

Rheumatoid-atlantoaxial Disease Associated Syringomyelia: A Causal Link?

Dear Sir,

Atlantoaxial (AA) subluxation is not uncommon in rheumatoid arthritis (RA) with the prevalence of radiologically evident disease ranging from 20% to 34%.¹ However, rheumatoid AA subluxation with syringomyelia is rare, with only 2 cases reported in the literature.^{2,3}

We describe a third such patient whose clinical course may shed some light on the relationship between rheumatoid cervical spine disease and syringomyelia. We then discuss the previously suggested ways in which rheumatoid cervical disease may lead to syrinx cavity formation and propose novel pathogenic mechanisms suggested by this third such patient.

A 45-year-old Chinese man presented with an 18-month history of increasing inflammatory-pattern joint pains that affected his hands, wrists and neck. Associated with the joint pains were bilateral symmetrical index and middle finger metacarpophalangeal, wrist and elbow joint swellings. He reported a persistent sensation of numbness in the arms approximately 1 year after the onset of joint pains. Traditional Chinese medicine was consumed with slight improvement of joint symptoms initially. There was no previous medical history or family history of note. On examination, there was synovitis of the bilateral index and middle finger metacarpophalangeal, wrist and elbow joints. Neck movement was mildly reduced in all directions. Neurological examination revealed a dissociated sensory deficit with reduced pin-prick sensation in the right trigeminal nerve, C2 to C7 dermatomes on the right and C4 to C6 on the left. The remaining sensory modalities were intact and L'Hermittes sign was not present. Deep tendon reflexes in all 4 limbs were brisk. There was no muscle wasting. Systemic examination was otherwise normal. The results of laboratory investigations were as follows (with reference ranges indicated in parentheses): rheumatoid factor was 125 U/mL (<10.3 U/mL); anti-cyclic citrullinated peptide antibody was 28.3 RU/mL (<5 RU/mL); and erythrocyte sedimentation rate was 78 mm/h (1 to 10 mm/h). The full blood count, serum urea and electrolytes and liver enzymes profile were unremarkable. Plain radiographs of the hands, wrists and elbows showed subtle erosions in the right wrist joint only. Magnetic resonance imaging (MRI) of the spine showed anterior AA subluxation, a pannus that eroded the odontoid peg and a syrinx cavity that extended from C2 to T6 level of the spinal cord (Fig. 1). No vertical subluxation was present. Nerve conduction studies showed widespread neuropathic changes affecting upper

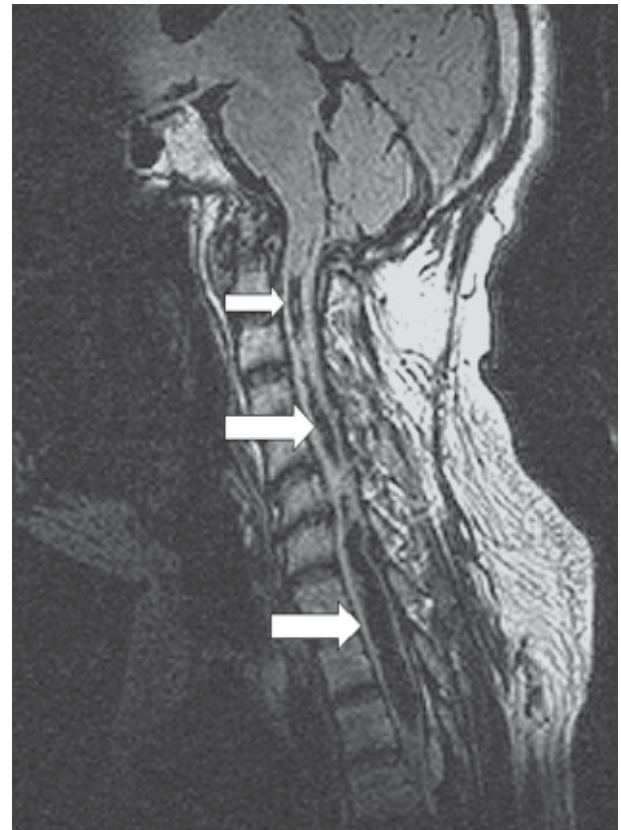


Fig. 1. Magnetic resonance sagittal T1-weighted image showing the syrinx cavity that extended from C2 to T6 level of the spinal cord.

limbs with the right C8 and T1 nerves being the most severely affected. Transcranial magnetic stimulation revealed findings compatible with an extensive cervical myelopathic process. The patient fulfilled the American College of Rheumatology (ACR) criteria for RA. Therefore, sero-positive RA with minimal peripheral joint involvement but extensive cervical spine disease and co-existing syringomyelia was diagnosed. Combination disease modifying anti-rheumatic drug (DMARD) therapy consisting of weekly oral (and subsequently parenteral) methotrexate, hydroxychloroquine and prednisolone was initiated immediately.

Thus far, the patient has received approximately 9 months of treatment and his symptoms have significantly improved. At present, he only has mild symptoms of joint stiffness in the hands and upper limb paraesthesia. He has not developed any new symptoms. There has been reduction of the erythrocyte sedimentation rate to 30 mm/h and anti-cyclic

citrullinated peptide antibody levels have been reduced to 16.3 RU/mL. The patient is currently on 200 mg of hydroxychloroquine and 5 mg of prednisolone per day and 35mg of subcutaneous methotrexate per week. The “ACR20”, a validated indicator of adequate response to treatment in RA, had been achieved. A follow-up MRI scan of the spine showed that the syrinx cavity and pannus around the AA joint has not progressed.

The 2 previously reported cases in the literature of rheumatoid-related syringomyelia were postulated to involve increased local-pressure at the cranio-cervical region respectively caused by vertical subluxation or malfunctioning surgically inserted cables.^{2,3} This increased pressure was postulated to result in the decreased flow of cerebrospinal fluid (CSF) resulting in increased CSF pressure, leading to syrinx formation. Our patient had neither of these pathologies, suggesting that a third mechanism might have resulted in the syrinx formation in this patient, the nature of which remains speculative. In addition, apart from RA, the patient did not have any other disorder that could be associated with syringomyelia, such as intramedullary tumours or Klippel-Feil syndrome. Therefore, the relationship between rheumatoid AA disease and syringomyelia may be a chance association or a causal link.

Hypothesised mechanisms previously suggested for the syrinx formation include the following. Firstly, severe craniocervical disease with vertical subluxation may reduce the rate of ascent of cerebrospinal fluid in the vertebral column by reducing the available space in the foramen magnum. Subsequently, cerebrospinal fluid would travel through the spinal cord as the path of less resistance, thus causing syringomyelia. Secondly, AA disease may compress and interfere with blood supply to the spinal cord, leading to ischaemia, necrosis and cavity formation.² In the reported case of an iatrogenic syrinx that was reversed by the removal of malfunctioned cables, the formerly described mechanism of raised local pressure caused by craniocervical crowding would be more plausible.³ Our patient did not have vertical subluxation nor did he have any prior surgical cervical spine procedure. Therefore, other pathological processes such as extensive rheumatoid pannus, rheumatoid inflammatory-process induced arachnoid mater scarring and cytokine-induced neuronal cell death may possibly have contributed to the formation of the syrinx cavity.

Combination therapy of methotrexate, hydroxychloroquine and low-dose prednisolone was initiated for our patient because such a regime was shown to be more efficacious than monotherapy. Combination therapy for

early RA with methotrexate, sulfasalazine, hydroxychloroquine and prednisolone can prevent the development of rheumatoid AA disorders.⁴ It is planned for our patient to have occipitocervical fusion and posterior fossa decompression because several studies have shown that patients with rheumatoid AA subluxation who have undergone occipitocervical fusion have a better outcome than those who do not have surgery.⁵ Improvement or resolution of the syrinx after treatment would therefore provide further evidence for a causal link between rheumatoid-atlantoaxial disease and syringomyelia.

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Jon KC Yoong,^{1,2} MB ChB, MRCP (Lond),

Kok-Yong Fong,^{1,2} MBBS, FRCP (Edin), FAMS (Rheumatology),

Kok-Ke Tang,³ MBBS, FRCS (Glas), FAMS (Neurosurgery),

Raymond KL Tan,⁴ MBBS, FRCP (Lond), FAMS (Diagnostic Radiology),

Julian Thumboo,^{1,2} MBBS, FRCP (Edin), FAMS (Rheumatology)

¹ Department of Rheumatology and Immunology, Singapore General Hospital, Singapore

² Yong Loo Lin School of Medicine, National University of Singapore, Singapore

³ KK Tang Adult and Paediatric Neurosurgery, Mount Elizabeth Medical Centre, Singapore

⁴ Department of Diagnostic Radiology, Singapore General Hospital, Singapore

Address for Correspondence: A/Prof Julian Thumboo, Department of Rheumatology & Immunology, Singapore General Hospital, Outram Road, Singapore 169608.

Email: julian_thumboo@sgh.com.sg