CALCIUM PYROPHOSPHATE DIHYDRATE CRYSTAL DEPOSITION IN THE LIGAMENTUM FLAVUM OF THE CERVICAL SPINE

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ABSTRACT

A 73 – year-old woman with cervical myelopathy was shown to have calcified nodule in the ligamentum flavum of C-4. Laminectomy was performed. Histological examination showed calcium pyrophosphate dihydrate crystals in the nodule. Images were of plain cervical spine radiographs and computed tomographic myelography.

INTRODUCTION

Calcium pyrophosphate dihydrate crystal deposition in the ligamentum flavum of the cervical spine is rare. It compresses the spinal cord, causing neurologic sign and symptoms. There have been several reports describing its histopathology, clinical and radiographic features. Most occured in United States of America and Japan.

We present a case of CPPD crystal deposition in the ligamentum flavum of the cervical spine in Thailand by plain radiograph and CT myelography.

CASE REPORT

A 73-year-old Thai female patient was requested for CT myelography of cervical spine. The patient was admitted with a 6-month history of progressive tetraparesis. She also had mild hypertension and DM. Examination revealed weakness in all extremities, more severe in lower extremities, and decreased pinprick sensation below the C-5 level. The deep tendon reflexes were 3+ and equal in all four extremities. The Babinski sign revealed a plantar extension. She had a positive Hoffman's sign.

Plain cervical spine radiographs showed minimal spondylotic change. A calcified nodule size about 10 mm. was found in left paramedian portion of the posterior spinal canal at C4-5 level. (Fig. 1)

CT myelography demonstrated a left posterolateral extradural oval- shaped densely calcified nodule size about 10 mm. at C-4 level compressing the spinal cord and displacing it to the right. (Fig. 2)

Laminectomy was performed at C-4. Histologically, the lesion consisted of CPPD crystal deposition in the ligamentum flavum. (Fig. 3)

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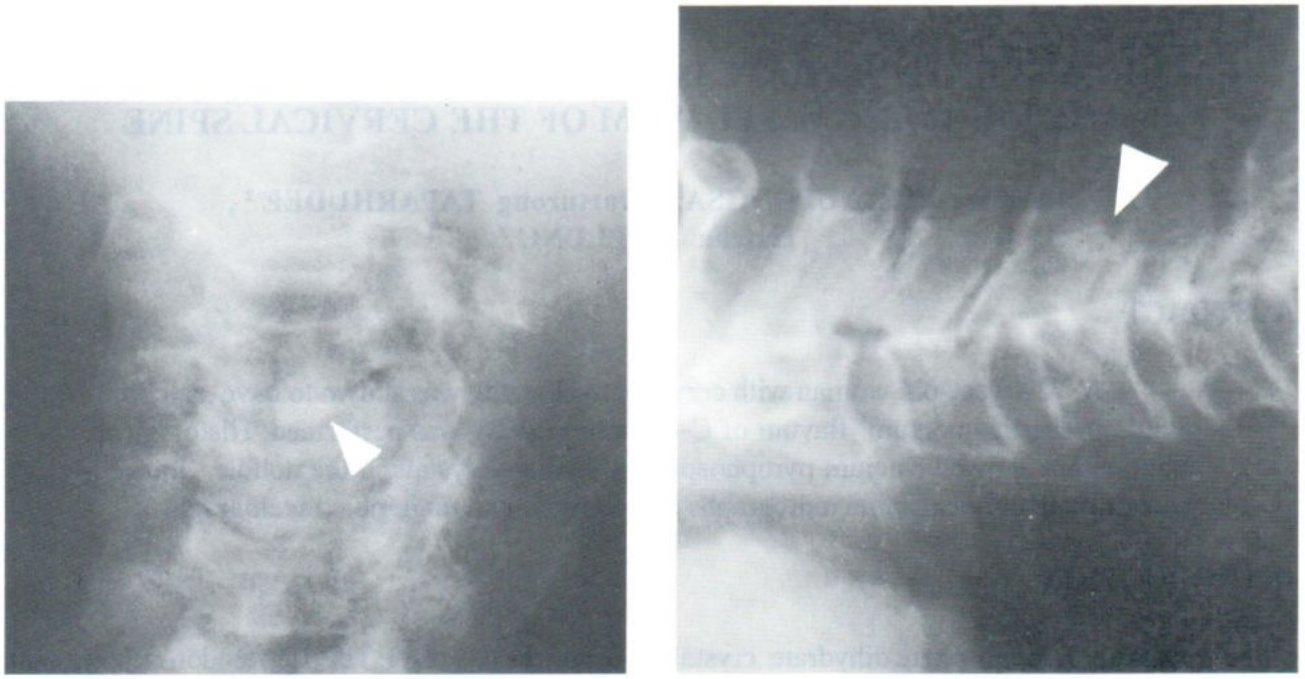
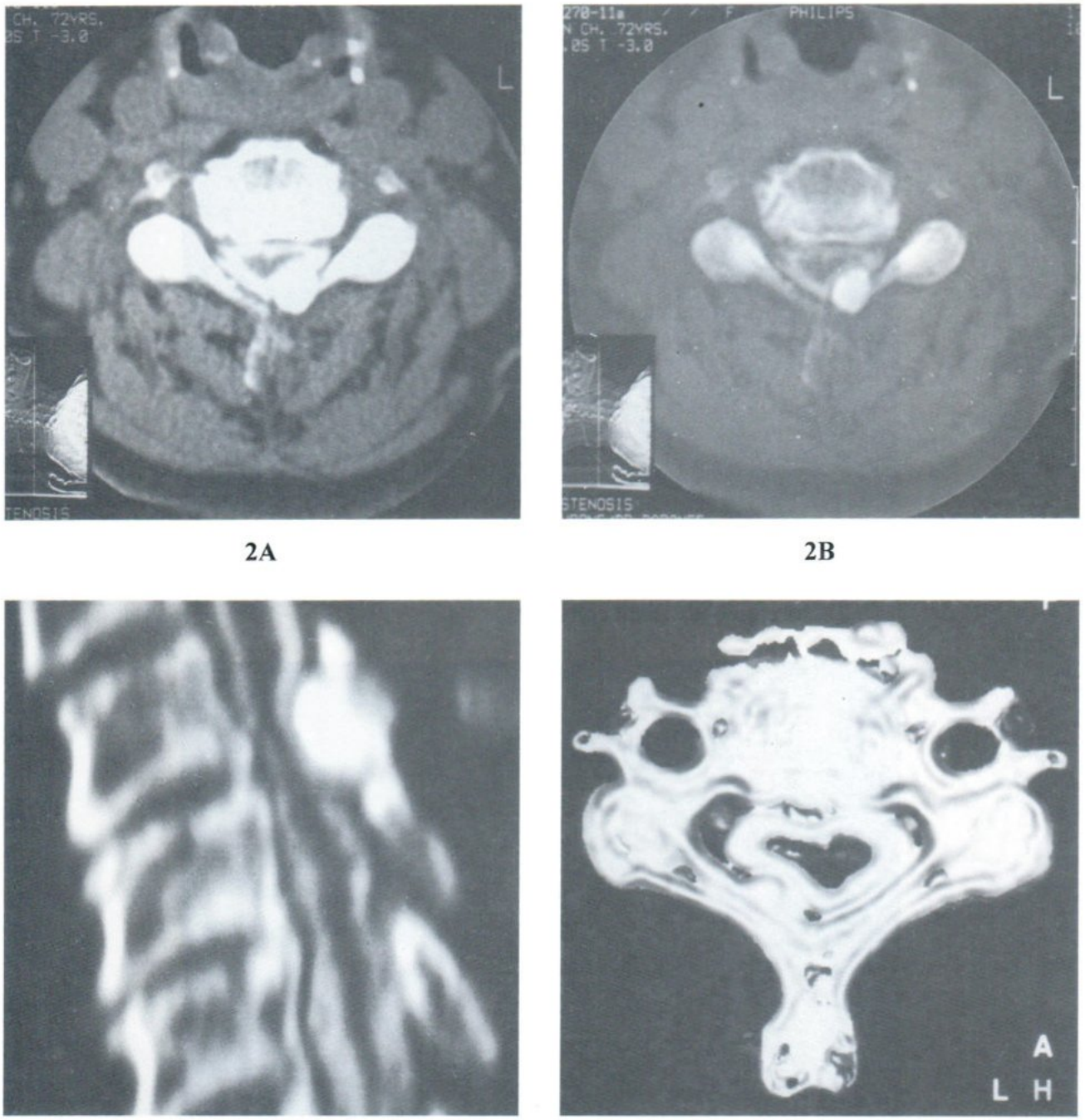


Fig.1 Plain radiographs of the cervical spine, AP and lateral views (A,B), showing radiopaque nodular shadow in posterior part of the spinal canal at C4 level.



2A 2B

2C 2D

Fig.2 CT myelography, A. axial image – soft tissue window, B. axial image – bone window, C. Midline sagittal reconstruction, D. 3 D reconstruction, demonstrating a left posterolateral extradural calcified mass compressing the cervical cord.

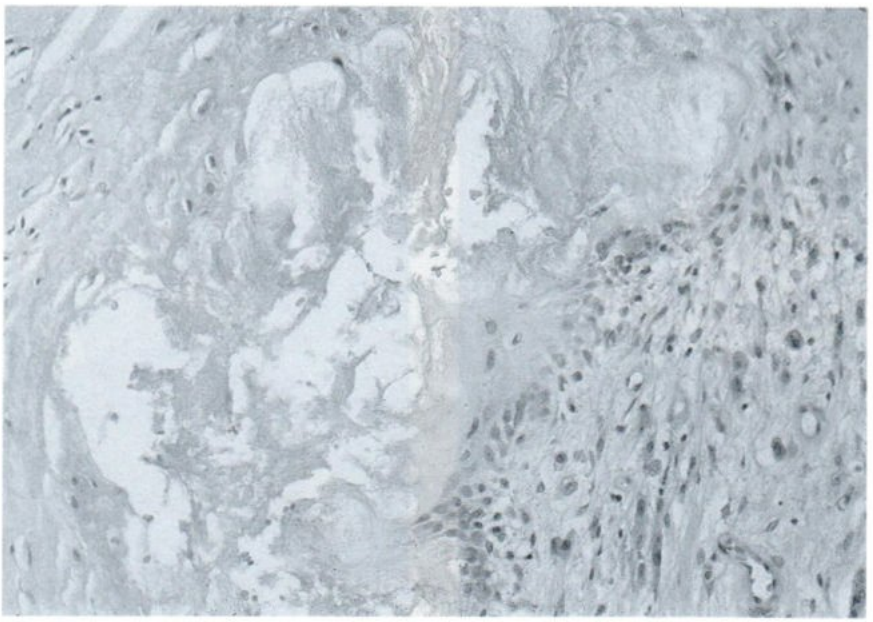


Fig.3A The granuloma consists of crystals and pink fibrinous material surrounded by epitheloid macrophages and a few foreign body giant cells (20x).

Fig.3B The center of granuloma contains rhomboid crystals of calcium pyrophosphate dihydrate and pink fibrinous material (40x).

DISCUSSION

Calcium pyrophosphate dihydrate (CPPD) crystal deposition disease is a general term for a disorder characterized by the presence of $Ca_2P_2O_7 \cdot 2H_2O_2$ (calcium pyrophosphate dihydrate or CPPD) crystals in or around joints.[1] CPPD crystal deposition disease affects both men and women and generally is observed in middle-aged and elderly patients.[1] Mc. Carty applied certain diagnostic criteria for CPPD : demonstration of crystal deposition by polarized light microscopy and chondrocalcinosis were required for a definite diagnosis; demonstration of crystal deposition or chondrocalcinosis provided a probable diagnosis; and the presence of a clinical syndrome consistent with pseudogout, a possible diagnosis.[1,5]

CPPD crystal deposition generally is first observed in articular cartilage, althrough deposits may be recognized in other articular tissues, such as synovium and capsule, as well as periarticular tissues, such as tendons and ligaments.[1,4,8] Rarely, the crystals are indentified at the dura mater or ligamentum flavum.[1]

Chondrocalcinosis and CPPD can involve the spine through a variety of mechanisms. Intervertebral discal calcifications are frequent, calcific collections resemble syndesmophytes of ankylosing spondylitis.[1,2,5] Vertebral body and intervertebral disc destruction causing disc space narrowing and vertebral sclerosis is a common finding.[1,5] Severe osseous destruction is unusual.[1] CPPD deposits in the ligamentum flavum causing myelopathy and cervicomedullary compression have been reported.[1,2]

Calcium crystal deposition rarely occurs in the ligamentum flavum of the cervical spine.[3,6] Crystal deposition in the cervical spine is most commonly a result of Calcium pyrophosphate deposition disease.[7] CPPD crystal deposition disease involved the cervical spine, usually in elderly woman without other systemic evidence of CPPD.

Most patients presented with progressive cervical myelopathy or radiculomyelopathy.[2,3,5,7,8,9,10] Most radioghaphic findings, including our case, showed focal enlargement of the ligamentum flavum due to oval CPPD deposits that compressed the spinal cord, causing neurologic sign and symptoms. The midcervical spine is most frequently involved.

CPPD deposition within the ligamentum flavum can be associated with significant spinal stenosis. Most patients described in the literature underwent laminectomy. These characteristics allow the radiologist to suggest a propable diagnosis of CPPD and to guide the pathologist to identify the CPPD crystals in the calcified deposits.

ACKNOWLEDGEMENT

We wish to thank Prof. Dr.Vorachai Sirikulchayanonta M.D., Department of Pathology, Ramathibodi Hospital, for helpful review the histologic slides and to Associate Prof. Dr.Patchrin Pekanan, Department of Radiology, Ramathibodi Hospital for reviewing the manuscript.

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