

A suspicious case of hyponatremia: Pseudomembranous colitis can present with severe hyponatremia even in the absence of diarrhoea

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ABSTRACT

Pseudomembranous colitis commonly manifests with abdominal pain, diarrhea, fever, and leukocytosis. The mortality rate is high (>60%) in patients whose condition is not diagnosed and treated. Here, we report the case of a 65-year-old male with a history of diabetes, hypertension, and asthma who presented to the emergency department with complaints of generalized weakness and dizziness for 3 days. The evaluation revealed leukocytosis and severe hyponatremia. There were no symptoms of diarrhoea Or vomiting. Further evaluation of the source of leukocytosis revealed pseudomembranous colitis and was managed appropriately. In this article, we describe an unusual case of hyponatremia secondary to pseudomembranous colitis without associated diarrhea, necessitating a high index of suspicion to avoid the potential disastrous effects of the disease.

Key words: *Clostridium difficile*, Colon, Colonic exudates, Hyponatremia, Leukocytosis, *Pseudomembranous colitis*

Pseudomembranous colitis is an inflammatory disease of the colon that causes mucosal edema in mild cases; severe cases are characterized by elevated yellow-white exudates that coalesce to form pseudomembranes on the colonic mucosa [1]. Patients with the condition commonly present with abdominal pain, diarrhea, fever, and leukocytosis. It is a severe colonic disease that is usually associated with antibiotic therapy altering the gut flora which then permits the colonization and elaboration of toxin from the anaerobic bacterium, *Clostridioides* (formerly *Clostridium*) *difficile*. The mortality rate is high in patients whose condition is not diagnosed and appropriately treated [2]. Complications include hypovolemic shock, sepsis, perforation, and toxic megacolon. However, Pseudomembranous colitis presenting as hyponatremia without any diarrhea is unusual. Given the high mortality associated with both pseudomembranous colitis and severe hyponatremia, And that studies have shown that mortality in the latter is governed largely by etiology, there is a reason to critically consider the diagnosis of pseudomembranous colitis in the presence of severe hyponatremia and unexplained leukocytosis [3].

In this case report, we describe a case of hyponatremia secondary to pseudomembranous colitis responding well to appropriate treatment. This case highlights the point that pseudomembranous colitis can present with severe hyponatremia even in the absence of diarrhea and a high index of suspicion

is thus necessary to avoid the potential disastrous effects of the disease.


CASE REPORT

A 65-year-old male with a history of diabetes (for the past 8 years, on oral medications), hypertension (for the past 7 years), and intermittent asthma (for the past 3 years) presented to the emergency department with complaints of generalized weakness and dizziness for the past 3 days.

On presentation, the patient was alert with a fair general condition. He had a regular pulse of 89/minute, blood pressure of 150/60 mmHg, respiratory rate of 20/min with no use of accessory muscles of respiration, and afebrile (temperature 37°C). The heart sounds were normal with no murmurs. Oxygen saturation was 100%. The abdomen was soft and there was no neurologic deficit.

Investigations revealed hyponatremia and hypokalemia along with leukocytosis (white blood cell, i.e., WBC count 39,000 cells/μL). Serum sodium was found to be 106 mmol/L with potassium levels of 3.0 mmol/L. Computed tomography (CT) scan of the brain was done which revealed age-related appearances of brain parenchyma with no evidence of intracranial hemorrhage or infarction. High-resolution CT scan (HRCT) chest showed no imaging evidence of pneumonia or any other abnormality in the chest.

The patient was started on intravenous (IV) antibiotics Piperacillin and Tazobactam (4.5 g, 8-hourly), electrolyte correction with hypertonic saline in the intensive care unit (ICU),

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and other supportive care. Leukocytosis persisted, due to which antibiotics were escalated to intravenous Meropenem (1 g, 8-hourly) and intravenous Metronidazole (500 mg, 8-hourly). The patient also developed anasarca with scrotal edema. Intravenous albumin was given and the scrotal edema was managed conservatively. He then developed abdominal distension and constipation on day 5 of the hospital stay, which did not improve despite conservative measures. X-ray abdomen (supine and Erect) (Fig. 1) was done, which showed dilated bowel loops.

CT abdomen was done in view of increasing abdominal distension and revealed segmental colonic wall thickenings with pericolonic fat stranding (Fig. 2). However, hyponatremia persisted, for which tolvaptan (7.5 mg, once a day) was started. A positron emission tomography-CT (PET-CT) scan was done to rule out a neoplastic etiology, which only revealed reactive nodules in the patient's right thigh, a biopsy of which was consistent with schwannoma. On day 7, a colonoscopy was done, given abnormal CT findings, which revealed pseudomembranous colitis (Fig. 3).

Biopsy done from the colon was also consistent with pseudomembranous colitis. Toxin A and B for *Clostridium difficile* was negative. p-ANCA and c-ANCA tests were done to rule out inflammatory bowel disease, which were both negative. Biopsy from colon revealed severe acute colitis with melanosis coli consistent with the diagnosis of pseudomembranous colitis

and no evidence of granuloma. An amoebiasis antibody IgG test was done and was positive. The patient was started on oral Vancomycin (250 mg, 6-hourly) along with Meropenem and intravenous Tinidazole (800 mg, once a day).

After this, the patient improved symptomatically. By day 10, his abdominal distension and constipation settled, and his appetite improved. He tolerated oral feeds well. Abdominal girth decreased and hyponatremia resolved (Serum Na at 132) (Table 1). He was discharged to home. He had an outpatient follow-up in 2 weeks at which point his sodium was 132 mmol/L, and the white cell count was normal. He had no further bowel complaints.

DISCUSSION

Our patient presented with the isolated findings of dizziness and generalized weakness, which prompted an evaluation of blood showing leukocytosis and hyponatremia. There were no symptoms of diarrhea and vomiting. On the contrary, there was constipation, with infrequent bowel movements. The differential diagnosis included sepsis with dyselectrolytemia. The patient was on no medications to have precipitated hyponatremia. In addition, pseudohyponatremia was ruled out as the serum was hypotonic and was not lipemic. The initial workup of the leukocytosis for source was focused on the respiratory system, blood, and urine

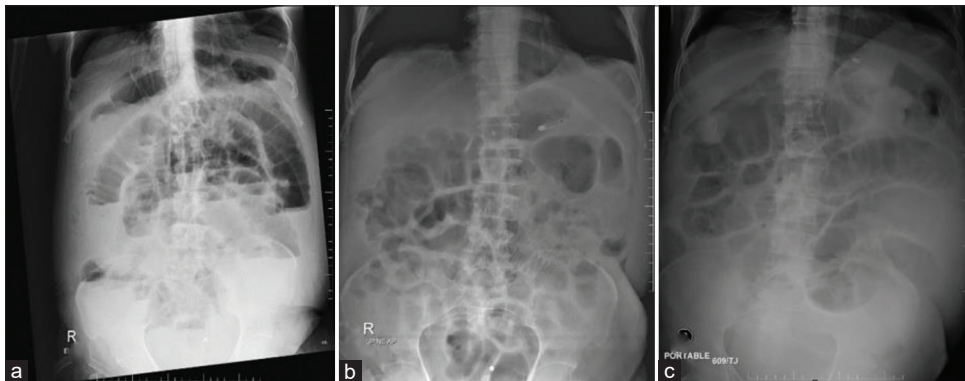


Figure 1: (a-c) X-ray abdomen (Left – Supine view; Center, Right – Erect view)

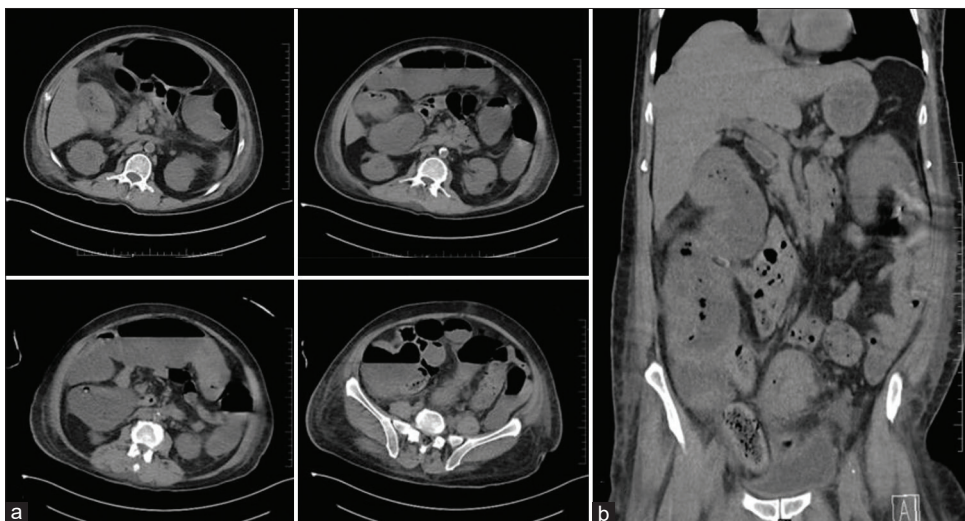
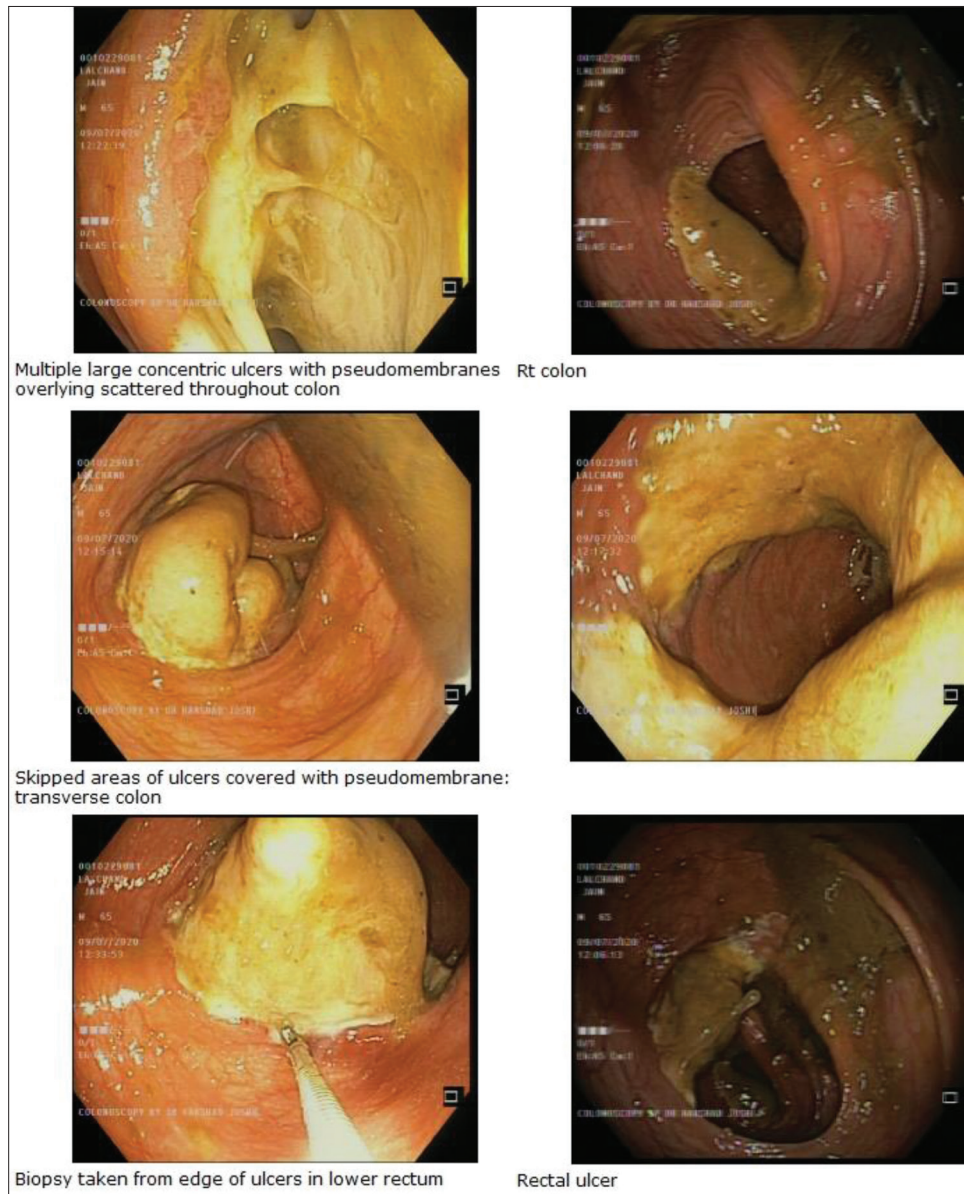


Figure 2: (a and b) CT abdomen and pelvis



Multiple large concentric ulcers with pseudomembranes overlying scattered throughout colon Rt colon

Skipped areas of ulcers covered with pseudomembrane: transverse colon

Biopsy taken from edge of ulcers in lower rectum

Rectal ulcer

Figure 3: Colonoscopy images showing pseudomembranes

Table 1: Laboratory investigations of the patient

Investigations	D 0	D 1	Day 3	Day 4	Day 6	Day 8	Day 10	Day 13	Day 15
Hb (g/dL)	10.2	9.5	9.5	9.6	10.2	11	9.4	9.6	8.7
WBC (cells/mm ³)	43060	36020	41220	33630	19440	19330	11730	6460	3630
Platelet (cells/mm ³)	514000	473000	471000	525000	479000	383000	366000	378000	311000
BUN (mg/dL)	7.52				37.85				
Creatinine (mg/dL)	0.52	0.74			1.34	1.20	1.14	0.92	
Uric Acid (mg/dL)	1.5				5.0				
Na (mmol/L)	106	112	126	124	132	131	136	134	132
K (mmol/L)	3.0	2.78	3.61	3.11	3.72	3.98	3.88	4.0	3.99
Serum osmolality (mOSm/kg)	221.57								
Urine spot Na (mmol/L)	28								
TSH (μIU/mL)	0.713								
Cortisol 8 am (μg/dL)	33.64		49.38						

cultures on the basis of the history of asthma given by the patient and the contemporaneous COVID-19 pandemic.

Ultrasonography of the abdomen and pelvis also did not reveal a source. Abdomen CT revealed segmental colonic wall thickenings

with pericolonial fat stranding. Colonoscopy finally exhibited the cause of the leukocytosis, which was pseudomembranous colitis. The final diagnosis was pseudomembranous colitis, which was confirmed on histopathology. Due diligence to identify the cause and source of severe leukocytosis which was worsening, (despite broad-spectrum antibiotics and absence of fever) led to the etiology. The leukocytosis and hyponatremia resolved with the treatment of colitis.

Pseudomembranous colitis is caused by toxins elaborated by *Clostridioides difficile* infection (CDI). CDI is usually associated with the use of antibiotics, which cause a breach in the bowel lining permitting the *Clostridioides difficile* to grow and produce its toxin [4]. However, other risk factors for CDI include advanced age, inflammatory bowel disease, chemotherapy, severe comorbid illness, enteral feeding, and gastrointestinal surgery [5]. Our patient did not report any definite use of antibiotics recently.

An extensive literature review did not reveal any presentation of pseudomembranous colitis with hyponatremia without diarrhea, making the present case unusual and insightful [6-8]. Chiefly, case reports, even those citing an unusual presentation, discuss the condition in the presence of diarrhea [9,10]. Associated findings of *Clostridioides difficile* colitis that manifested in our patient were protein-losing enteropathy, hypoalbuminemia, and edema [11,12].

There are two reasons why this atypical case becomes particularly significant. First, symptomatic severe hyponatremia has not been seen in association with colitis in the absence of frank diarrhea. Given this resolved with the treatment of the colitis, we suggest added vigilance in considering bowel infection in the case of hyponatremia with leukocytosis, even in the absence of diarrhea. Next, due diligence to identify the cause and source of severe unexplained leukocytosis which was worsening despite broad-spectrum antibiotics and the absence of fever led to the final diagnosis.

CONCLUSION

This case highlights the point that pseudomembranous colitis can present with leukocytosis, hyponatremia, and constipation

leading to abdominal distention (interestingly, in the absence of diarrhea). Due diligence to this unusual presentation can allow early diagnosis and treatment for an otherwise serious disease.

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