphoma is considered the second most common malignancy of the sinonasal tract after squamous cell carcinoma[15] and represents 3% to 5% of all malignancies.[16] Sinonasal lymphomas also constitute approximately 1.5% of all lymphomas[17] and around 35% of all Waldeyer ring lymphomas.[18,19,20] Males are more commonly affected compared with females, usually in the fourth to seventh decades of life. Sinonasal lymphoma bears different geographic demographic characteristics, with B-cell lymphoma being more commonly encountered in the Western population, South American and Western population of the Far East, and natural killer (NK) cell lymphoma generally more prevalent in the Asian population.[14,20,21] Additionally, maxillary sinus lymphomas are more common in the sinonasal region in the Western population compared with the Asian population, in which nasal cavity tumors are more prevalent.[14-16,20,21]

Diffuse large B-cell lymphomas are the most common form of tumors encountered in the sinonasal region, followed by Burkitt lymphoma, mucosa-associated lymphoid tissue lymphoma, and follicular lymphoma. Signs and symptoms vary depending on the subtype of lymphoma but generally nasal obstruction, epistaxis, rhinorrhea, and variable degrees of nasal septum, nasal bone, and palatal bone perforation and destruction may be observed. Histologically, non-Hodgkin lymphoma typically presents with variable histomorphologic features, including diffuse sheets of malignant lymphocytes with or without follicular features, and the diagnosis is confirmed with a battery of immunohistochemical stains, including CD45, PAX-5, p63, BCL-6, CD20, CD30, and MUM-1, among several others.[14,15,17,18,21-24] NK/T-cell lymphomas (angiocentric T-cell lymphoma) of the sinonasal region deserves special attention, given its known and well-documented prevalence for this region. Males are more commonly affected compared with females, and Asians more than the Western population. There is a strong association with Epstein-Barr virus infection, which can be readily confirmed with immunohistochemistry and DNA/RNA hybridization, and histologically, tumor cells show angiocentric distribution with positive labeling with CD2, CD3, and CD56, as well as TIA-1 and perforin, which are considered to be reliable markers for this tumor.[25]

NK/T-cell lymphoma was strongly considered in the current case because palatal ulceration and perforation are common features of this tumor; however, the majority of reported tumors appear as midline destructive masses with sinus opacification, which was not seen in the current case.[17,18] Despite the fact that the vast majority of sinonasal lymphomas present as unilateral diseases, bilateral involvement similar to the clinical manifestations in this case may be also encountered in slightly more than half the population surveyed, which may potentially lead to a delay in establishing the diagnosis and to negative therapeutic and prognostic implications.[26]

Plasma cell disorders of the sinonasal region, as well as the spectrum of histiocytic disorders, may be also included in the differential of the current case. Extramedullary plasmacytoma is a rare soft tissue tumor, which constitutes only 3% of all plasma cell dyscrasias, with approximately 80% of these tumors documented in the head and neck region and around 75% of these reported in the sinonasal tract.[27-29] This tumor affects patients between the sixth and eighth decades and with a documented 4:1 predilection in males.[20-22] The most commonly involved sites are the nasal cavity and septum, oropharynx, nasopharynx, and larynx, and the most common symptom is nasal obstruction, but nasal discharge, epistaxis, visual disturbances, and sore throat and dysphonia may be also experienced.[28-30] Imaging plays an important role in the diagnosis of this condition, where the tumor typically displays a well-demarcated soft tissue density that appears isointense on T2-weighted magnetic resonance imaging (MRI) images (reflecting the high cellular content within the lesion) and is considered highly suggestive for the diagnosis of extramedullary solitary plasmacytoma.[28-30] The diagnosis of extramedullary plasmacytoma can be further confirmed histologically by demonstrating diffuse aggregates of mostly monotonous plasma cells, with cartwheel eccentric nuclei and basophilic cytoplasm, but some cells may also show atypical cytomorphology, and mitotic activity maybe also observed. Immunohistochemical stains for kappa (κ) and lambda (λ) light chains, confirming the clonality of the plasma cell infiltrate, along with positive staining with CD138 further supports the diagnosis.[27,29,30] Although this entity was tentatively considered in our differential diagnosis, bilateral maxillary swelling and diffuse bone resorption identified within the maxillary sinus conflicted with this diagnosis.

The involvement of the head and neck region, including the sinonasal region, in histiocytic disorders is also well documented and was included in the differential of the current case. Sinus histiocytosis with massive lymphadenopathy, also known as *Rosai-Dorfman disease* (RDD), is an indolent non−Langerhans cell histiocytic proliferative disorder of unknown etiology but may be attributed to clonal cell proliferation on the basis of identification of RAF/MEK/ERK mutations within these lesions.[31,32] It tends to involve patients of all ages but is most likely encountered in children and adolescents. The head and neck represents one of the most common extranodal sites, and it may occur concomitantly with or independently from nodal disease, with

predilection for the nasal and paranasal sinus sites.[31-33] Paranasal sinus localizations commonly present as an enhancing polypoid mass or as localized mucosal thickenings but may also appear locally aggressive with evidence of bone resorption. Furthermore, the lesion also tends to project with low T2 signal intensity on CT.[33,34] Ultrasonography and nucleotide bone scan may also help delineate the lesion. Histologically, RDD is characterized by diffuse accumulation of monotonous foamy histiocytic cells, with evident emperipolesis (lymphocytes phagocytized by histiocytes), and a variable number of plasma cells, polymorphonuclear leukocytes, and extravasated red blood cells may be seen. Histiocytes consistently show CD68 and variable S100 positivity, but unlike Langerhans cell histiocytosis (LCH) RDD infiltrate constantly is CD1a and Langerin negative.[34] Also, the foamy cell infiltrate, in contrast to LCH, does not demonstrate Birbeck granules at ultrastructural examination.[35] Erdheim-Chester disease (ECD) is another non−LCH that primarily involves the long bones (96%) but can also involve soft tissues in the head and neck region, including those of the periorbital area, maxillary sinus, and jaws. It is most commonly seen in adults, with an average age ranging between the fifth and seventh decades of life, and also shows slight male predilection.[36] Radiographically, ECD typically presents with bone sclerosis but may also present with maxillary sinus wall thickening, as well as sinus wall osteosclerosis, which appears hypointense on T1- and T2-weighted MRI images.[36] Histologically, biopsy specimens from ECD reveal dense collections of foamy and lipid laden histiocytes, which react positively with anti-CD68 and anti-S-100 protein antibodies but stain persistently negative for anti-CD1a. Of significance, ECD, similar to LCH, also exhibits *B-RAFV600E* mutation.[37]

LCH is among the histiocytic disorders that were also included in the differential diagnosis of the current case. The disease shows slight predilection for males and children age 3 to 5 years but also is well documented in adults. It also shows prevalence for the head or neck region where approximately 60 to 80% of cases are observed in the skull base, temporal bone, jaws, maxillary sinus, paranasal sinuses, and oral mucous membranes.[38-41] This condition was among the top considerations in the differential diagnoses list, especially because bilateral maxillary swelling has been reported as part of the head and neck manifestations of the disease[42] and because the radiography shows bone resorption encircling the roots of the maxillary teeth, within the maxillary sinus. Additionally, palatal ulceration with partial necrosis was also observed bilaterally in the current case, increasing the suspicion for the presence of LCH.

Diagnosis: An incisional (diagnostic) biopsy was performed on one of the lesions on the right side of the hard palate, and the specimen was promptly fixed in neutral buffered formalin, embedded in paraffin, cut and stained with hematoxylin and eosin. Microscopic examination showed the lesion consisting of a dense accumulation of lymphoid-like cells of variable sizes (Figure 4), occupying the lamina propria up to the interface with the covering epithelium. At higher magnification (Figure 5), 2 distinct cell populations were evident: (1) smaller and dispersed lymphoid cells admixed with abundant eosinophilic granulocytes, and (2) larger cells, sometimes clumped in small clusters, frequently showing cytoplasmic clearing. At even higher magnification, the latter exhibited grooved nuclei with evident indentations, finely dispersed chromatin and small nucleoli. Immunohistochemistry revealed positive labeling of the large cells with anti-S 100 protein, CD1a (Figure 7A) and Langerin (Figure 7B), and lack of immunopositivity for pan-cytokeratin (AE1/AE3), melanocytic markers (HMB45 and Melan A), CD3, CD20, CD30, CD56, CD68, and CD138. Consequently, the diagnosis of LCH of the sinonasal region was formulated, and in consideration of the lack of systemic involvement, the patient was initially treated with intralesional injection of steroids (dexamethasone), which led to complete regression of the intraoral lesions. The patient was followed up every 3 months, with total body CT performed every 6 months. After 1 year, perianal skin nodules and pelvic osteolytic lesions were identified, and the patient was referred to the Hematopathology department for systemic treatment.

Discussion: Histiocytic disorders are a heterogeneous group of conditions that share overlapping histomorphologic features and are derived from different cell lineages, including Langerhans cells. LCH is a relatively rare and unique disorder that was first described by Lichtenstein in 1953.[43] Three distinct and separate conditions have been described within LCH according to patient age: (1) Letterer-Siwe disease, an acute, disseminated and aggressive form of the disease characterized by cutaneous rash along with bone, soft tissue, and visceral localizations, most commonly detected during the pediatric period; (2) Hand-Schuller-Christian syndrome, predominantly affecting children and manifesting as the triad of diabetes insipidus, exopthalmos, and lytic skull lesions; and (3) eosinophilic granuloma, usually presenting as solitary or localized lesions in a slightly older age group.[43-45] Eosinophilic granuloma accounts for the majority of cases, representing approximately 60% of all LCH cases.[38-40,42-44,46] LCH is slightly more common in males and in children between ages 3 and 5 years, but occurrence in adults is also well documented. The disease may involve various body sites, with well-documented preference for the head and neck region. However, only few cases with nasal and maxillary sinus involvement have been reported in the literature.[47-52] Our current review of the English language literature yielded 5 cases with available complete or partially complete reportable demographic characteristics. Three of the 5 cases involved males, whereas the fourth was reported in a female patient and the gender was not available for the fifth. Patient ages ranged from the first to seventh decades, with all patients except one being age 16 years or younger. In 4 of 5 cases, the lesion occurred in the maxillary sinus, and in one, it also extended to the

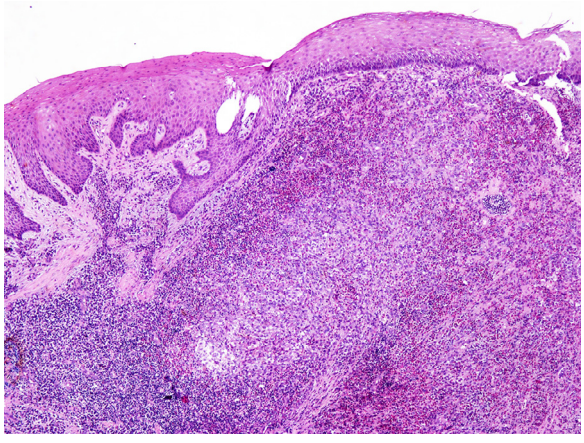

Fig. 4. Low-power view of the biopsy sample, showing dense subepithelial infiltration by variably sized cells (hematoxylin and eosin [H&E]; original magnification × 4).

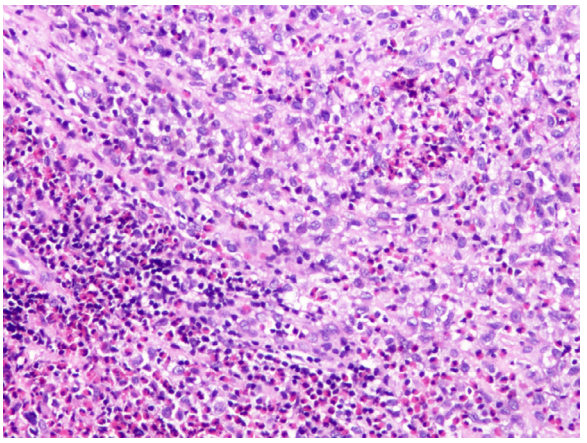

Fig. 5. The subepithelial infiltrates composed of small lymphoid cells, eosinophilic granulocytes, and larger cells showing cytoplasmic clearing (hematoxylin and eosin [H&E]; original magnification × 10)

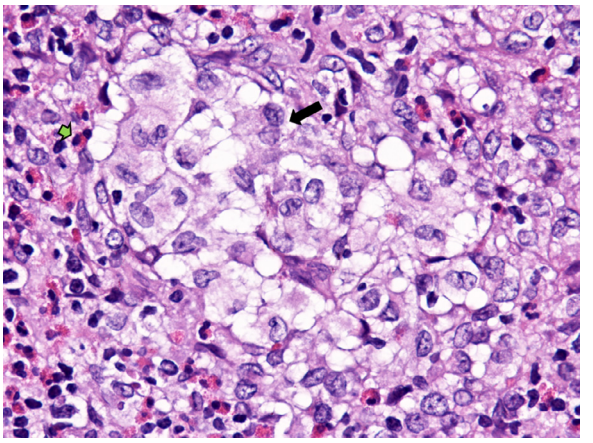

Fig. 6. At higher-power view, the larger cells possess oval, indented nuclei with evident nucleoli and show prominent cytoplasmic clearing and vacuolization *(long black arrow)*. Marked eosinophilia could be also seen *(short green arrow)*. (hematoxylin and eosin [H&E]; original magnification × 40).

temporal and mastoid areas bone mass; in the fifth case, it was detected in the nasal area. Imaging analysis was available for 4 of 5 cases, where the tumors universally produced an enhanced soft tissue mass with maxillary sinus wall destruction, with or without extension to the surrounding tissues. Additionally, one of the patients also had bowing of the maxillary sinus wall. In 2 of 5 cases, variable signs and symptoms were observed, and a symptomatic facial and periorbital intermittent swelling of the cheek area was seen, and nasal congestion was reported in 2 other cases. Posterior auricular pain was reported in the fourth case and a fungating extruding mass was detected in the fifth case. Three of 4 patients were treated with a combination of chemotherapy and prednisone, 1 patient was managed with curettage and Caldwell-Luc procedure, and 1 patient received surgical excision of the

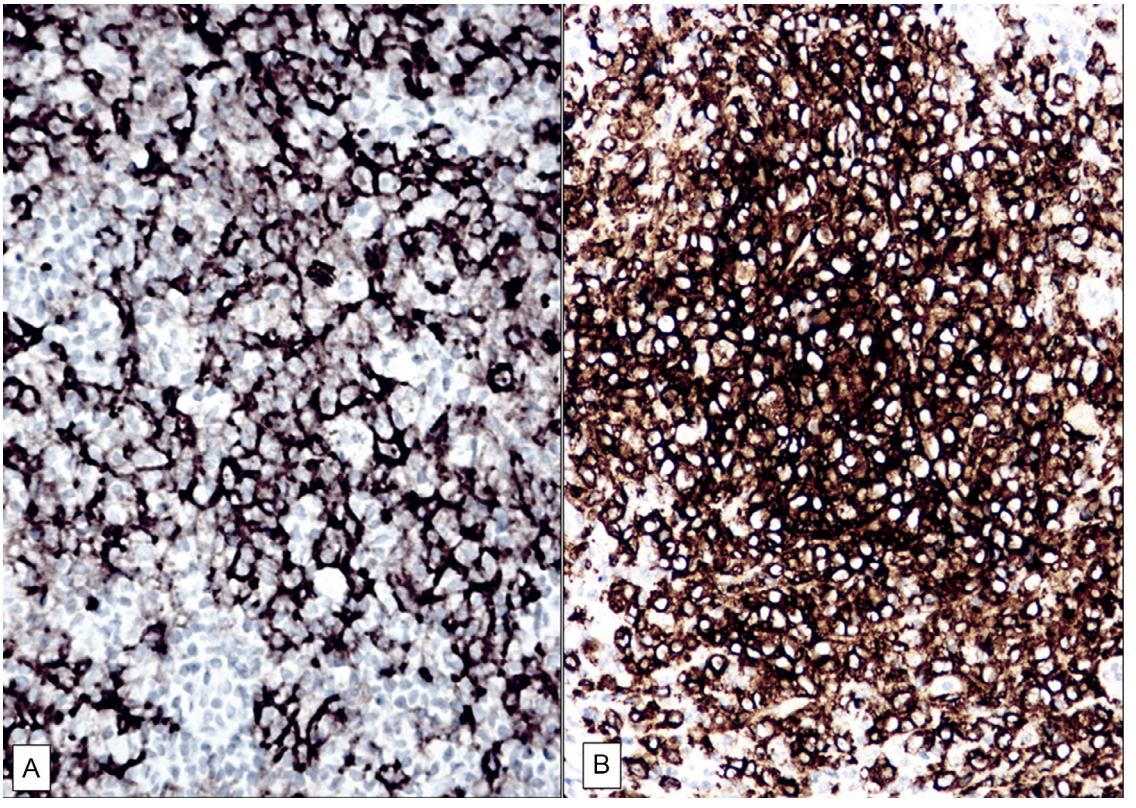

Fig. 7. CD1a **(A)** and Langerin **(B)** immunoreactivity is evident in large neoplastic cells (immunohistochemistry; original magnification × 40).

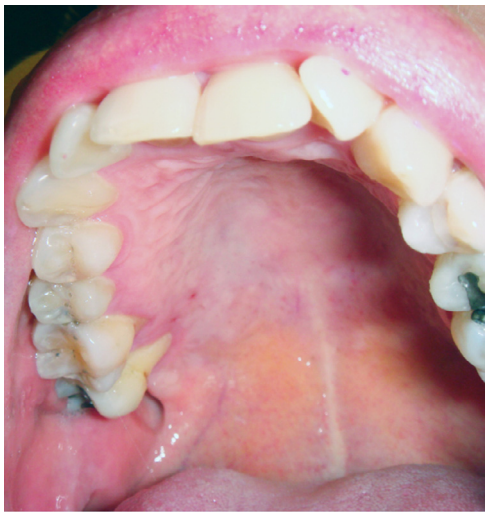

Fig. 8. At 3-month follow-up after intralesional injection of steroids, the lesions are seen to be completely regressed.

tumor. The disease duration was available for 4 of 5 cases and ranged from 4 days to 5 months, during which time 2 patients showed no evidence of recurrence after a total of 8 months to 1 year of follow-up, and the third patient is still alive but has shown evidence of disease as a result of liver involvement. Significantly, the LCH of the head and neck region occurred as part of a generalized systemic disease in 3 of 5 patients, and in the remaining 2 patients, the tumor was localized to the head and neck region.

The etiopathogenesis of LCH most likely is multifactorial, including suppressor T-lymphocyte deficiency, viral or bacterial infection, inflammatory processes, or true malignancies. Currently, LCH is considered a true neoplasm, based on the monoclonal nature of Langerhans cells, their immature morphologic appearance, the identification of cell cycle dysregulation, and the identification of telomere shortening of LCH cells.[53,54] Also, the identification of somatic activating mutations of the proto-oncogene *BRAF* in approximately 50% of LCH not only is considered a breakthrough in the etiopathogenesis and diagnosis of LCH, thus confirming its neoplastic nature, but also proven to be beneficial in targeted therapy of this condition.[55]

The management of LCH primarily is driven by whether the disease is localized or has multisystem involvement. Generally, localized disease may be effectively managed with curettage, supplemented by intralesional steroids injections, whereas multisystem disease is best managed with multiagent chemotherapy. The latter often is prolonged, which has been proven more effective in controlling disease in comparison with prednisolone alone.[48,49,52,54] Future targeted therapy using monoclonal antibodies against CD1a and Langerin, specific cytokine inhibitors, and novel trial agents, including 2-chlorodeoxyadenosine, may also prove to be potentially beneficial.[55] Additionally, the discovery of mutation of the proto-oncogene *BRAF* not only is considered an essential diagnostic tool but also a potential target for novel treatments.[55-57]

In conclusion, the case reported here emphasizes that LCH involving the oral mucosa, the jaws, or the nasal and sinonasal structures is a clinical challenge and may remain undiagnosed for a long time, thus allowing significant growth of lesions before proper diagnosis because of the several distinct processes that are considered in the differential diagnosis and the lack of specific clinical symptoms and radiologic features.

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CLINICAL PATHOLOGY CONFERENCE CASE #6: MULTIPLE TUMORS OF THE SKULL IN A PEDIATRIC PATIENT

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Clinical Presentation: A 2-year-old female from Guatemala presented with multiple tumors affecting the skull, orbits, and the maxillary sinuses. Clinical examination revealed bilateral exophthalmos and marked periorbital swelling in the left eye that was displaced inferiorly. Additionally, the patient had slight hyperpigmentation associated with the periorbital swellings, and temporal swelling was also present. Bleeding from the right nostril, clear fluid dripping from the left nostril, and mouth breathing were present.

Axial and coronal slices of magnetic resonance imaging (MRI) showed multiple, hypointense, space-occupying masses in the right occipital lobe, right temporal lobe, right transverse sinus, left orbit, left temporal lobe, and cerebellum. Focal areas of cortical destruction were also noted. Non−contrast-enhanced, coronal computed tomography soft tissue window showed 2 masses in the orbits, both with internal calcifications seen encroaching on the superior surfaces of the right and left globes (Figure 1).

Differential Diagnosis: On the basis of the findings on clinical examination and radiographic imaging of the multiple masses in the skull, orbits, and maxillary sinuses, the differential diagnosis for this case included a range of common pediatric head and neck tumors with multifocal and/or metastatic presentation. The differential diagnoses included the following: lymphoma (Hodgkin and Non-Hodgkin), neuroblastoma, retinoblastoma, rhabdomyosarcoma, osteosarcoma, thyroid carcinoma, Langerhans cell histiocytosis, Ewing sarcoma, and salivary gland tumors.[1,2]

Lymphomas are the most common head and neck tumors in children, with Hodgkin lymphoma being more common than non-Hodgkin lymphoma.[1,2] On MRI, lymphomas in the head and neck region appear as homogeneous, hypointense masses with rare calcifications.[3]

Neural tumors are the next most common pediatric tumors in the head and neck region.[1,2] These include neuroblastomas and retinoblastomas, both occurring more commonly in children less than 2 years of age. Neuroblastoma, however, is more common than retinoblastoma in young children.[1,2] Retinoblastoma is a primary malignancy of the retina, whereas neuroblastoma is a malignancy of the immature cells that are found in several areas of the body. Neuroblastomas most often arise in the adrenal glands and may metastasize to other parts of the body, including the head and neck region. Hyperpigmentation of the eyes, or raccoon eyes, can be seen in neuroblastomas involving the eye.[4] On MRI, neuroblastomas present as heterogeneous, hypointense masses, and on computed tomography, internal calcifications can be demonstrated.[5]

Soft tissue sarcomas are the third most common head and neck tumors in the pediatric population, with rhabdomyosarcomas being the most common. Osteosarcomas are also seen in children but occur less frequently in infants and toddlers.[1,2] On imaging, osteosarcomas are seen within bone, whereas rhabdomyosarcomas are seen within soft tissue. About 10% to 20% of rhabdomyosarcomas can involve the orbit.[6] Clinically, hyperpigmentation of the eyes ("raccoon eyes") can be seen in rhabdomyosarcomas involving the eye. On MRI, rhabdomyosarcomas may present as intermediate to high signal intensities without internal calcifications. Bone destruction of the temporal bone and skull base and invasion of various structures in the head and neck region are also seen.[2]

Other less common head and neck tumors in children include thyroid cancers, Langerhans cell histiocytosis, Ewing sarcoma, and salivary gland carcinoma.[1,2] In older children, thyroid cancers, Ewing sarcoma, and salivary gland neoplasms are more commonly seen compared with Langerhans cell histiocytosis (LCH).[1,2] LCH is a disorder characterized by an excess of immune system cells, known as *Langerhans cells*. These excess immature Langerhans cells form tumors in the skull or the long bones. On imaging, these tumors are seen as masses within bone, rather than in soft tissues.

On the basis of the young age of this patient, the clinical presentation of bilateral periorbital swellings with slight hyperpigmentation, and imaging showing multiple hypointense, soft tissue masses with internal calcifications displacing, rather than destroying or infiltrating, adjacent structures, the following tumors were initially excluded from the differential diagnosis: lymphoma, retinoblastoma, rhabdomyosarcoma, osteosarcoma, thyroid carcinoma, LCH, Ewing sarcoma, and salivary gland tumors. A diagnosis of metastatic neuroblastoma with brain and eye involvement had to be excluded.

Diagnosis and Management: Incisional biopsy of a sinonasal lesion revealed several soft tissue fragments (Figure 2). Histopathologic analysis of these tissue fragments demonstrated diffuse sheets of mononuclear, medium-sized cells showing irregular cytoplasmic and nuclear contours with eosinophilic granular cytoplasm. Some of these tumor cells presented with a plasmacytoid disposition. Additionally, small eosinophilic, round cells resembling eosinophils were noted, and within these small round cell populations, large round cells with pale eosinophilic cytoplasm and folded or grooved nuclei resembling coffee beans were also seen. Intermingled macrophages and a subacute inflammatory infiltrate at the periphery of the tumor were also noted. Considering the histologic features observed, a diagnosis of LCH was hypothesized, and an immunohistochemical analysis was performed. LCH was ruled out, along with most of the above-mentioned differential diagnoses, because the tumor cells were negative for S-100, CD1a, CD207, leukocyte common antigen, terminal deoxyribonucleotide transferase, desmin, CD138, chromogranin, and neuron-specific enolase and were positive for vimentin. Given the immunohistochemistry (IHC) results, a differential diagnosis of myeloid sarcoma (MS) was considered, and additional IHC analyses were performed for confirmation. The tumor cells showed strong positivity for myeloperoxidase,