Subacute combined degeneration with vitamin B12 deficiency in a patient with bulimia nervosa

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Abstract

Context: Subacute combined degeneration (SCD) is a rare cause of myelopathy and is classically due to vitamin B12 deficiency. The typical pathological changes associated with SCD include axonal loss selectively involving the dorsal columns as well as the anterolateral pyramidal pathways.

Findings: We report a 22-year old Chinese woman who initially presented with progressive numbness and recurrent falls. Patient was subsequently diagnosed with subacute combined degeneration involving the thoracic and cervical cord based on imaging findings and low vitamin B12 levels. With careful and empathetic interviewing the patient admitted to intermittent self-induced vomiting after periods of compulsive eating consistent with a diagnosis of Bulimia Nervosa.

Conclusion: To our knowledge, this is the first case report of subacute combined degeneration due to B12 deficiency secondary to bulimia nervosa.

Case Report

Here we present a 22-year-old female of Chinese origin who initially began experiencing numbness and tingling in her hands and feet. This later progressed to weakness primarily in her lower extremities to the point where she began falling repeatedly. Patient was quite reserved and not forthcoming with her history however with gentle questioning regarding her eating habits she finally admitted to periods of binge eating followed by self-induced vomiting or purging. She admitted to doing this on a “on and off” basis over the 6 months prior to the onset of her symptoms.

Her exam revealed a well-developed female who initially was quite reserved and withdrawn. Cranial nerve exam was normal and strength in the upper extremities was 4/5 while strength in bilateral lower extremities was 3/5. There were horizontal linear abrasions immediately below her knees which she attributed to repeated falls. She had impaired sensation to light touch in bilateral upper and lower extremities and proprioception and vibration sensation were also both impaired. She was unable to stand up from a laying position without significant assistance and was unable to ambulate even for a few steps (Table 1).

Initial investigations included an electrocardiogram which showed normal sinus rhythm, computerized tomography scan of the head which was normal. Her laboratory workup was remarkable for a markedly low serum B12 level together with markedly elevated methylmalonic acid and homocysteine levels. To investigate the potential etiology of the low B12 levels, we obtained testing for anti-parietal cell, anti-intrinsic factor antibodies and Immunochemical fecal occult blood all of which were negative. A Gastroenterology consult was obtained, and a computerized tomography of the abdomen was performed together with testing for fecal calprotectin (an intestinal inflammatory biomarker used to screen for inflammatory bowel disease) [1] both of which were normal. A full psychiatric assessment was then obtained, and patient was screened for possible drug abuse including the possibility of exposure to nitrous oxide (known to impair B12 metabolism) [2]. Patient met all diagnostic and statistical manual (DSM) criteria for Bulimia Nervosa – Purging Type. Lab and imaging workup is shown in Table 2.

A magnetic resonance imaging of the brain was unremarkable however magnetic resonance imaging of the cervical and thoracic spine revealed an abnormal signal hypointensity within the bilateral posterior columns of the thoracic cord, most apparent below T7 and a similar extensive signal hypointensity within the posterior columns of the spinal cord extending from the cranio cervical junction through C6-C7 (Figure 1A and 1B). With cyanocobalamin replacement and concurrent rehabilitation, the patient improved markedly where she was then able to ambulate with minimal assistance within the first 2 weeks after treatment.

Discussion

To our knowledge, this is the first case report describing subacute combined degeneration of the spinal cord due to B12 deficiency in a

Table 1: Patient Demographics and baseline characteristic

| Age        | 22 |
|------------|----|
| Sex        | F  |
| Ethnicity  | Chinese |
| Duration of Bulimia | 6 months |
| Symptoms   | Numbness and weakness – 4 extremities |
|            | Recurrent falls |
| Neurologic Exam | Cranial nerve exam: normal; quadriaparesis; Decreased proprioception, vibration and light touch in bilateral upper and lower extremities; Unable to ambulate; Linear abrasions below knees bilaterally due to repeated falls |

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Lab and imaging workup

| Lab Name              | Value      | Normal Range        |
|-----------------------|------------|---------------------|
| WBC                   | 5.3        | 4.0 - 11.0 x10^3/µL |
| RED BLOOD CELL        | 3.53 (L)   | 3.63 - 5.04 x10^6/µL|
| HEMOGLOBIN            | 11.4 (L)   | 12.0 - 15.3 g/dL    |
| HEMATOCRIT            | 34.5 (L)   | 34.7 - 45.1 %       |
| MCV                   | 97.9       | 80.0 - 100.0 fL     |
| PLATELETT             | 200        | 150 - 450 x10^3/µL  |
| GLUCOSE               | 97         | 70 - 99 mg/dL       |
| SODIUM                | 140        | 133 - 144 mmol/L    |
| POTASSIUM             | 3.7        | 3.5 - 5.1 mmol/L    |
| CHLORIDE              | 109 (H)    | 98 - 107 mmol/L     |
| BUN                   | 20         | 7 - 25 mg/dL        |
| CREATININE            | 0.6        | 0.6 - 1.2 mg/dL     |
| CALCIUM               | 9.4        | 8.6 - 10.3 mg/dL    |
| AST (SGOT)            | 17         | 13 - 39 U/L         |
| ALT (SGPT)            | 14         | 7 - 52 U/L          |
| ALKALINE PHOSPHATASE  | 53         | 34 - 104 U/L        |
| TSH                   | 3.573      | 0.270 - 4.200 µU/mL |
| CRP                   | 1.3 (H)    | 0.0 - 0.5 mg/dL     |
| CERULOPLASMIN         | 222.0      | 180.0 - 580.0 mg/L  |
| Syphilis Treponemal AB| Nonreactive | Nonreactive         |
| HIV-1/HIV-2 Ag/Ab     | Nonreactive | Nonreactive         |
| IGG SYNTHESIS RATE CSF| <0.0 | <=8.0 µg/d |
| IGG/ALB RATIO CSF     | 0.17       | 0.09 - 0.25 [ratio]|
| IgG Index             | 0.61       | 0.28 - 0.66 [ratio] |
| ALBUMIN INDEX         | 3.8        | 0.0 - 9.0 [ratio]   |
| OLIGOCOL BAN.CSF      | Negative   | Negative            |
| Urine Drug Screen     | Negative   | Negative            |
| VITAMIN B1            | 4          | 4 - 15              |
| VITAMIN E (ALPHA TOCO)| 7.7        | 5.5 - 18.0 mg/L     |
| VITAMIN E (B-GAMMA TOCO)| 0.9| 0.0 - 6.0 mg/L     |
| VITAMIN B12           | 88 (L)     | 180 - 914 pg/mL     |
| VITAMIN B12 (3 weeks post-treatment)| 790 | 180 - 914 pg/mL |
| FOLIC ACID            | 23.6       | 5.9 - 24.8 mg/mL    |
| HOMOCYSTEINE          | 60.3 (H)   | 3.7 - 13.9 umol/L   |
| METHYLMALONIC ACID    | 4.49 (H)   | 0.00 - 0.40 umol/L  |
| PARIETAL CELL AB      | <1:20      | <1:20               |
| INTRINSIC FACTOR AB   | Negative   | Negative            |
| Immunochemical fecal occult blood | Negative | Negative |
| CT Abdomen with contrast | Unremarkable | Unremarkable |
| MRI Brain             | Unremarkable | Unremarkable |
| MRI C and T spine     | hyperintensity within the bilateral posterior columns | |
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