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Rosai-Dorfman disease of the subglottis

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Abstract
A case of subglottic narrowing caused by an extranodal deposit of sinus histiocytosis in a 29-year-old man is reported. The characteristic features of Rosai-Dorfman disease, such as massive painless cervical lymphadenopathy, fever, raised erythrocyte sedimentation rate and raised white cell count, were all found to be absent. However, typical histological features, such as diffuse lymphoplasmacytic infiltrate, Russel bodies, foamy histiocytes and histiocytes with emperipoiesis, confirmed the diagnosis. Rosai-Dorfman disease is an uncommon disorder and its presentation with progressive subglottic narrowing is extremely rare. Our experience in the management of this condition is reported and the review of literature is discussed.

Key words: Histiocytosis, Sinus; Larynx

Introduction

Sinus histiocytosis with massive lymphadenopathy was first described by Rosai and Dorfman in 1969.[1] It is a non-neoplastic lymphoproliferative condition characterized by painless cervical lymphadenopathy, fever, leukocytosis, elevated ESR and polyclonal hypergammaglobinaemia.[1–4] The disease commonly manifests in children and in young adults. Other lymph node groups may be involved with, or without, cervical lymphadenopathy[5] and in nearly 30 per cent of the cases, extranodal involvement is likely to be seen.[5,6] Distinct histological features are usually seen, the most important being a marked proliferation of sinus histiocytes, that often contain phagocytized lymphocytes.[5] No specific cause for the disease has so far been identified, although it is speculated that the pathogenesis is related to an unidentified infectious agent or an altered immune response.[3] The typical course of the disease is that of an insidious onset, protracted duration of the active disease and eventual spontaneous remission, occasionally with subsequent recurrences.[2]

Various treatment patterns including surgery, antibiotics, radiotherapy, chemotherapy and steroids, frequently in combination have been tried, but no consistent pattern response has emerged from these studies.[5] Deaths have been reported in cases where there has been infiltration into vital organs.[7]

Case report

A 29-year-old male presented to our out-patient department, with complaints of progressive noisy breathing on exertion, of four months duration. There was no history of cough, aspiration or tuberculosis. Indirect laryngoscopy revealed a smooth reddish swelling in the left subglottic area and left upper tracheal wall. There were no ulcerations over the swelling and it was found to be compromising the airway. Both the vocal folds were found to be mobile. His blood investigations showed a haemoglobin of 14.9gm%, ESR of 14 mm/hour, and a WBC count of 8000/cu. mm. Sputum was negative for acid-fast bacilli. He had no fever, cervical lymphadenopathy or organomegaly. A computed tomography (CT) scan of the neck with 3-D reconstruction and virtual endoscopy was performed and the extent of the lesion was assessed. The airway was found to be narrowed in the region of the lesion, but distal to it the airway was normal. The axial cuts of the CT scan showed a homogeneous hyperdense lesion in the left subglottic area and in the left upper tracheal wall (Figure 1). A differential diagnosis of rhinoscleroma,

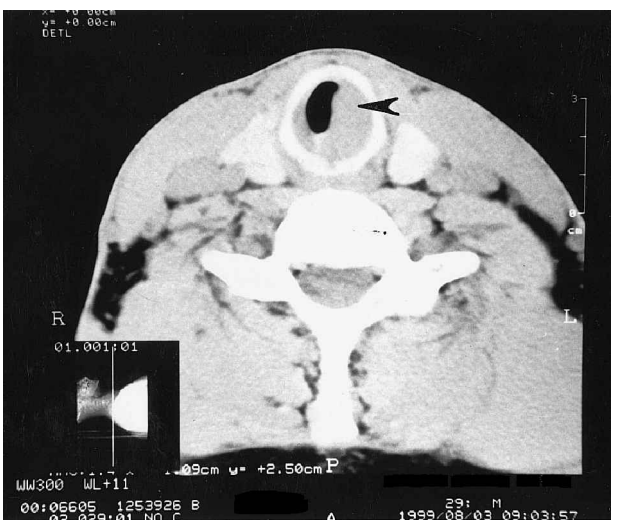

Fig. 1
Axial computed tomography imaging showing homogenous mass in the subglottic area on the left side (arrow head).

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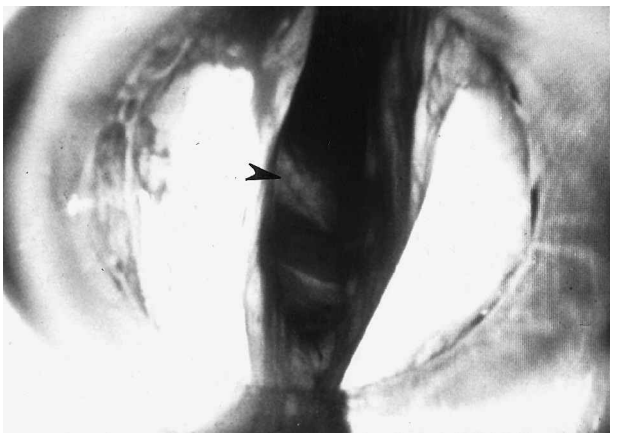

FIG. 2
Microlaryngoscopic picture showing the subglottic lesion on the left side (arrow head).

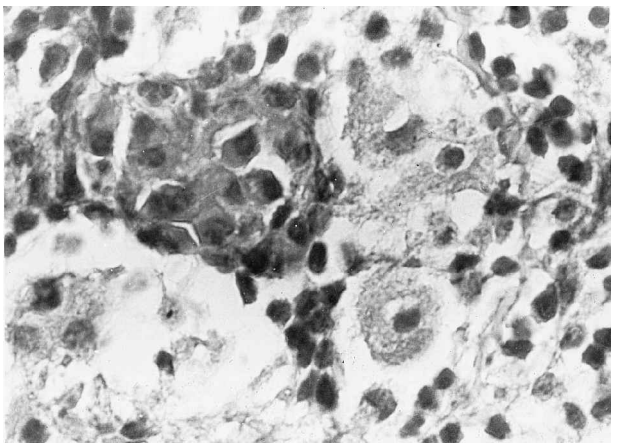

FIG. 4
Photomicrograph of the extranodal lesion showing histiocytes with emperipoiesis and surrounded by plasma cells (H & E; ×1000).

tuberculosis or malignancy of the subglottis was made and further management was planned.

A preliminary tracheostomy was carried out under local anaesthesia, as the anaesthetist was anticipating a difficult intubation. This was followed by a microlaryngoscopy under general anaesthesia, that revealed a smooth bulge in the left subglottic and upper tracheal area (Figure 2). A biopsy was taken which showed some foam cells, but a definite diagnosis was not possible due to a crush artifact. There was no evidence of malignancy in the specimen studied. A tracheal swab taken at time of the microlaryngoscopy cultured *Klebsiella* species. A few days later, a surgical excision of the lesion by the anterior tracheotomy approach was carried out by a team of surgeons, headed by the senior author (Figure 3). During the surgery a solitary Delphian lymph node, about 0.5 × 0.5 cm was found. The histopathology of the excised lesion showed inflamed hyperplastic respiratory mucosa, overlying inflamed glands, diffuse lymphoplasmacytic infiltrate, Russel bodies, foamy histiocytes, histiocytes with emperipoiesis and dense areas of fibrosis (Figure 4). The Delphian lymph node showed dilated sinuses filled with histiocytes having foamy cytoplasm and marked emperipoiesis, erythrophagocytosis and nuclear debris (Figure 5). Hence a diagnosis of extranodal and nodal Rosai-Dorfman's disease was made. The patient was decannulated about a week after the surgery and was put on a course of oral steroids, prednisolone 30 mg tapered over a period of four weeks. At present the patient is being closely followed up and about two months after the surgery there is no evidence of recurrence.

Discussion

Since Rosai Dorfman's disease or sinus histiocytosis with massive lymphadenopathy was first described in 1969, several cases of extranodal involvement have been reported. The most common sites for extranodal involvement are skin, upper respiratory tract and bone.[8] In the head and neck region the extranodal sites that are known to be involved include the nasal cavity, paranasal sinuses, nasopharynx, parotid and submandibular glands, larynx,

FIG. 3
Intra-operative photograph showing the subglottic lesion (arrow head), seen through the anterior tracheotomy.

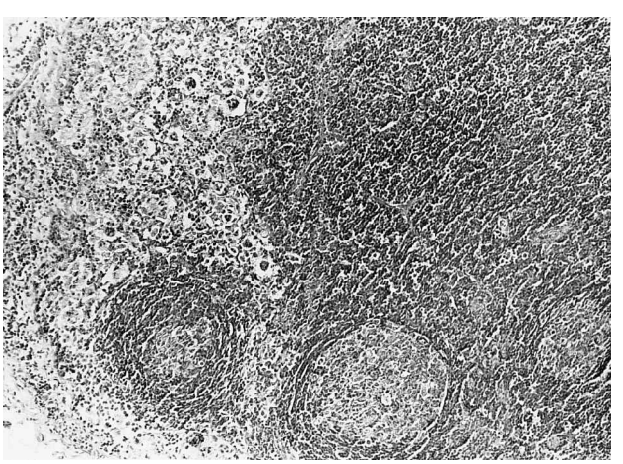

FIG. 5
Photomicrograph of the Delphian lymph node showing follicular hyperplasia, dilated sinuses filled with histiocytes showing emperipoiesis and plasma cells (H & E; ×100).

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temporal bone, infratemporal fossa, pterygoid fossa, meninges and the orbital region.[6]

The subglottis is a rare site for extranodal involvement of Rosai-Dorfman's disease, with very few cases reported up until now.[2,6,9] The diagnosis in this case was particularly difficult since typical features such as painless massive cervical lymphadenopathy, fever, leukocytosis and raised ESR were all absent. The diagnosis was made entirely based on the histopathologic report.

Wright and Richards,[7] noted that massive cervical lymphadenopathy (as originally described) need not be present in all cases of Rosai-Dorfman's disease and this case report is consistent with that finding. We would like to further note that other typical findings such as fever, raised ESR and WBC counts need not be present in all cases of Rosai-Dorfman's disease.

The exact aetiology of Rosai-Dorfman's disease is still uncertain. Lampert *et al.*[10] demonstrated high anti-body titers to *Klebsiella* sp. In this case report, a swab taken from the trachea cultured *Klebsiella* sp., which is consistent with the earlier report. Rosai-Dorfman's disease has been reported in human immunodeficiency virus (HIV) positive patients.[11] An alteration in the immune system has been reported in several cases of Rosai-Dorfman's disease and an associated altered immune system is considered to be a poor prognostic factor.[8]

The clinical presentation of extra-nodal Rosai-Dorfman's disease will depend on the site and extent of involvement. When the subglottis is involved, the presentation is that of progressive airway obstruction with, or without, other characteristic features of Rosai-Dorfman's disease such as massive lymphadenopathy, fever, leukocytosis and an elevated ESR. High resolution CT scans with 3-D reconstruction are useful in assessing lesions involving the subglottis and have the added advantage of identifying any lymph nodes in the neck that might not have been clinically palpable.

Rosai-Dorfman's disease is considered to be a benign self-limiting disorder and treatment is not necessary in most instances.[12] However, some patients will require surgery, radiotherapy and/or chemotherapy, when there is danger to life or to a organ. Death due to infiltration of vital organs such as kidney have been reported.[7] The involvement of the kidney, lower respiratory tract and liver have been found to be poor prognostic factors.[8]

The role of surgery is primarily to obtain a biopsy and in certain cases to relieve any obstruction that may be caused due to the disease. In the presence of cervical lymphadenopathy, fine needle aspiration cytology or lymph node biopsy is useful in the diagnosis.

When the subglottis is involved, a tracheostomy is sometimes required to secure the airway. Microlaryngoscopy and biopsy are required to assess the lesion and to make an accurate diagnosis. A punch biopsy can sometimes be inconclusive, as is the case in this report and also in an earlier case report by Courteney-Harris and Goddard.[9] The management of Rosai-Dorfman disease of the subglottic area has not been clearly documented, although a surgical or laser excision of the lesion seems to be the best modality of treatment to relieve the airway obstruction. Adjuvant chemotherapy or a course of steroids can be tried although the results are uncertain. The tracheostoma is closed after the subglottic narrowing is removed and the patient is closely followed up.

Antonius *et al.*[13] have reported a case of Rosai-Dorfman's disease with respiratory obstruction in a child responding dramatically to a two-week course of steroids with complete resolution of the clinical symptoms within five days. They also noticed a pattern of steroid dependence in that patient with clinical symptoms reappearing a few weeks after stopping the steroid and disappearing again once the steroids were restarted.

Komp[12] studied the various chemotherapeutic regimens in the management of Rosai-Dorfman's and felt that a combination of vinka alkaloid, alkylating agent and corticosteroid was effective in the management of the condition. Methotrexate and 6-mercaptopurine have also been used with fairly good results.[14]

The role of radiotherapy is not understood with some cases reporting almost complete resolution with radiotherapy and some with no response to radiotherapy.[5] The recurrence rate or the factors influencing recurrence are still not clearly understood.

Conclusion

Rosai-Dorfman's disease of the subglottis is a rare condition presenting with progressive airway obstruction. The characteristic features of Rosai-Dorfman's disease such as massive lymphadenopathy, fever, leucocytosis and elevated ESR need not be present in all cases. A high resolution CT scan and 3-D reconstruction and virtual endoscopy is useful in the assessment of the lesion and airway and also to rule out the presence of any lymph nodes in the neck. An infectious agent, as a possible aetiological factor cannot be ruled out, since *Klebsiella* species were cultured from the tracheal swab. A tracheostomy may be required to secure the airway. A punch biopsy during a microlaryngoscopy can be falsely negative for Rosai-Dorfman's disease. The diagnosis of extranodal Rosai-Dorfman's disease is a histopathological one. A surgical excision of the subglottic lesion followed by a course of steroids is effective. A close follow-up is essential to rule out recurrence.

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