

# MRI Diagnosis Of Subacute Combined Degeneration Of Spinal Cord

Y Sathe, S Daga

## Citation

Y Sathe, S Daga. *MRI Diagnosis Of Subacute Combined Degeneration Of Spinal Cord*. The Internet Journal of Pediatrics and Neonatology. 2007 Volume 9 Number 1.

## Abstract

Neurological manifestations of vitamin B12 deficiency are less common compared to hematological manifestations. Subacute combined degeneration of cord (SACD) is a neuropathologic manifestation of vitamin B12 deficiency characterized by loss of posterior column functions and lower limb weakness. Earlier, the diagnosis was based largely on clinical findings. With the advent of finer neuroimaging technique like MRI, it is possible to define the exact area involved. We report a case of SACD with MRI evidence of spinal cord involvement.

## CASE REPORT

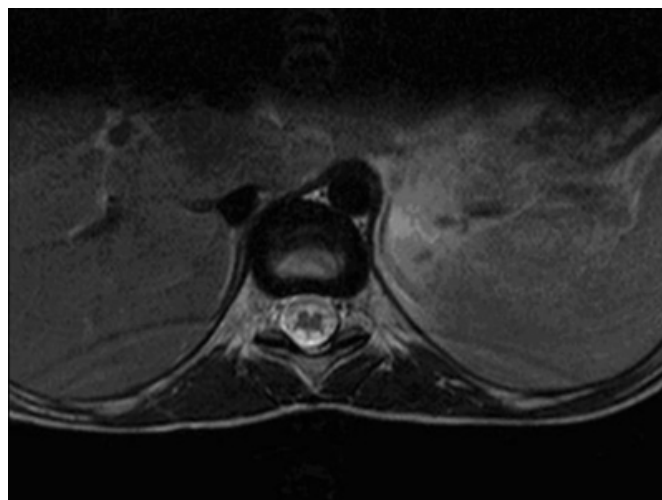
A 12 year old girl was admitted with complaints of gradually progressive lower limb weakness and inability to walk since three months. There was no history of trauma, fever, vomiting, diarrhea, upper respiratory tract infection, photophobia, radicular pains in the limbs, bladder and bowel incontinence. Her CNS examination revealed loss of vibration and position sense at ankles and small joints of both lower limbs. Her remaining sensations were completely normal. Motor system examination showed grade three power at both hips and knees, grade two power at both ankles and grade one power at all small joints of both feet. Deep tendon reflexes were exaggerated in lower limbs. Plantars were extensors. Romberg's sign was positive. The patient walked with a wide-based ataxic gait. Her cranial nerves were normal. Spine was normal. Other systemic examination did not reveal any abnormality.

On investigation, complete blood count showed: Haemoglobin-9.8gm/dl, hematocrit -29.1%, total leucocyte count- $6.5 \times 10^9$ /cells/L, mean corpuscular volume (MCV)-125.6 fL (N- 77—95fL), mean corpuscular haemoglobin (MCH)-0.65fmol/cell (N- 0.39—0.41fmol/cell), mean corpuscular haemoglobin concentration (MCHC)-5.22mmolHb/L RBC (N- 4.81—5.74mmolHB/L RBC) and RDW-16.9% (N-11.5—16.5%). Platelet count was  $422 \times 10^9$ /L. Her peripheral smear examination showed normocytic normochromic red cells with anisopoikilocytosis, many fully haemoglobinised macrocytes, few polychromatic cells, tear drop cells, with a lot of

hypersegmented neutrophils. Corrected reticulocyte count was 0.5%, serum LDH levels were 288 IU/L (N—120—330 IU/L), serum B12 levels were 44.28pmol/L (N—103—257pmol/L), serum folic acid levels were 26nmol/ml (N—4.1—20.4 nmol/ml). Her MRI scan of spine showed hyperintense signals on T2WI from the posterior columns of the thoracic spinal cord, consistent with the diagnosis of subacute combined degeneration of the spinal cord [figure].

## Figure 1

Figure 1: T2WI MRI scan of thoracic spinal cord



With administration of Injection vitamin B12 1000 micrograms intramuscularly daily for 14 days, the child showed gradual improvement in tone, gait, vibration and position sense. Her power in the lower limbs improved over

one month. It came up to grade four in both hips and knees and grade three at both ankles and small joints of feet. Romberg's sign became negative.

### **DISCUSSION**

Vitamin B12 deficiency occurs due to decreased dietary intake, malabsorption from small intestine, surgical loss of intestine or pernicious anemia. Haematological manifestations of vitamin B12 deficiency are megaloblastic erythropoiesis, multilobed neutrophils and thrombocytopenia. In our country, vitamin B12 deficiency is not uncommon in children. Severe vitamin B12 deficiency and SCD has been described in Indian population by Dastur et al (1) and Jeejeebhoy et al (2), among adults. Wadia et al (3) reported 99 cases of "true" B12 deficiency and 68 cases of "borderline" deficiency. Of the total 167,42 cases had sensory neuropathy, 12 had spinal cord involvement and seven had peripheral neuropathy. Posterior column, pyramidal tract signs and cognitive and behavioral changes were seen in 10.3% cases. SCD although reported frequently in Indian literature among adults there are stray case reports in children (4,5). Demyelination of posterior columns of thoracic spinal cord appears to be the earliest manifestation of vitamin B12 deficiency (6). It is also considered as the most reversible change in a case of SCD. MRI allows early detection of the demyelination in posterior columns of the spinal cord. Of the other three reports of the MRI findings in SCD, two reported (7,8) T2WI showing diffusely increased signals involving the posterior, lateral and anterior columns of the spinal cord consistent with myelitis, whereas the third report (9) showed preferential

involvement of the posterior columns of the cervical and thoracic cord. Ours is the third case showing such preferential involvement and the second in a child. Only two previous MRI reports of vitamin B12 deficient myelopathy give evidence of such preferential posterior column involvement of the thoracic cord (6,9). Recognition of this specific MRI pattern in the early stages of this reversible metabolic disorder is essential. Complete recovery, as seen in the case described here, is possible with prompt treatment.

### **References**

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**Author Information**

**Yogesh Sathe, MD**

Lecturer, Department of Pediatrics, BJ Medical College

**Subhashchandra Daga, MD**

Professor, Department of Pediatrics, BJ Medical College