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McCune-Albright syndrome with fibrous dysplasia of the paranasal sinuses*

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SUMMARY

We report a 19-year old female patient with the McCune-Albright syndrome, which is a rare disease consisting of polyostotic fibrous dysplasia (FD) of bone associated with brown pigmented areas of the skin and several endocrine dysfunctions. The patient had FD involving the paranasal sinuses, the middle turbinate and the skull. The endocrine dysfunction of the patient concerns both growth hormone and prolactin hypersecretion. Because the patient had no major symptoms, neither surgical nor medical treatment was applied. Five-year follow-up revealed no complication and enlargement of the lesion.

Key words: fibrous dysplasia, growth hormone, McCune-Albright syndrome, paranasal sinuses, skull

INTRODUCTION

Fibrous dysplasia (FD) is a benign bone disorder recognised in three forms. Monostotic (affecting a single bone) FD is the most common form. Craniofacial involvement tends to be unilateral and occurs in 10% to 30% of the monostotic forms but in 50% to 100% of the polyostotic (affecting multiple bones) forms (Davies and Macpherson, 1991; Camilleri, 1991; Ferguson, 1994). The most uncommon form of FD occurring almost exclusively in young girls is McCune-Albright syndrome (MCAS), which is comprised of the triad of FD, cutaneous pigmentation and several endocrine dysfunctions like sexual precocity or growth hormone (GH) and prolactin (PRL) hypersecretion (Pacini et al., 1987; Cuttler et al., 1989; Cremonini et al., 1992).

The MCAS appears to be the result of an early mutational event producing a mosaic population of cells with the occurrence and degree of involvement in the skin, bone and endocrine tissues (Schwartz et al., 1996). FD in MCAS is usually polyostotic and involves craniofacial bones and the skull base in almost every case (Cuttler et al., 1989; Chanson et al., 1994). However, the other bones of the body and even the hair follicles can be involved (Schwartz et al., 1996; Sisayan et al., 1997). Frontal and sphenoid bones are the most common sites of calvarial involvement of FD. The incidence of paranasal sinuses (PNS) involvement is not known because of its rarity and often asymptomatic nature (Ferguson, 1994).

CASE REPORT

A 14-year old girl presented with a two-year history of mild unilateral nasal airway obstruction in 1993. She also had intermittent frontal headaches and epistaxis. Her family thought that the minimal facial asymmetry and small swelling on the right part of her frontal bone had been significant and the reason of the head trauma she had had when she was seven years old. Menarche was normal at the age of 12. She had no family history. Her weight was 76kg and height was 179cm (over the 97th percentile at age 14). On physical examination, there was a congenital 9x7cm-width pigmentation (diagnosed as a café-au-lait pigmentation by a dermatologist) at the upper backside of her right leg. On the endoscopic examination of her nasal airway, right middle turbinate hypertrophy and deviation of the septum were noted. Plain X-ray of PNS in the Caldwell position showed opacity at the right frontal and ethmoidal sinus areas. Coronal and axial PNS and cranial computed tomography (CT) scan (Figure 1 and 2) showed FD of the right ethmoid, frontal and sphenoid sinuses, the right middle turbinate and one half part of the right parietal, temporal and frontal bones. Serum calcium, phosphate and alkaline phosphatase levels were normal. A whole body bone scintigram showed increased activity only in the craniofacial bones (the right parietal and frontal bones) and in the right nasal and orbital areas. The first hormonal work-up revealed elevated basal levels of plasma GH (110 mIU/HGH; normal 20) and PRL (16.21 ng/ml; normal 15.2). The last work-

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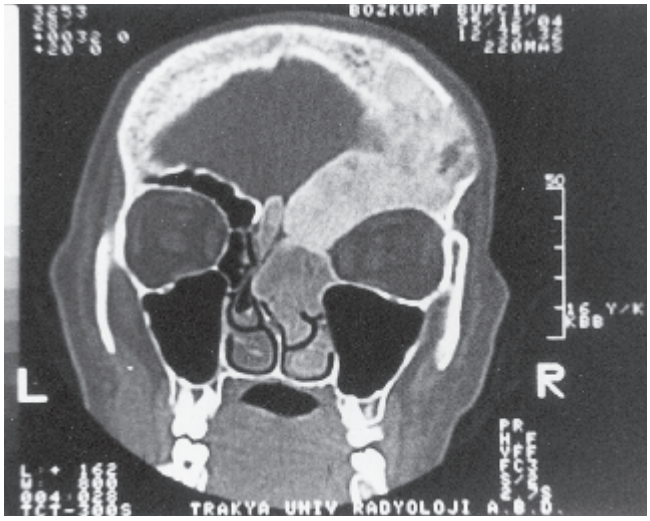

Figure 1. Coronal CT scan revealing FD of the right ethmoid and frontal sinuses, right middle turbinate, and right frontal and parietal bones.

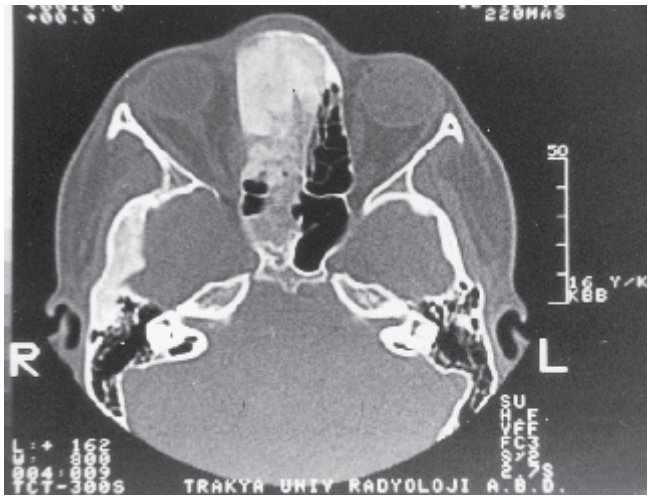

Figure 2. Axial CT scan revealing FD of the right ethmoid and sphenoid sinuses, and the right temporal bone.

up revealed a normal level of plasma GH (2.86ng/ml; normal <8.6) and an elevated level of PRL (95.3 ng/ml; normal <20) that may be related with the pregnancy of the patient. Magnetic resonance imaging and CT scan demonstrated a normal sella. Ophthalmic examination revealed telecanthus and hypertelorism. Visual fields and optic fundi appeared normal. Visual evoked potential was normal and no sign of optic nerve compression has been detected throughout the follow-up.

She has been reviewed at six-month intervals and has been warned to return if there would be any change in her vision, enlargement of the facial deformity or increase of the headache. The patient's clinical and radiological state remained static during a five-year follow-up.

DISCUSSION

A tall stature and coarsening of facial features are frequent features of the MCAS (Cuttler et al., 1989). Craniofacial and PNS involvement of FD may produce headache, epistaxis, nasal obstruction, sinus obstruction leading to recurrent infections and mucocele formation, or cranial nerve compression leading to visual problems, facial paralysis, anosmia, trigeminal neuralgia-like pain and hearing loss (Osguthorpe and Gudeman, 1987; Bollen et al., 1990; Camilleri, 1991; Ferguson, 1994). Following skeletal maturation, the process may stabilise. Quiescent fibrous lesions may reactivate later in life, particularly during pregnancy, and new lesions may occasionally develop. Complete spontaneous involution of any lesion has not been reported (Stompro and Bunkis, 1990).

Since the clinical and radiographic findings are usually pathognomonic, sequential radiological monitoring can be adequate for diagnosis and management of craniofacial FD without the necessity for histological confirmation (Pecaro, 1986; Camilleri, 1991). The radiographic appearance of FD of the skull varies. The bone lesions may be radiolucent (cyst-like), sclerotic or mixed (pagetoid). CT has shown a characteristic uniform amorphous texture of higher density than soft tissues surrounded by a sclerotic rim (Eich et al., 1990). A bone scan examination can be useful for the diagnosis, follow-up and planning of therapy in MCAS (Sisayan et al., 1997).

The differential diagnosis in monostotic craniofacial FD includes osteoma, ossifying fibroma, meningioma, osteosarcoma, chondrosarcoma and osteoblastoma (Harrison, 1984; Weisman et al., 1990; Camilleri, 1991). In polyostotic FD, the differential diagnosis includes Paget's disease, hyperparathyroidism, neurofibromatosis and tuberous sclerosis (Camilleri, 1991). Osteoma of the PNS should be easily excluded by its focality and intrasinus location (Grossman, 1996). Most of the lesions of ossifying fibroma occur in the mandible. However, the maxilla is more commonly affected than the mandible in monostotic facial FD, and in all cases of FD the lesions are diffuse unlike ossifying fibroma (Harrison, 1984; Mendelsohn et al., 1984). Facial asymmetry seen with FD rarely combines with meningiomas (Weisman et al., 1990). FD occurs in younger patients; it most often involves the face and does not produce the trabecular coarsening typical of Pagets disease (Grossman, 1996). Except severe forms of FD, the serum levels of calcium, phosphate, alkaline phosphatase and parathormone are usually all normal (Camilleri, 1991).

The treatment of MCAS depends on the patients endocrinopathy and the extent of the FD. Effective treatment of GH excess in MCAS has been difficult. Bromocriptine or octreotide therapy may be effective or totally ineffective (Cuttler et al., 1989; Chanson et al., 1994). However, when the growth of the FD ceases, the GH may decline to adult levels (Hall et al., 1984). The decrease of GH levels in our case may be related with the static process of the FD of the patient.

The treatment of FD in MCAS is difficult because skull involvement frequently prevents neurosurgical excision. Radiation therapy may cause bone sarcomatous transformation (Chanson et al., 1994). However, a few cases of bone sarcomas arising in FD without prior radiation therapy have been reported (Ishida et al., 1992). No effective chemotherapy is known. Steroid therapy has reversed acute visual loss from optic neuropathy from FD (Ferguson, 1994).

The presence of areas of FD in the craniofacial bones does not necessarily indicate a need for surgery. Conservative treatment

might be adequate for diffuse lesions limiting complete resection that offers the only guarantee of cure (Harrison, 1984; Davies and Macpherson, 1991). However, surgery is indicated at any age if an important function is threatened, deformity becomes substantial or complications develop; e.g. obstruction and infection of the PNS, dental malocclusion or severe epistaxis (Camilleri, 1991). In our case, a septorhinoplasty with submucous resections of the septum and the right middle turbinate might be necessary in the follow-up. As FD lesions are quite vascular, the major caution to surgery is the intraoperative and postoperative bleeding problems (Stompro and Bunkis, 1990).

Patients who have MCAS require close follow-up for signs of bony regrowth (Osguthorpe and Gudemann, 1987). In longstanding areas of FD, an increasing growth rate, evidence of bone destruction and pain would indicate malignant change (Harrison, 1984; Camilleri, 1991). Any change in a patient's vision could be the result of optic nerve compression (Weisman et al., 1990). In our opinion, patients with MCAS should be reviewed at six-monthly intervals for otorhinolaryngologic, ophthalmic and neurologic examinations and yearly intervals for radiological follow-up. The most effective method of estimating the extent of the disease and monitoring growth seems to be CT (Mendelsohn et al., 1984; Camilleri, 1991). Magnetic resonance imaging (MRI) having no problem of X-ray exposure to younger patients is also useful for radiological monitoring, especially when a complication (e.g. aneurysmal bone cyst or compression of optic nerve) is expected (Weisman et al., 1990; Som et al., 1991). However, MRI characteristics of FD should be known well as MRI characteristics could be mistaken for many benign and malignant craniofacial lesions (Mohammadi-Araghi and Haery, 1993).

In conclusion, close clinical and serial radiological follow-up and a careful hormonal work-up may be adequate for diagnosis and treatment of extensive lesions of FD involving the skull and PNS of MCAS patients who have a static state of the disease without any significant clinical symptoms.

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