CASE REPORT

Atherothrombotic brain infarction in a patient with pachydermoperiostosis

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Abstract A 58-year-old man was admitted due to mild right-sided hemiparesis and a speech disturbance. We diagnosed an atherosclerotic brain infarction of the left cerebral hemisphere. The patient had severe clubbing of his fingers and toes bilaterally. Based on the history, clinical features, and X-ray examinations, he was diagnosed as having pachydermoperiostosis. Although general complications have been reported in previous literature, this is the first report of a patient with pachydermoperiostosis who had a cerebrovascular event.

Keywords Hypertrophic osteoarthropathy · Ischemic stroke

Introduction

Primary pachydermoperiostosis (PDP) is a rare form of hypertrophic osteoarthropathy characterized by clubbing of the fingers and toes and enlargement of the extremities secondary to periarticular and osseous proliferation [1–3]. The prognosis of the disease is thought to be good; however, the association with other diseases, such as atherosclerotic diseases, remains unclear. We report the first case of a patient with PDP who developed an atherothrombotic brain infarction.

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Case report

A 58-year-old man came to the emergency room with right-sided hemiparesis and speech disturbance. There was no family history of cerebrovascular diseases or systemic tissue diseases. Since infancy, the patient had enlargement of his hands, wrists, feet, and ankles, without any joint pain. He had a history of hypertension for which he was treated with an antihypertensive agent from the age of 40 years to the age of approximately 50 years.

The patient's weight was 54 kg, and his height was 169 cm. The blood pressure was 202/134 mmHg, and the pulse rate was 81 beats/min and regular. Prominent skin folds were seen on the forehead, while his nose and tongue were approximately normal in size. All of his fingers and toes were severely clubbed (Fig. 1), and he had excessive sweating of both palms and thenar regions. The other findings that represented autonomic, including orthostatic hypotension, dysuria, diarrhea, constipation, or impotents were not noted. General dyshidrosis, seborrhea, or acnes were also not seen. No abnormal sounds were heard on chest austiculation. On neurological examination, he was slightly somnolent. He did not show any cognitive dysfunction. There was a mild facial palsy on the right side. His speech was slightly dysarthric, but not dysphasic. The Barré sign was present in the right arm, while the Mingazzini sign was absent. His deep tendon reflexes were brisk in all four extremities. The Babinski reflex, patellar clonus, and ankle clonus were present bilaterally. Coordination was intact in all four extremities. The patient's US National Institutes of Health Stroke Scale score was 3.

The electrocardiogram showed sinus rhythm with a heart rate of 85 beats/min; left ventricular hypertrophy was suspected. Blood cell counts, thyroid hormone, growth hormone, and insulin-like growth factor 1 were all within





Fig. 1 The patient's hands (a) and feet (b). All fingers and toes show extreme clubbing. Both feet have a hallux valgus deformity

normal ranges. The patient had a mildly elevated alkaline phosphatase (414 mg/dl; normal, 102–302). Total cholesterol (107 mg/dl; normal, 130–220) and high-density-lipid cholesterol (30 mg/dl; normal, 35–100) were low, and triglyceride (111 mg/dl; 30–150) was within the normal range.

There was no evidence of secondary hypertension, such as renal artery stenosis, primary aldosteronism, or hyperthyroidism. His respiratory function was good (%VC, 93.4 and FEV_{1.0}%, 75.8). Transthoracic echocardiography revealed mild left ventricular hypertrophy; there was no evidence of a right-to-left shunt or aortic plaques on transesophageal echocardiography. On 24-h Holter electrocardiography, there was no evidence of atrial fibrillation, but chronic ST depression was seen.

Standard X-ray examinations showed deformities of the distal phalanges with proliferative periostitis (Fig. 2) and proliferative periostitis of the long-bones of the extremities (Fig. 3). X-rays of the cervical vertebra revealed narrowing of the intervertebral spaces, which indicated disc degeneration. On chest X-ray, there was no cardiomegaly, but the fourth arch on the left side protruded slightly. On duplex ultrasonography, some small plaques were seen at the

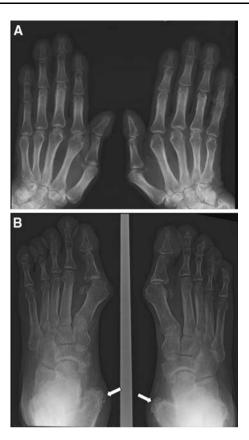


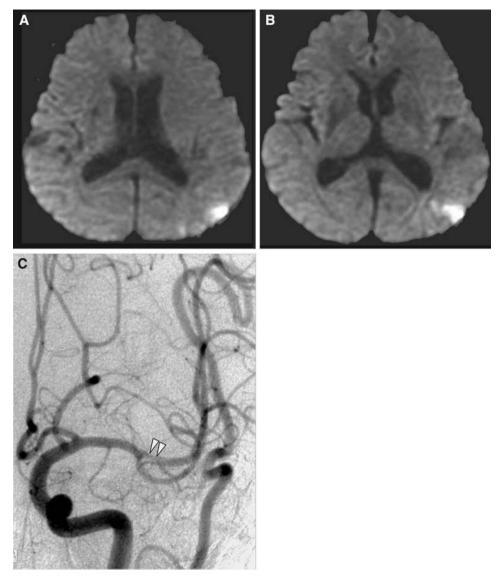
Fig. 2 a, b Standard X-rays of the extremities. Deformities of the distal phalanges of the feet are seen. At the end of the tibial bones, proliferative periosteum is also seen (*arrows*)



Fig. 3 Standard X-rays of the long bones of the upper (a) and lower (b) extremities. Proliferative periosteum is seen in every bone



Fig. 4 a, b Diffusion-weighted magnetic resonance imaging. Hyperintensity lesions are seen in the territory of the posterior branch of the left middle cerebral artery. c The left common carotid arteriography seen on intra-arterial digital subtraction angiography. A stenosis of approximately 50% is seen in the beginning of the posterior branch of the left middle cerebral artery



beginning of both internal carotid arteries. Diffusion-weighted brain magnetic resonance imaging demonstrated an acute infarction in the cortex of the left parietal lobe (Fig. 4a, b). On magnetic resonance angiography, stenosis was suspected in the distal part of the left middle cerebral artery (MCA). After several days in hospital, a moderate stenosis was confirmed on intra-arterial digital subtraction angiography (Fig. 4c). An atherothrombotic brain infarction was diagnosed, and oral aspirin 100 mg/day was started. The patient was discharged home on the 12th hospital day with little disability.

Discussion

This is the first report of a patient with primary PDP who developed an atherothrombotic brain infarction. No underlying causes of clubbing, including lung disease,

heart disease, or malignancy, were detected. The patient had no symptoms due to PDP prior to the index stroke. This rare disease is considered to have a favorable prognosis unless there is joint pain. There are no published descriptions of any vascular events in PDP patients, although general complications, such as skin complaints, myelofibrosis, and gastrointestinal abnormalities, as well as specific findings, such as compressive neuropathy, corneal leukemia, and gynecomastia, have been reported [2].

In the present case, no vascular abnormalities suggestive of connective tissue diseases were seen. However, moderate stenosis of the right MCA and small plaques at the beginning of both internal carotid arteries were noted. These findings are often seen in stroke patients and indicate that this patient's stroke was a common atherothrombotic brain infarction. However, the association between the patient's stroke and his PDP could not be determined. Though the underlying mechanism of PDP has not been



elucidated, endothelial growth factors, platelet abnormalities, or hormonal disturbances may be involved [4, 5]. Further case reports of patients with PDP who experienced various vascular events like ours may clarify the association between arterial diseases and PDP.

Based on his clinical presentation, including pachydermia, hypertrophic periosteum, and prominent skin folds in the forehead, our patient has a complete form of PDP [1, 3, 6]. He had no family history of a similar disorder. Familial recurrence of PDP has been reported in 33–100% of pedigrees [6–8]. The disorder is considered to be inherited as an autosomal dominant trait [3, 9], but an autosomal recessive model or an X-linked model has also been proposed [10].

Patients with PDP often have autonomic dysfunction, such as dyshidrosis or blood pressure control disturbances. Our patient had hyperhidrosis of both palms and soles, though other autonomic symptoms were absent. The patient had experienced severe hypertension since his 40s without any causes of secondary hypertension. In a review of the PDP literature, hyperhidrosis was found to be present in 27% of 126 patients; no article mentioned hypertension [2]. While supine hypertension [11, 12] or paroxysmal hypertension in patients with spinal injury are well-known as signs of autonomic dysfunction, the association between chronic hypertension and dysautonomia is unclear. Hyperactivity of the sympathetic nerve system may be related to hypertension and hyperhidrosis of the palms and soles in our patient. However, that is just a hypothesis, since we did not investigate for autonomic dysfunction such as serum catecholamine level, thermography, and head-up tilt test.

In conclusion, we have reported a patient with PDP who developed an atherothrombotic brain infarction. The association between this rare disease and systemic atherosclerosis remains unclear. A greater number of reports dealing with PDP and its natural course are required.

Conflict of interest statement There are no potential conflicts of interest.

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