Original Research Article

Pitfalls in the diagnosis of lesions of sinonasal tract both on clinical and histopathological grounds

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Abstract

Background: The nasal cavity and paranasal sinuses are collectively referred to as the sinonasal tract, which is anatomically and embryologically distinct from the nasopharynx.
Aim and objectives: To understand the variable clinical presentations of three unusual cases in the sinonasal tract, to study the histomorphology and analyze the pitfalls in their diagnosis, to study the differential diagnosis and review the literature.
Materials and methods: Unusual presentations of three cases were encountered during the period from October 2016 to July 2017 in the Department of Pathology, Government ENT Hospital, Hyderabad. Excised specimens of all the three cases were received and subjected to routine processing, cutting, staining and histopathological features were analyzed. Special histochemical and immunohistochemical stains were done for confirmation of final diagnosis.
Results: Case 1 was Rosai Dorfman Disease, Case 2 was Botryoid Embryonal Rhabdomyosarcoma and Case 3 was Invasive Aspergillosis.
Conclusion: Rosai Dorfman Disease has to be differentiated from lymphoproliferative and other histiocytic disorders while the benign inflammatory pattern of Botryoid Embryonal Rhabdomyosarcoma is invariably mistaken for an inflammatory process. Aspergillosis mimics as a neoplastic lesion, by its expansile invasive nature. Thus an inflammatory lesion may be mistaken for neoplastic growth and vice versa which can lead to erroneous diagnosis, improper therapy and poor outcome.

Key words

Rosai Dorfman Disease, Botryoid Embryonal Rhabdomyosarcoma, Invasive Aspergillosis, Immunohistochemistry.

Introduction

The nasal cavity and paranasal sinuses are collectively referred to as the sinonasal tract, which is anatomically and embryologically distinct from the nasopharynx [1]. The nasal cavity, paranasal sinuses, and nasopharynx form a functional unit, which is lined by stratified squamous, respiratory-type pseudostratified columnar, and transitional (intermediate) epithelium [2, 3]. The mucosa of nasal cavity and paranasal sinuses are referred to as the Schneiderian membrane [4]. Sinonasal tract and nasopharyngeal lesions can be non-neoplastic (polyps, bacterial and fungal infections) and neoplastic (benign and malignant).

Present study was conducted to study the three cases of Rosai Dorfman disease (RDD), Embryonal Rhabdomyosarccoma of Botryoid type and Aspergillosis arising from the sinonasal tract and nasopharynx, to categorize them, and to correlate between their clinical mode of presentation and histomorphology.

Materials and methods

Objectives of the present study were to understand the variable clinical presentations of three unusual cases in the sinonasal tract, to study the histomorphology and analyze the pitfalls in their diagnosis, to study the differential diagnosis and review the literature.

Unusual presentations of three cases were encountered during the period from October 2016 to July 2017 in the Department of Pathology, Government ENT Hospital, Hyderabad. Excised specimens of all the three cases were received and subjected to routine processing, cutting, staining and histopathological features were analyzed. Special histochemical and immunohistochemical stains were done for confirmation of final diagnosis.

Case 1

A 12 year old girl presented with a history of unilateral swelling in the right nasal cavity which was progressively increasing in size since past 3 months. She had a history of nasal stuffiness and epistaxis since 2 months. There was no history of any other complaints or any other swellings in the body. No history of similar complaints in the past or in the family.

General and sytemic examination and routine hematological investigations revealed no abnormality. Clinically there was a mass in the nasal cavity which was not accessible for aspiration cytology. CT scan revealed a well-defined soft tissue isodense lesion at the left naso maxillary junction extenting into left nasal cavity reaching medially up to nasal septum and anteriorly into subcutaneous maxillary planes. Findings were nonspecific to any etiology. Differentials considered, included dermoid/ epidermoid/ neoplastic lesion (**Figure – 1, 2**). An excision biopsy was done and specimen sent to pathology department.

Gross: Received a relatively well circumscribed solid grey white to grey yellow mass measuring approximately 2.5x2x1.5 cm. Cut surface showed homogenous grey white appearance.

Histopathology: Microscopic examination revealed diffuse histiocytic proliferation, arranged in sheets admixed with lymphocytes, plasma cells and multinucleated giant cells. Some of the histiocytes were showing emperipolesis. Immunohistochemistry for S100 and CD68 markers showed diffuse and focal positivity in the histiocytic cells respectively, while CD1a was negative (**Figures – 3 to 8**).

Case 2

A 6 year old male presented with chief complaints of nasal stuffiness and obstruction.

On CT there was a mass in the nasopharynx of approximately 4.5x3x2 cm protruding into nasal cavity.

Endoscopic biopsy bit was sent as adenoid tissue of 0.4 cm in dimensions. Microscopic examination on scanner and low power views appeared like an inflammatory polyp. On higher magnification all embedded tissue on H&E section revealed surface respiratory epithelium with focal squamous metaplastic changes with subepithelial, loose textured relatively paucicellular, diffuse, unencapsulated lesion composed of spindle cells in the edematous stroma intermingling with polygonal cells with abundant eosinophilic cytoplasm, hyperchromatic nucleus and occasional bizarre forms and atypical mitosis. Foci of clear cut mature skeletal muscle differentiation were noted along with condensation of undifferentiated cells beneath the surface epithelium. Also noted were few inflammatory cells and vascular proliferation. Immunohistochemistry done with desmin showed intense positivity in the tumor cells. Based on the findings of mucosal involvement, polypoidal nature, occurring in younger age group correlating with hypo and hypercellular areas, rhabdoid morphology, skeletal muscle differentiation and characteristic cambium layer on microscopy and IHC substantiation with desmin, a diagnosis of Embryonal Rhabdomyosarcoma of botryoid type was made (**Figures – 9 to 14**).

Case 3

A 32 year old female patient presented with complaints of slow growing swelling on right side of the face since 8 months. On examination there was a diffuse swelling on the right side of the face measuring around 6x4x3 cm involving right maxilla and nasal cavity.

CT scan revealed a hypodense soft tissue lesion in the right maxillary antrum, widening of the osteomeatal unit and extending into the nasal cavity. There was erosion of the cortex of the maxilla, posterolateral wall of the maxillary sinus.

A biopsy was performed and specimen sent for histopathological examination. On gross, the tissue received was mostly necrotic admixed with tiny grey white bits altogether measuring around 5x4x3 cm.

Microscopic examination revealed occasional bony spicules and irregular strips of respiratory epithelium along with necrosis, dense colonies of entangled hyphae, branching at acute angles admixed with brown coloured spores and fruiting bodies (conidiophores) with minimal inflammatory response. Periodic acid schiff's stain (PAS) was faintly positive.

Based on the morphology and extensive involvement a diagnosis of invasive asperigillosis (A. niger) involving nasal cavity and extending into the maxillary bone was made (**Figures – 15 to 18**).

Results

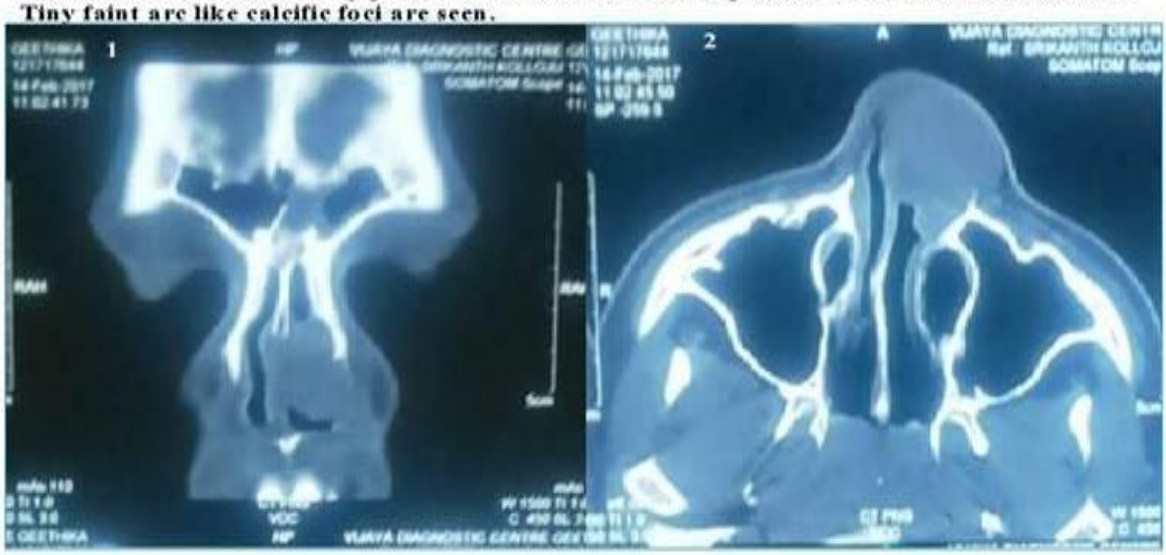
Case 1 was Rosai Dorfman Disease, Case 2 was Botryoid Embryonal Rhabdomyosarcoma and Case 3 was Invasive Aspergillosis.

Discussion

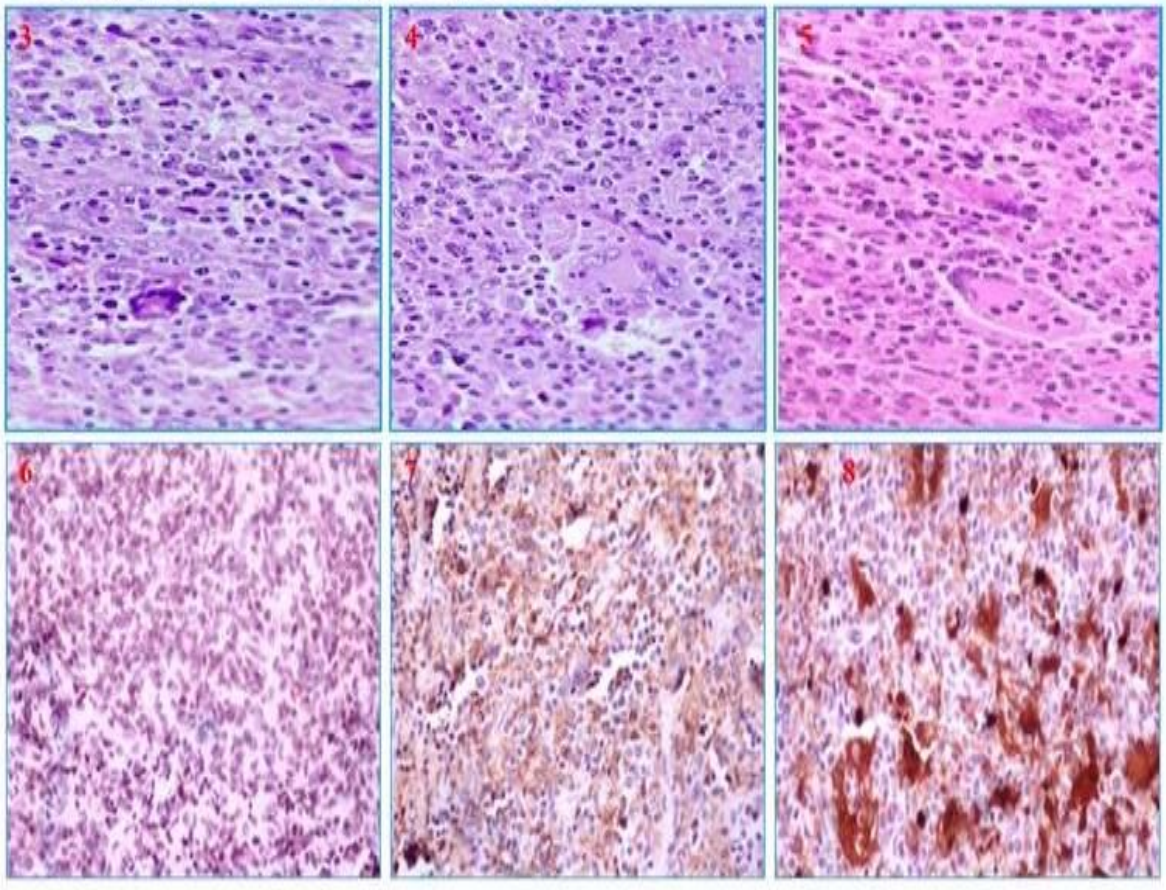
RDD, also known as Sinus Histiocytosis with Massive Lymphadenopathy is a rare histiocytic, benign lesion [5]. It was first described by Azoury and Reed and later described as a benign lesion by Rosai and Dorfman in 1969. The etiology is unknown although immune mediated or infectious origin by Brucella, Klebsiella and Epstein Barr virus are implicated as most probable pathological mechanisms [6].

RDD commonly presents as painless massive cervical lymphadenopathy along with enlargement of other group of lymph nodes like axillary, inguinal, para aortic and mediastinal lymph nodes. It is associated with fever and weight loss. Neutrophilia, elevated ESR, hypergammaglobulinemia [7, 8] and anemia are seen. Rarely in about 43% of cases, extranodal sites like head and neck, skin, lungs, bone, salivary glands and orbit can also be involved [9].

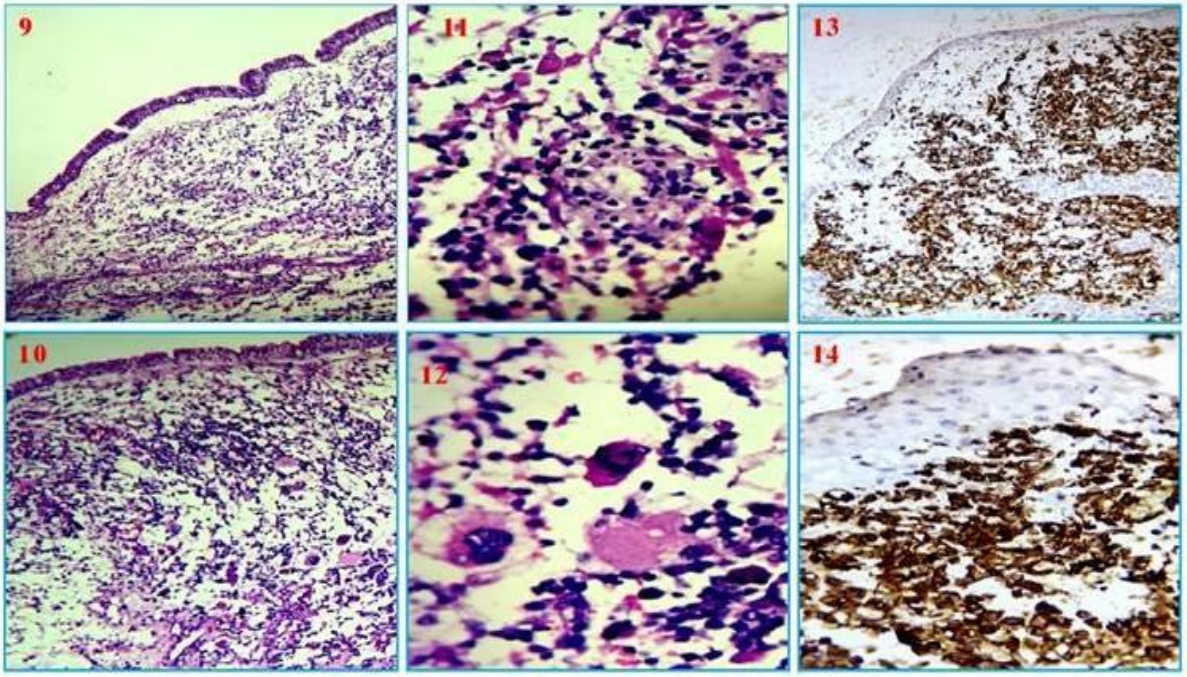
Figure 1 & 2 : CT Scan image revealed a well defined soft tissue isodense lesion at the left nasomaxillary junction extending into left nasal cavity reaching medially upto nasal septum and anteriorly into subcutaneous maxillary plane. Destruction of frontal process of left maxilla was noted. Tiny faint arc like calcific foci are seen.



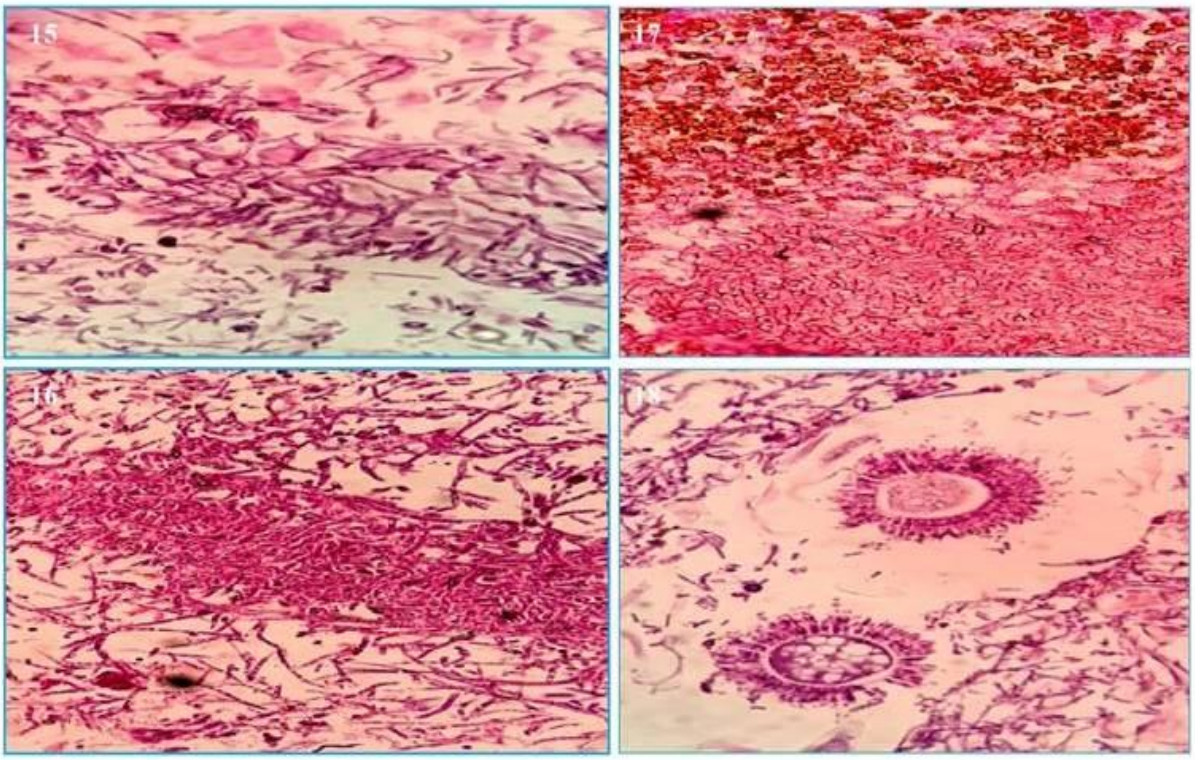
Figures 3 to 8 H & E sections of Rosai dorfman disease .
Figues 3, 4 & 5 : H& E section of 40x view showing histiocytes in diffuse sheets admixed with lymphocytes, plasma cells and giant cells with emperipolesis.
Figures 6 : IHC for CD1a negative. Figure 7 : IHC for CD68, weakly positive. & Figure 8 : Showing intense & diffuse positivity for S100.



Figures 9 to 14 : Images of Botryoid Embryonal Rhabdomyosarcoma
Figures 9 & 10 : H&E sections of 10x views showing cambium layer .
Figures 11 & 12: 40 x views showing mature skeletal muscle differentiation & bizarre cells & mitotic figures respectively. Figure 13 &14 : 10x & 40x views of IHC images showing cytoplasmic intense positivity for desmin



Figures 15 to 18 showing images of Asperigillosis. Figures 15 & 16 : 40x views showing entangled mass of fungal hypahae, branching at acute angle. Figure 17 : Fungal hyphae & spores are noted. Figure 18 showing fruiting body/ conidiophores , fungal hyphae.



In the nasal cavity, RDD has to be differentiated from other histiocytic lesions like tuberculosis, leprosy, sarcoidosis, rhinoscleroma, syphilis and Langerhans' cell histiocytosis and lymphoma [10]. Microscopic examination and IHC marker study were consistent with RDD. Emperipolesis is a characteristic feature of this condition, but may not be present in all the cases of RDD [11].

Correlating the mass lesion in the right nasal cavity with characteristic histomorphology, highlighted by emperipolesis and substantiated by immunohistochemical marker positivity for CD68, S100 and negativity for CD1a [12], a diagnosis of solitary extranodal Rosai dorfman disease was made (right nasal cavity).

Clinically it is a benign lesion of insidious onset having protracted course of active disease with spontaneous remission. Recurrences are occasional [13].

Embryonal Rhabdomyosarcoma of Botryoid type accounts for 6% of all rhabdomyosarcomas [14]. Rhabdomyosarcomas of the head and neck account for approximately 41% of all pediatric rhabdomyosarcomas, commonly occuring in the orbit, nasopharynx and ear [15, 16]. Parameningeal rhabdomyosarcoma is the tumor arising from the nasal cavity, paranasal sinuses, infratemporal fossa, nasopharynx or middle ear representing 16% of all cases and is associated with early recurrences and poor prognosis [16, 17]. Our case was a male patient of 6 years old with the mass in nasopharynx.

Histologically, it is classified into embryonal, alveolar, pleomorphic, and mixed histological subtypes. Embryonal rhabdomyosarcoma is the most common histological variant seen in the childhood [16]. Our case was also of embryonal rhabdomyosarcoma of botryoid type.

Immunohistochemistry with Desmin, Myogenin and MyoD1 confirms the diagnosis. In our case Desmin was strongly positive which confirmed the diagnosis of rhabdomyosarcoma [18].

Aspergillus species are commonly found in the soil and decaying organic matter. It can cause invasive fungal infections in human beings. Primary lesions can be localized in the eyes, paranasal sinuses, external ear and larynx in apparently healthy individuals [19]. More than 95% of the infections are caused due to Aspergillus fumigatus and causes both invasive and non-invasive aspergillosis [20]. Infectious lesions of paranasal sinuses are of four types i.e., allergic, noninvasive, invasive and fulminant [21]. Local factors like nasal polyps, stagnation of nasal secretions, chronic rhinitis and states of immunosuppression can promote the infection.

The mean age group of 34.6 years has been described by Chakrabarti, et al. [22] which is correlating with our case. Bony involvement is present in 30 to 50% cases [20] which are also present in our case. Invasive type of aspergillus infection has been reported to affect the paranasal sinuses of immunocompetent individuals, which was seen in our case [23].

Conclusion

Diagnosis of masses in the sinonasal tract and nasopharynx are difficult as the clinical presentation is poorly defined and radiological findings are sometimes indistinguishable from sinus neoplasms. Histopathology and supplementation by immunohistochemistry confirms the diagnosis. Rosai Dorfman Disease has to be differentiated from lymphoproliferative and other histiocytic disorders while the benign inflammatory pattern of Botryoid Embryonal Rhabdomyosarcoma is invariably mistaken for an inflammatory process. Aspergillosis mimics as a neoplastic lesion, by its expansile invasive and necrotic nature. Thus inflammatory lesion may be mistaken for neoplastic growth and vice versa which can lead to erroneous diagnosis, improper therapy and poor outcome.

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