Case Report

Sensorineural hearing loss and status epilepticus associated with ulcerative colitis: Is there enough evidence to support immune-related mechanisms?

Sinem Yazici, Gulcin Benbir, Birsen Ince

Department of Neurology, Istanbul University, Istanbul, Turkey

ABSTRACT

Ulcerative colitis (UC) is characterized by an inflammatory disorder of the gastrointestinal tract. Immune-mediated extraintestinal manifestations of UC have increasingly attracted attention in the literature recently, for which UC is now considered as a systemic disease. Neurologic involvement associated with UC is probably under-reported because of the unawareness of many physicians, although early recognition and treatment are crucial in preventing major morbidity and sequel. In this case report is presented a patient newly diagnosed as UC, who developed both sensorineural hearing loss and intractable status epilepticus that we suggest to have resulted from immune-mediated mechanisms.

Key words: Immune-mediated mechanisms, sensorineural hearing loss, status epilepticus, ulcerative colitis

Introduction

Ulcerative colitis (UC) is characterized by an inflammatory disorder of the gastrointestinal tract. It is a chronic and debilitating disorder most often diagnosed in patients between 15 and 30 years of age, although it may present at any age. Women and men are equally affected. It has a prevalence rate of 200/100,000. In its pathogenesis, it has hypothesized abnormal or excessive responses by an inadequately regulated mucosal immune system to unknown triggers, in addition to genetic predisposition.[1] Immune-mediated extraintestinal manifestations of UC have increasingly attracted attention in the literature recently, for which UC is now considered as a systemic disease.[2,3]

Major target organ for UC is colon; any part may be affected. However, the most common presenting symptoms are abdominal pain and bloody diarrhea.[1-3] Neurologic involvement associated with UC, on the other hand, is probably under-reported because of the unawareness of many physicians. Several case presentations have reported sensorineural hearing loss as an early immune-mediated manifestation of UC,[4-7] whereas the association of epilepsy and UC is neglected as one of the extraintestinal neurologic manifestations of UC.[8] There are only few case reports with UC who develop epileptic seizures, which were suggested to occur in relation to structural or metabolic causes, and thus regarded secondary to a neurologic complication, but not as an immune-mediated neurologic manifestation of UC itself.[8,9] Early recognition and treatment are crucial in preventing major morbidity and sequel.[8,10]

In this case report, a patient newly diagnosed as UC, who developed both sensorineural hearing loss and intractable status epilepticus, which we suggest to have resulted from immune-mediated mechanisms, is presented.

Access this article online	
Quick Response Code:	Website: www.ruralneuropractice.com
	DOI: 10.4103/0976-3147.143205

Case Report

A 23-year-old woman started to have abdominal pain, recurrent vomiting, and weight loss for the previous 1 month, and she was diagnosed as having

Address for correspondence:
Dr. Gulcin Benbir, Department of Neurology, Cerrahpasa Faculty of Medicine, Istanbul University, Istanbul, Turkey.
E-mail: drgulcinbenbir@yahoo.com

UC 2 weeks ago proved by colorectal biopsy. Oral methylprednisolone therapy (1 mg/kg/day) was initiated. At second week of her diagnosis, she developed bilateral hearing loss. Otologic examination revealed no abnormality in external ear canals and tympanic membranes. Pure tonal audiometry demonstrated the presence of bilateral sensorineural hearing loss (the pure tone averages for the frequencies 500, 1000, and 2000 Hz were 93dB in the left and 88 dB in the right ear). Her neurological examination was otherwise normal.

Laboratory investigations showed mild anemia, leukocytosis, hypoalbuminemia, and elevated inflammatory markers. Other detailed biochemical tests, coagulation tests, complement factors, C3 and C4 levels, and vasculitis markers were all normal. Thyroid, nuclear, cytoplasmic, and perinuclear anti-neutrophiles, anti-smooth muscle antibodies, anti-gliadin and anti-endomycium antibodies were negative. Antibodies to *Borrelia burgdorferi* and *Treponema pallidum* were normal. The microbiological analysis of blood and stool was unremarkable.

One week later, she had a tonic–clonic generalized seizure. Electroencephalography showed generalized slowing over bilateral hemispheres (4–5/s slow-wave - delta activity). Cranial magnetic resonance (MR) imaging was normal, except bilateral peri-rolandic hyperintense signal changes compatible with postconvulsive hypoperfusion in FLAIR-weighted MR images. Cerebrospinal fluid analysis revealed that protein level was mildly elevated, cell count was normal, and oligoclonal IgG bands were negative. Detailed biochemical tests were repeated and ruled out any metabolic or electrolyte imbalance, hypovitaminosis and infections. She continued to have generalized tonic–clonic seizures in spite of high doses of intravenous vaproic acid (1500 mg/day), for which she was internalized into intensive care unit and anesthetized. At the end of 1 week, she was retransferred into our neurology clinics. She was seizure-free under anti-epileptic and methylprednisolone treatment. Within 1 month, bilateral sensorineural hearing loss was increased to some extent (98 dB in the left and 91 dB in the right ear). The follow-up colonoscopy revealed complete recovery of ulcerations. After 1 month seizure-free period, antiepileptic therapy was tapered down and stopped without any seizure recurrence. She is now being followed-up in our outpatient neurology clinic for about 2 years without any complaints.

Discussion

In this case report, a patient newly diagnosed as UC was presented, who developed both sensorineural hearing loss and intractable status epilepticus. Upon detailed etiological work-up, we suggest that sensorineural hearing loss and status epilepticus resulted from immune-mediated extraintestinal manifestations of UC. The clinical improvement with corticosteroid therapy also supports an immune-mediated mechanism.

The mechanisms involved in the pathogenesis of extraintestinal manifestations of UC are not clear; increased bowel permeability during active disease was proposed to cause luminal antigens to be presented to systemic immune system, which in turn lead to significant inflammatory responses elsewhere in the body.[7] Only few studies have investigated the frequency of neurologic disorders in patients with UC, but resulted to be inconsistent due to iatrogenic conditions or disease-related complications.[8,10] Pathophysiologically, disorders of peripheral and/or central nervous system in association with UC was ascribed to six different mechanisms: (1) Malabsorption and nutritional, particularly vitamin deficiencies, (2) toxic metabolic agents, (3) infections as a complication of immunosuppression, (4) side effects of medication or therapy, (5) thromboembolism, and (6) immunological abnormalities.[8]

Sensorineural hearing loss (SNHL) was documented to be more common in patients with UC compared with age- and gender-matched healthy controls.[6,7] Although the pathogenesis of SNHL associated with UC is not fully understood, it is thought to be immune mediated.[7] Humoral mechanisms were suggested due to the deposition of circulating immune complexes leading to vasculitis of vessels supplying the inner ear.[5] A specific antibody that binds to a 68-kDa inner ear antigen, the anti-68 kDa antigen, is defined as the hallmark of inner ear autoimmune disorder; it is supposed to cause SNHL through attacking the inner ear antigen.

Epilepsy has been reported in small case series and case reports as a rare extraintestinal and neurologic manifestation of inflammatory bowel diseases.[8,9] It has been suggested that if there was an association of epilepsy and inflammatory bowel diseases, it would preferentially be with Chron's disease, but not with UC.[8] Epileptic seizures in UC were reported to be secondary to structural or metabolic causes and regarded as a neurologic complication rather than neurologic manifestation of UC itself.[8,9]

In the presented case, all predisposing factors for epileptic seizures including metabolic factors have been excluded at the time she developed resistant epileptic seizures and status epilepticus. Moreover, the clinical table showed gradual improvement with corticosteroid

treatment. On this context, although not conclusively proved, we suggest that it is possible that both conditions in this patient, namely, sensorineural hearing loss and epileptic seizures, might have a common etiology in dysfunction of the immunologic system.

References

1. Podolsky DK. Inflammatory bowel disease. N Engl J Med 2002;347:417-29.
2. Danese S, Semeraro S, Papa A, Roberto I, Scaldaferri F, Fedeli G, *et al*. Extraintestinal manifestations in inflammatory bowel disease. World J Gastroenterol 2005;11:7227-36.
3. Ephgrave K. Extra-intestinal manifestations of Crohn's disease. Surg Clin North Am 2007;87:673-80.
4. Spier BJ, Wyman JB, Reichelderfer M, Schwartz DC. Acute sensorineural hearing loss as an early manifestation of indeterminate colitis. Dig Dis Sci 2004;49:1275-9.
5. Moris G, Milla A, Ribacoba R, González C. Acute deafness as an extraintestinal manifestation of ulcerative colitis. Eur J Intern Med 2005;16:440-2.
6. Kumar BN, Smith MS, Walsh RM, Green JR. Sensorineural hearing loss in ulcerative colitis. Clin Otolaryngol Allied Sci 2000;25:143-5.
7. Akbayir N, Caliş AB, Alkim C, Sökmen HM, Erdem L, Ozbal A, *et al*. Sensorineural hearing loss in patients with inflammatory bowel disease: A subclinical extraintestinal manifestation. Dig Dis Sci 2005;50:1938-45.
8. Scheid R, Teich N. Neurologic manifestations of ulcerative colitis. Eur J Neurol 2007;14:483-93.
9. Keene DL, Matzinger MA, Jacob PJ, Humphreys P. Cerebral vascular events associated with ulcerative colitis in children. Pediatr Neurol 2001;24:238-43.
10. Wills AJ, Pengiran Tengah DS, Holmes GK. The neurology of enteric disease. J Neurol Neurosurg Psychiatry 2006;77:805-10.

How to cite this article: Yazici S, Benbir G, Ince B. Sensorineural hearing loss and status epilepticus associated with ulcerative colitis: Is there enough evidence to support immune-related mechanisms?. J Neurosci Rural Pract 2015;6:77-9.

Source of Support: Nil. **Conflict of Interest:** None declared.