CT OF FACE AND NECK MASSES IN CHILDREN

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ABSTRACT

CT scans of 16 patients with face and/or neck masses were reviewed. These patients were diagnosed by histopathology or clinical follow up as having cystic hygromas (6 cases), hemangiomas (5 cases), benign lymphoepithelial parotid cysts (2 cases), plunging ranula (1 case), non-Hodgkin lymphoma (1 case), and plexiform neurofibromatosis (1 case). Cystic hygromas were seen as uniloculated or multiloculated cystic masses with septa of variable thicknesses. The masses were usually not discrete. Hemangiomas were characterized by intense enhancement. Children with human immunodeficiency virus and benign lymphoepithelial cysts had bilateral diffuse enlarged parotid glands with multiple small cysts. The plunging ranula appeared as a well-defined homogeneous cystic lesion extending from the sublingual to the submandibular region. The location, extent and internal characteristics of face and/or neck masses were determined by CT.

INTRODUCTION

Face and neck masses are uncommon in children. They can be evaluated by ultrasonography (US), computed tomography (CT), or magnetic resonance (MR) imaging. CT and MR imaging are better than US for demonstrating the extent of the masses, the presence or absence of bone erosion, vascular encasement, and airway compromise.[1]

MATERIALS AND METHODS

We reviewed CT scans performed from April 1995 to January 1997 of 16 children ranging in age from 15 days to 15 years with face and/or neck masses. There were 8 females and 8 males. Both pre- and post-contrast enhanced CT scans were done using contiguous axial cuts 5 mm thick through the region with face and/or neck masses. Sometimes contiguous coronal CT scans with 5 mm thick sections were also done. The diagnoses were cystic hygromas (6 cases), hemangiomas (5 cases), benign lymphoepithelial parotid cysts (2 cases), plunging ranula (1 case), non-Hodgkin lymphoma (1 case), and plexiform neurofibromatosis (1 case). The diagnoses of 5 of the 6 patients with cystic hygroma were proved by histopathology, and of 1 by needle aspiration. For the patients with hemangiomas the diagnoses were verified by regression of the masses with corticosteroid therapy in 4 cases. Fine needle aspiration of the fifth patient with hemangioma of the left masseter muscle revealed unclotted blood, which was confirmed by MR imaging showing a hyperintense mass with serpentine signal voids on T2-weighted images. The two patients with benign lymphoepithelial parotid cysts were diagnosed by their positive anti-HIV antibody and their clinical history. The diagnoses

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of the patient with plunging ranula and the patient with non-Hodgkin lymphoma were proved by histopathology. The last patient with plexiform neurofibromatosis was diagnosed using her clinical history.

RESULTS

Cystic hygromas CT scans of 4 of the 6 patients with cystic hygromas showed multiloculated cystic masses (Fig. 1); CT scans of the other two patients showed uniloculated cystic masses (Fig. 2). The smaller lesions tended to be well demarcated, while the larger lesions tended to be poorly demarcated. The masses were confined to the parotid spaces in 2 cases, and invaded the parotid glands as part of extensive cervical masses in 2. In one patient the cystic hygroma was in the posterior triangle of neck. The last patient had cystic hygroma at the right submandibular triangle of the neck, which had similar CT findings to those of simple ranula. However a needle aspiration revealed fluid consistent with cystic hygroma. The density of fluid in the cystic hygromas varied from 10.7 HU to 19.4 HU. The CT scans showed displacement of the trachea and esophagus in 2 patients.

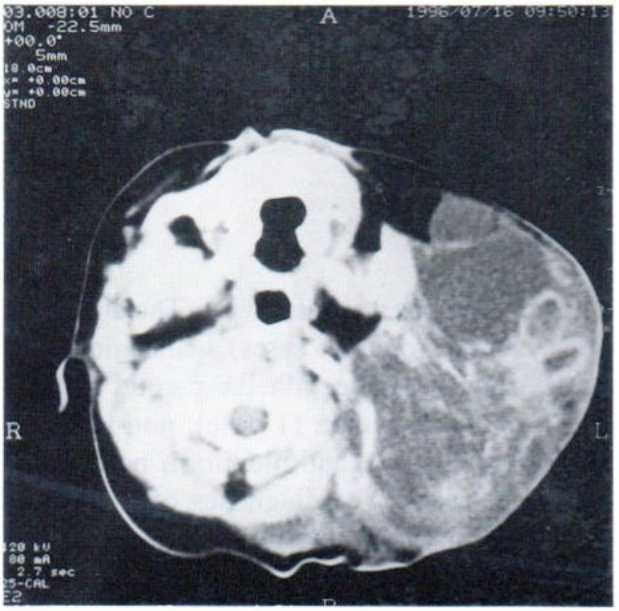

Fig.1 A 23-day-old boy with cystic hygroma of the left parotid gland. Contrast CT scan shows a multiloculated cystic mass in the left parotid region.

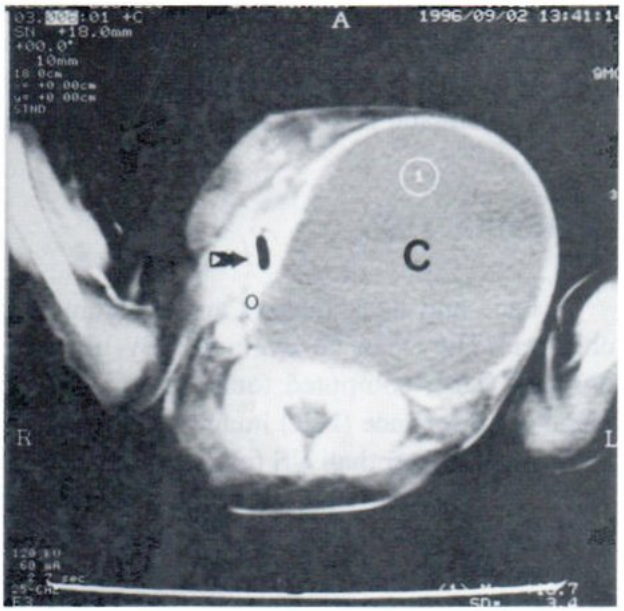

Fig.2 A 15-day-old boy with cystic hygroma of the left neck. Contrast CT scan shows a well-defined uniloculated cystic mass (c) with displacement of the endotracheal tube (arrow) and orogastric tube (o) to the right.

Hemangiomas The CT findings of the 5 patients with hemangiomas showed intense enhancement of the tumors. Three of them had hemangiomas of the right parotid glands; one had a hemangioma of the left parotid gland. The last patient had a hemangioma of the left masseter muscle. On pre-contrast CT scans the hemangiomas were slightly hypodense compared to the muscles (Fig. 3A). Post-contrast CT scans greatly enhanced the mass (Fig. 3B). In one patient a few small areas of hyperdensity were seen in the mass, consistent with focal areas of hemorrhage (Fig. 4). One of the hemangiomas compressed the trachea. Pre-contrast CT scans of the single patient with hemangioma of the left masseter muscle showed enlargement of this muscle with a hypodense mass. Post-contrast CT scans enhanced the center of the mass giving it a tortuous appearance (Fig. 5). T1-weighted MR imaging showed enlarged left masseter muscle with slight hyperintensity. T2-weighted MR imaging showed hyperintensity with serpentine signal voids. None of the five patients had phlebolith.

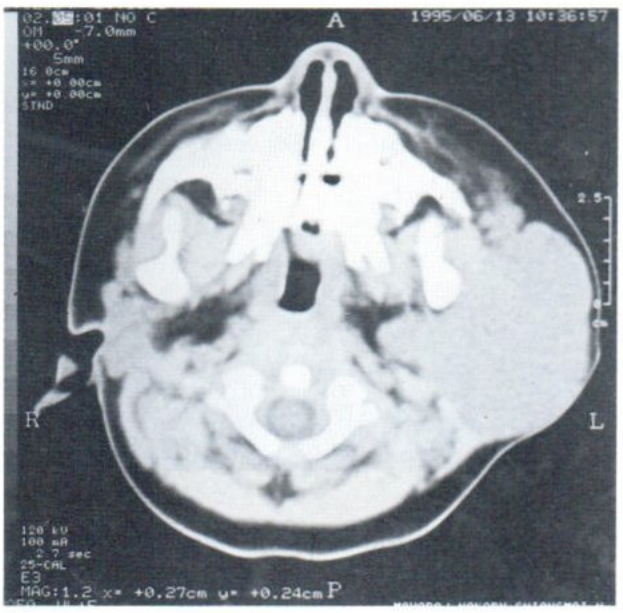

Fig.3 A 2-month-old girl with hemangioma of the left parotid gland.

Fig.3A Noncontrast CT scan shows enlarged left parotid gland with slight hypodensity compared to the muscles.

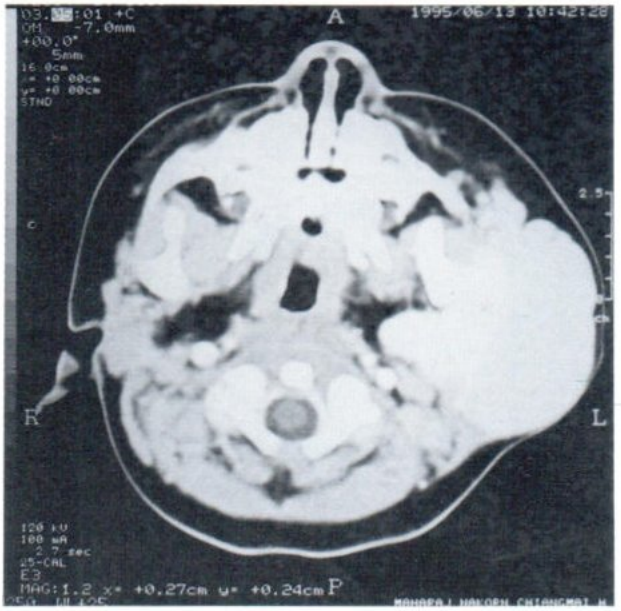

Fig.3B Contrast CT scan shows intense enhancement of the mass.

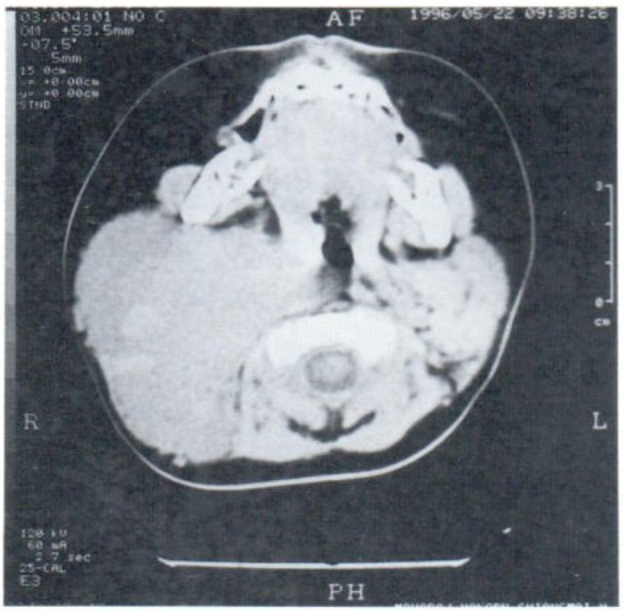

Fig.4 A 7-month-old girl with hemangioma of the right parotid gland.

Fig.4A Noncontrast CT scan shows enlarged right parotid gland with a few areas of hyperdensity consistent with hemorrhage.

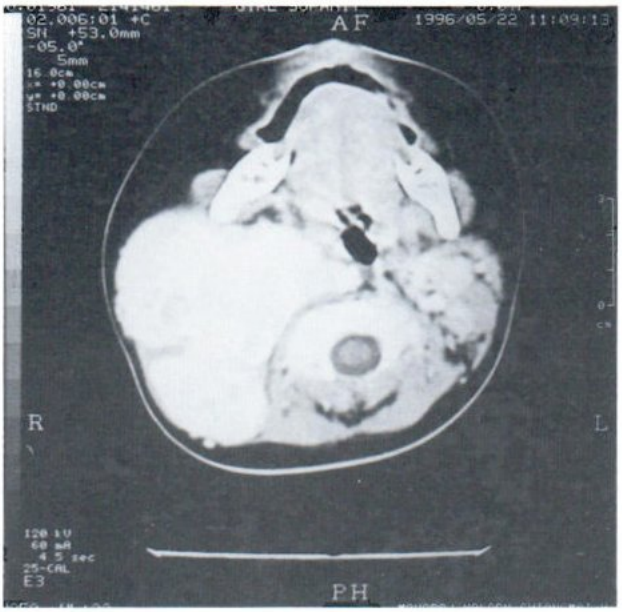

Fig.4B Contrast CT scan shows intense enhancement of the mass.

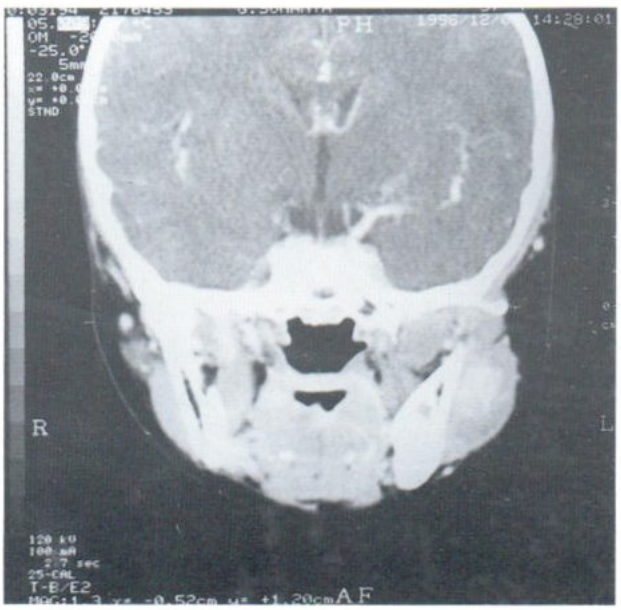

Fig.5 A 3-year-old girl with hemangioma of the left masseter muscle.

Fig.5A Contrast CT scan shows enlarged left masseter muscle with a hypodense mass and tortuous enhancement at the center.

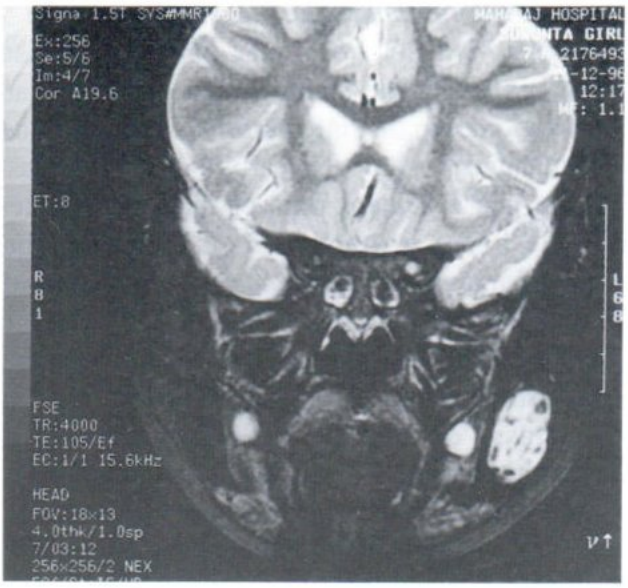

Fig.5B Coronal MR image (FSE 4000/105) shows hyperintense mass with serpentine signal voids in the left masseter muscle.

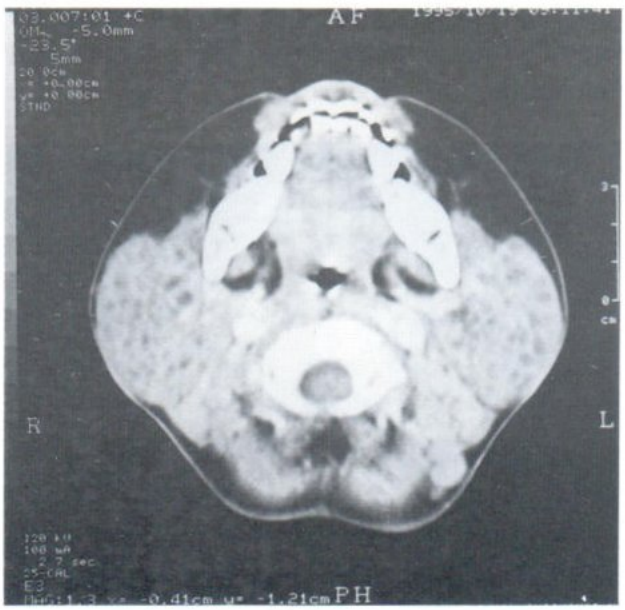

Fig.6 A 1-year-old boy with benign lymphoepithelial cysts. Contrast CT scan shows enlarged bilateral parotid glands with multiple small cysts. The parotid parenchyma is also denser than normal. Bilateral enlarged posterior cervical lymph nodes are also seen.

Benign lymphoepithelial parotid cysts The two patients with acquired immunodeficiency syndrome (AIDS) had enlarged bilateral parotid glands with multiple small cysts (Fig. 6). The parotid parenchyma was denser than normal. Multiple enlarged lymph nodes were seen in the posterior cervical region.

Ranula CT scans of the single patient with plunging ranula showed a well-defined cystic mass at the left side of the floor of the mouth with extension to the left submandibular region (Fig. 7).

Non-Hodgkin lymphoma CT scans of the patient with non-Hodgkin lymphoma showed soft tissue masses in the nasopharynx (Fig. 8) and oropharynx, which compressed the airway. Multiple enlarged cervical lymph nodes were also seen.

Plexiform neurofibromatosis Dysplasia of the left sphenoid wing, exophthalmos of the left orbit, thickening of the sclera of the left orbit and fusiform masses in the left temporalis muscle were seen on the CT scans of the patient with plexiform neurofibromatosis (Fig. 9).

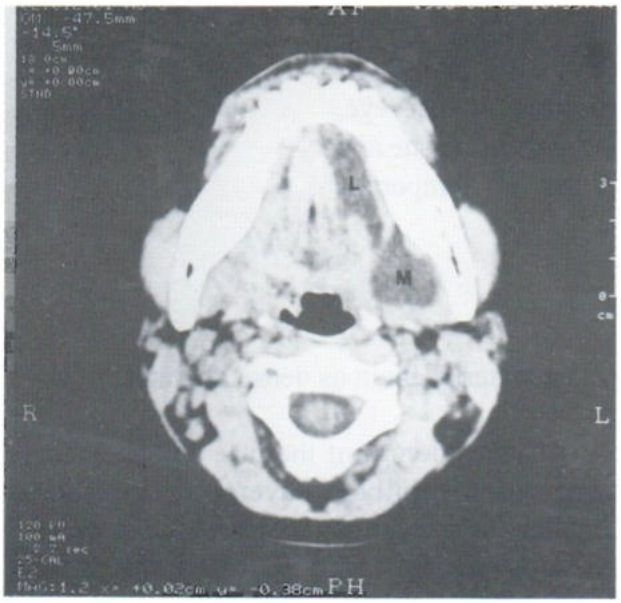

Fig.7 A 7-year-old girl with plunging ranula. Noncontrast CT scan shows a cystic mass in the left sublingual region (L) extending to the left submandibular region (M).

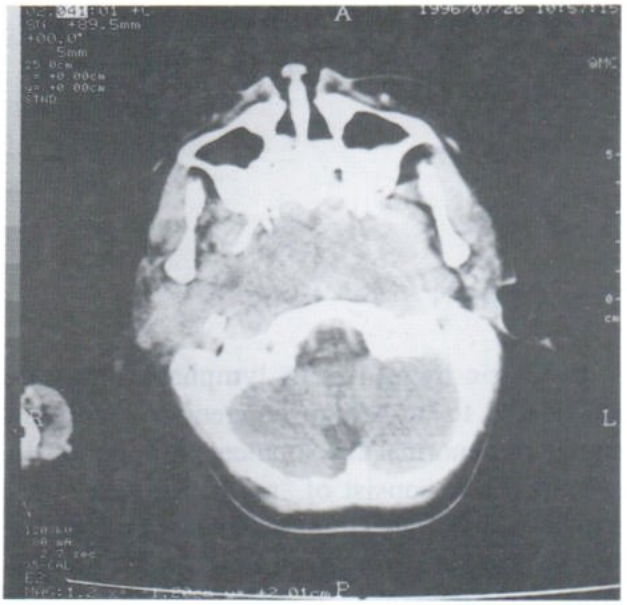

Fig.8 A 8-year-old boy with non-Hodgkin lymphoma. Contrast CT scan shows inhomogeneous mass in the nasopharynx with obliteration of the airway.

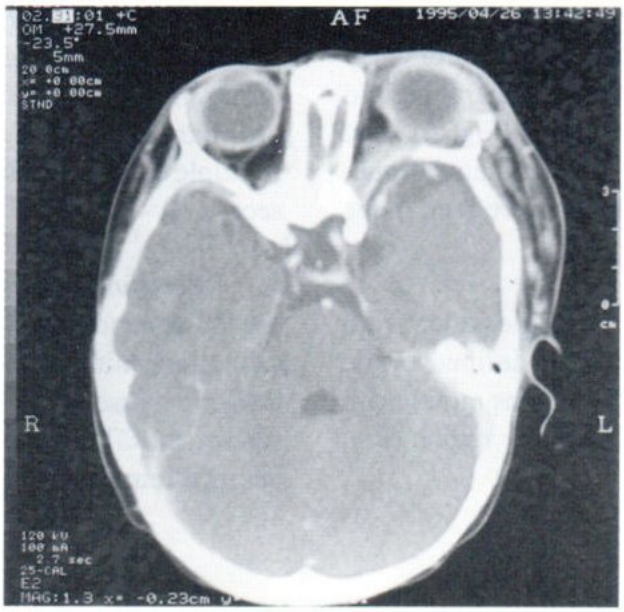

Fig.9 A 2-year-old girl with p lexiform neurofibromatosis. Note dysplasia of the left sphenoid wing, proptosis of left eye, thickening of periorbital soft tissue and fusiform masses in the left temporalis muscle.

DISCUSSION

Cystic hygromas or lymphangiomas are considered to be benign congenital neoplasms caused by abnormal development of the lymphatic system. They consist of multiloculated cystic masses with individual cysts that vary in size.[2] The mass is usually not discrete. Most hygroma patients are diagnosed by the age of 2. The neck is the most common site, especially the posterior triangle, but the face, tongue, and floor of the mouth are also occasional sites.[3] Complications of untreated cystic hygromas come from the pressure that the mass can exert on structures such as the trachea or esophagus. Although cystic hygromas of the parotid gland are rare[4], we found two patients in our review. It is more common for cystic hygromas to occur as large cervical masses which can extend to the parotid gland.[5] On CT scans they are thin-walled, uniloculated or multiloculated, non-enhanced cystic masses filled with a material about as dense as water.

Hemangiomas of the face and neck are of three types: capillary, cavernous, and mixed. Capillary hemangiomas are usually discovered at birth or during infancy; the frequency of spontaneous regression is high.[1] They are the most common parotid gland tumors in the first year of life. Usually discovered shortly after birth, they are unilateral, compressible, nonencapsulated, lobulated, soft, and more common in girls. There also may be associated hemangiomas in the overlying skin. On CT these tumors show intense enhancement; they are often lobular. They may extend to the overlying skin, or may have phleboliths within the tumor tissue.

Intramuscular hemangiomas are uncommon tumors in the head and neck region. The masseter

muscle is the most frequent site of involvement there. Masseter hemangiomas occur almost exclusively in the pediatric patients.[6] CT usually shows an enhanced, well-circumscribed intramuscular mass.

Bilateral parotid enlargement in an acquired immunodeficiency syndrome (AIDS) patient is usually due to benign lymphoepithelial cysts[7,8], which have a very similar image to cysts in Sjögren's syndrome. Both kinds of cysts are seen in large parotid glands with either inhomogeneous density or multiple cysts.[9] The parotid parenchyma is also denser than normal.

Ranulas, also termed mucoceles or mucous retention cysts of the floor of mouth, are of two varieties. The simple variety is usually due to obstruction of one of the minor salivary glands or obstruction of the sublingual gland. The plunging variety results from rupture of wall of a simple ranula. It may appear as a mass either in the submental or submandibular region. On CT scans it is usually a thin-walled, unilocular, well-defined, nonenhanced, cystic-appearing lesion.[10]

Lymphoma of the head and neck most frequently involves the cervical lymph node chain, the Waldeyer ring, and lymphoid tissue at the base of the tongue. Such lymphoma is most often non-Hodgkin[1].

The orbital-facial disfigurement and proptosis that occur with neurofibromatosis may be due to either one or a combination of disease processes that include orbital neoplasms, plexiform neurofibromatosis, orbital osseous dysplasia, and congenital glaucoma. CT is able to differentiate between these four entities and to demonstrate their full extent[11]. Plexiform neurofibromatosis appear as multiple masses or fusiform enlargements along the courses of the peripheral nerves.[12]

CONCLUSION

A diagnosis can often be made based on the appearance and location of these masses on CT. The vascular nature of a face and/or neck mass is shown on contrast CT by intense enhancement or the tubular appearance.

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