Subacute Combined Degeneration

- Vitamin B_{12} deficiency
  - produces selective degeneration of dorsal ± lateral spinal cord column
- Malabsorption (most common)
  - Metabolic conditions:
  - Copper deficiency
  - nitrous oxide anesthesia susceptibility
  - transcobalamin II deficiency
- Paraesthesia, stiffness, mild sensory ataxia, loss of position and vibration sense, spasticity, hyperreflexia
- Degree of resolution of clinical symptoms is inversely proportional to their duration and severity

Imaging

- Longitudinal dorsal cord T2 signal abnormality
- Axial image → "inverted V" or "inverted rabbit ears" within dorsal spinal cord
- ± mild dorsal column enhancement
- Neurologic findings may precede anemia
- Imaging changes may not completely resolve following treatment.
- **pernicious anemia** is a type, is a disease in which not enough red blood cells are present due to a lack of vitamin B_{12}.

DDx: (Include in initial workup)

- Copper deficiency myeloneuropathy
- Vitamin E deficiency
- Methotrexate-induced myelopathy
- HIV myelopathy
- Nitrous oxide intoxication
- Transverse myelitis

DDx:

- Copper deficiency myeloneuropathy
  - Low ceruloplasmin and decreased urine copper levels (unlike Wilson disease, in which urine copper levels will be elevated) and is highly associated with gastric surgery
  - Frequently seen in the setting of bariatric surgery.
  - Association with zinc toxicity secondary to excessive intake.
- Vitamin E deficiency
  - Very rare cause with only a few confirmed cases reported.
  - Clinical findings will be similar to Friedreich ataxia, and MRI findings may show cerebellar atrophy in addition to signal changes involving the posterior column of the spinal cord.
- Methotrexate-induced myelopathy
  - most commonly associated with intrathecal administration of methotrexate and is a very rare cause of SACD.
  - Patients will also demonstrate increased cerebrospinal fluid levels of myelin basic protein and homocysteine.
- Nitrous oxide myelopathy
  - Occurs secondary to irreversible inactivation of vitamin B12, resulting in interference of the pathway required for normal myelin production.
  - Clinical and imaging findings can be identical to SACD with the exception of a history of nitrous oxide abuse.

Other

- Multiple sclerosis
- Transverse myelitis
- Neoplasm
- All Can cause abnormal cord signal
  - Usually not confined to the dorsal column
  - Will demonstrate associated contrast enhancement and cord enlargement in the affected region that is not seen with SACD

Vitamin B12 deficiency (sub-acute combined degeneration)

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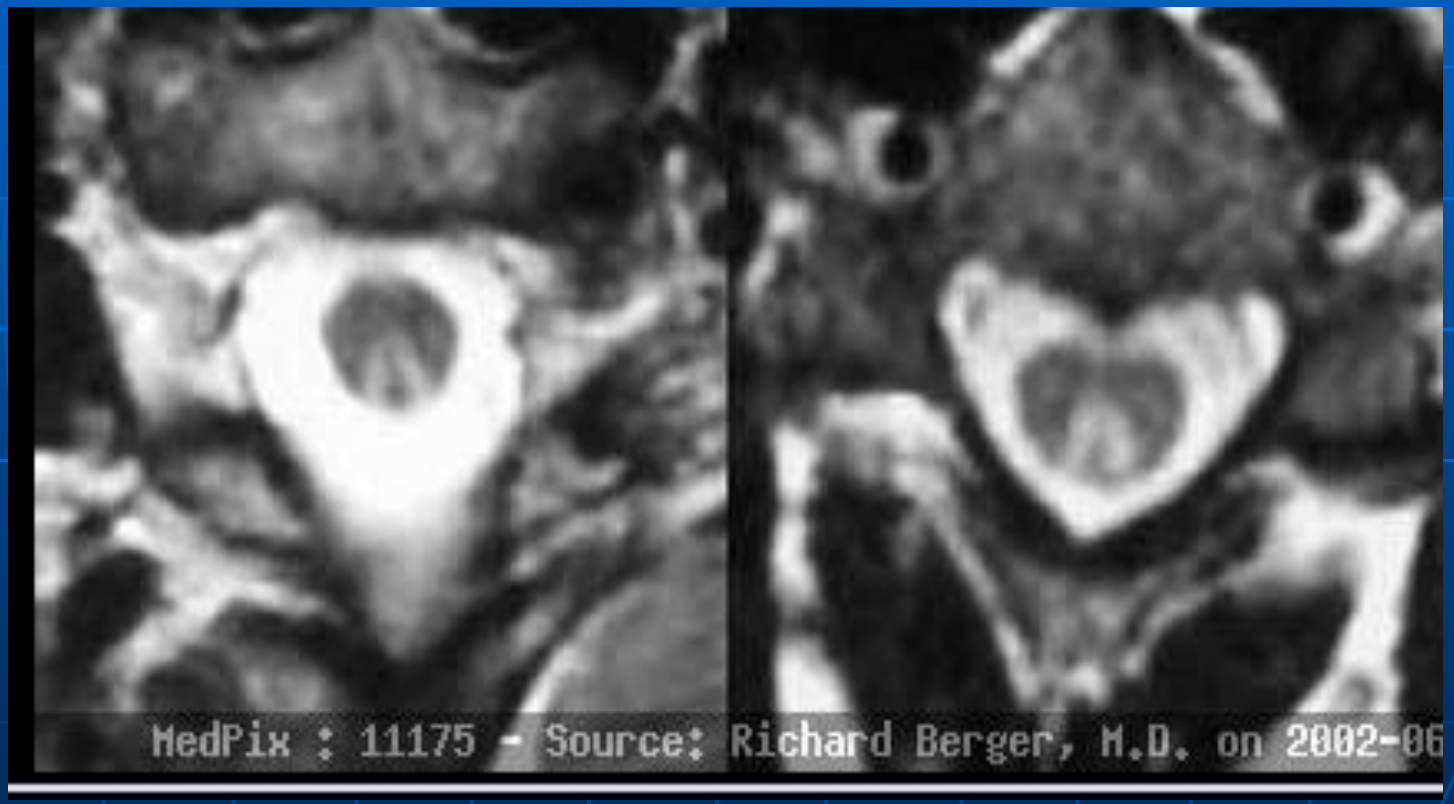

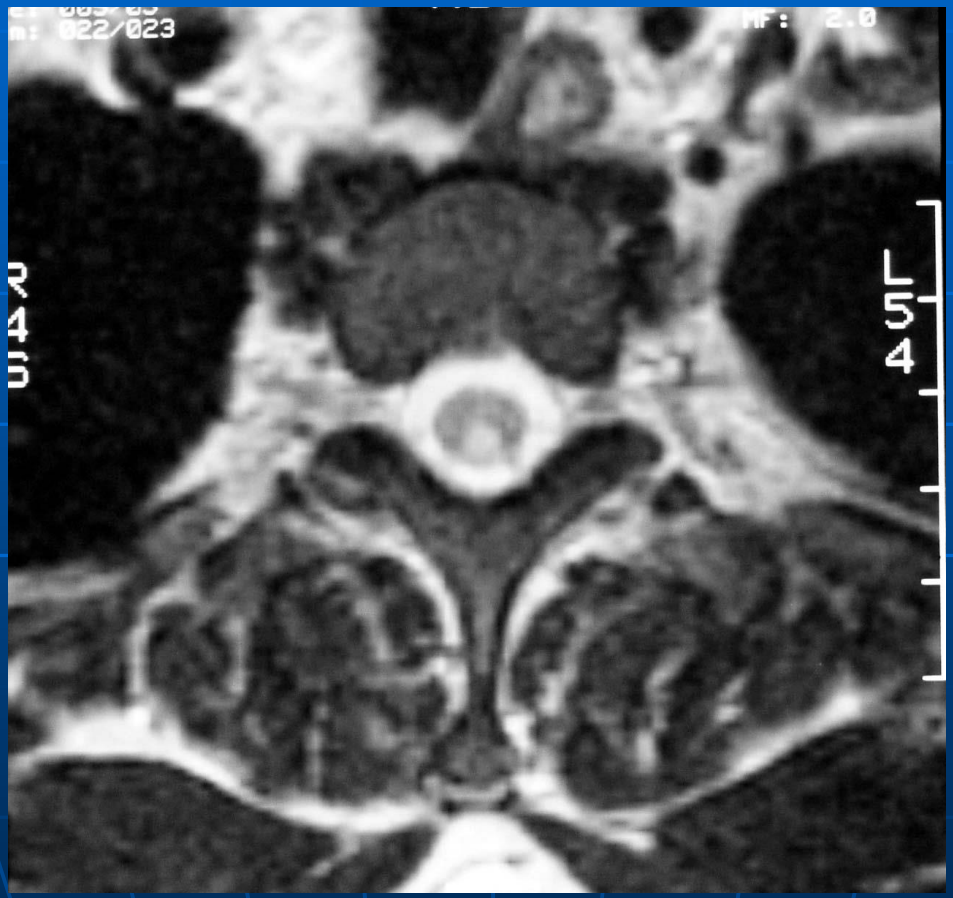
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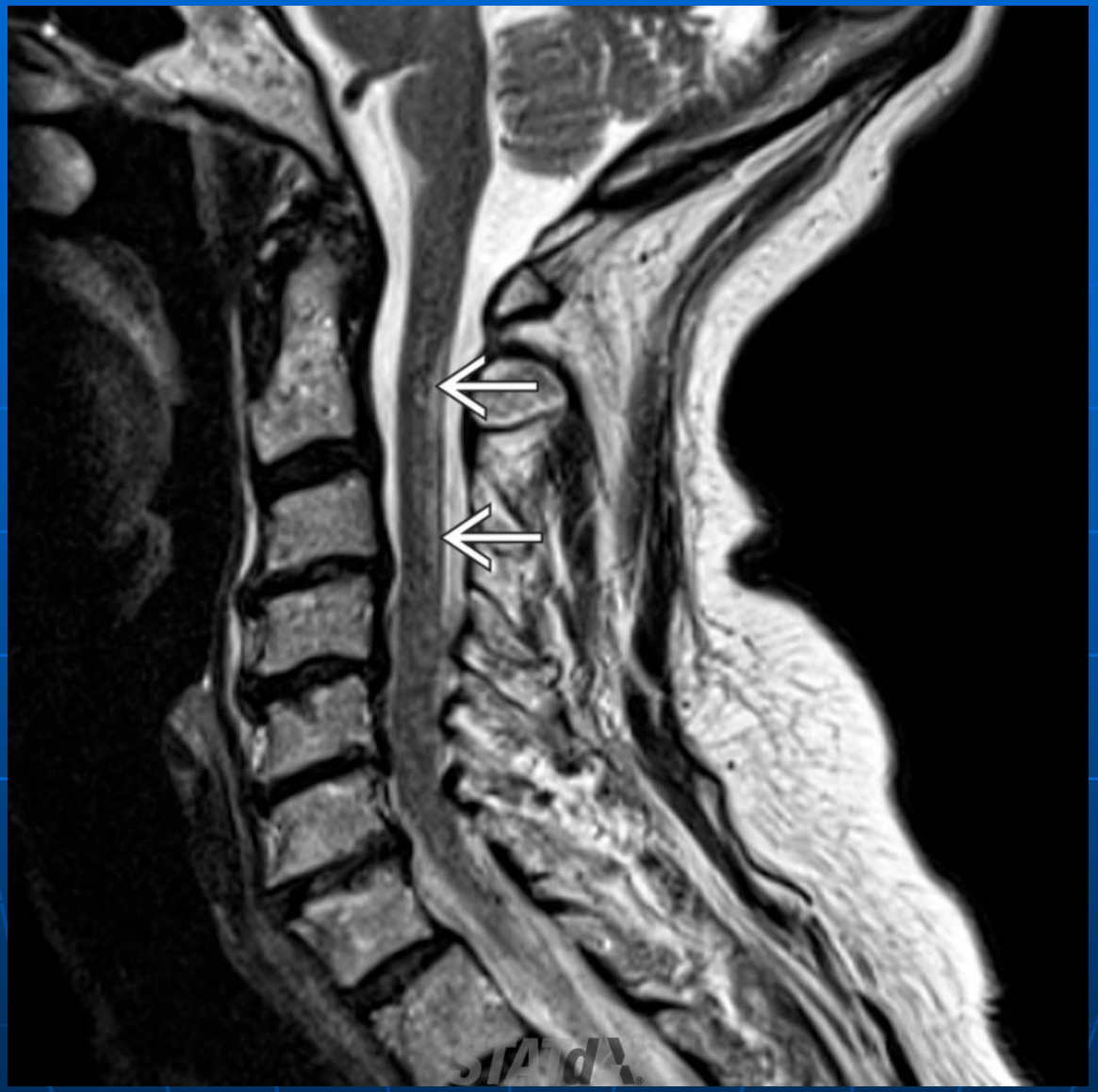

Sagittal T2WI MR shows linear hyperintensity (white solid arrow) in the dorsal cervical cord due to SCD in this patient with hypocupremia. Copper deficiency myelopathy is a treatable cause of noncompressive myelopathy, which closely mimics SCD due to B_{12} deficiency.