Adenoma with rectal villous diarrhoea and severe hypokalaemia (McKittrick–Wheelock syndrome)

Introduction

Colonic polyps are common. Villous adenomas constitute 5–6% of colon polyps and may cause systemic symptoms. Villous adenomas may lead to electrolyte fluid disturbances associated with diarrhoea and hypokalaemia. Secretory diarrhoea and hypokalaemia caused by villous adenoma is known as McKittrick–Wheelock syndrome, first described as carcinoma of the colon in 1954 by McKittrick and Wheelock. This article presents a typical case of McKittrick–Wheelock syndrome with diarrhoea and hypokalaemia caused by a large villous adenoma in the rectum.

Discussion

Colorectal tumours are the most common tumours of the gastrointestinal tract. Most colorectal tumours are adenocarcinomas (DiSario et al, 1994). Adenomas of the colon are divided into three groups: tubular, villous, and tubulovillous. Villous adenomas constitute 5–6% of the tumours of the colon. All colorectal adenomas are dysplastic. The degree of dysplasia is higher in villous adenomas than in other types.

Adenomas of the colon usually cause mild gastrointestinal symptoms or are asymptomatic. In rare cases of villous adenoma, there is a secretory diarrhoea with loss of fluid and electrolytes. The villous adenoma associated with diarrhoea, dehydration, acute renal failure and electrolyte imbalance is known as McKittrick–Wheelock syndrome (McKittrick and Wheelock, 1997). Diarrhoea may be present for many years, compensated for by oral intake and increased renal adaptation. When the compensatory mechanisms are exhausted, a life-threatening dehydration and electrolyte imbalance occurs.

In the pathogenesis of this syndrome, both plasma prostaglandin E2 and cyclic adenosine monophosphate have been suggested to play a role as possible mediators in the increased fluid and electrolyte flow to the lumen of the colon (Payne et al, 2006). Indomethacin and other prostaglandin inhibitors are used in patients with secretory villous adenomas to provide significant benefits in controlling the rectal fluid flow (Pugh and Thomas, 1994; Smelt et al, 1992). Villous adenomas of the colon result in reduced serum potassium concentrations, because there is

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Case Report

A 67-year-old man was admitted with a 6-year history of attacks of diarrhoea with mucus and blood. In a colonoscopy, performed 5 years ago, a biopsy was taken from a fragile, fluffy, very soft-looking vegetating lesion 10 cm from the rectum extending distally and surrounding the lumen. The histopathology revealed findings compatible with villous adenoma. An operation was proposed at that time, but the patient did not accept. Consequently, although the patient had similar attacks, he had never sought medical care.

Twenty days before the patient's admittance to the authors' clinic, the complaints of diarrhoea with mucus and blood from time to time had started again. For about 3 days, the patient complained of increasing weakness, dizziness and diarrhoea. The complete blood count was within normal limits except for leukocytosis (white blood cell: 16 360/mm^3). Liver function tests were also within normal limits. Renal function tests and electrolytes were as follows: urea 152 mg/dl, creatinine 2.44 mg/dl, potassium 2.8 mEq/litre, sodium 134 mEq/litre, calcium 8.5 mg/dl, phosphorus 4.9 mg/dl, chlorine 90 mEq/litre, magnesium 3.2 mg/dl. Ultrasound of the liver revealed no abnormalities, except for grade 1 steatosis. The viral serology was within the normal limits. Although the patient had persistent diarrhoea, both examination of the stools for parasites and stool culture were negative.

Despite rigorous potassium supplementation for the hypokalaemia, the potassium levels remained persistently below the normal range (2.3–2.9 mEq/litre). The patient's fluid deficit was also treated by fluid replacement. Although the patient was initially thought to have developed prerenal renal failure, in the follow-up, the urea and creatinine returned to normal levels. Colonoscopy (*Figure 1*) revealed an ulcerating, vegetating mass starting from the end of the rectum, extending up to 20 cm proximally with a height of 10–12 mm; multiple biopsies were obtained. The histopathology revealed findings compatible with villous adenoma. An abdominal computed tomography scan showed a polypoid mass that surrounded the lumen of the rectum, extending up to the sigmoid colon. The diarrhoea and the hypokalaemia were thought to be a result of this lesion.

The patient was transferred to the surgical ward for an operative treatment. A Miles procedure (excision of the mass from the rectosigmoid region) was performed. The histopathology showed a 'giant villous adenoma' with fields of high-grade dysplasia. After an initial examination of the resection specimen (*Figure 2*) and sampling of all grossly suspicious areas, the lesion was serially cut in 5 mm slices, and two representative samples were taken from each slice. There was low-grade dysplasia all over the lesion (*Figure 3*), without any invasive areas. The diarrhoea disappeared completely postoperatively. The postoperative serum potassium value was 4.8 mEq/ml, and other kidney function tests were within normal limits.

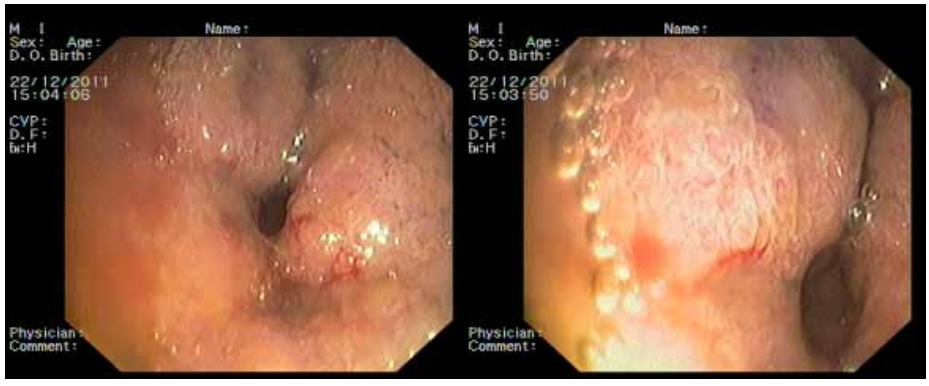


Figure 1. A mass, too large to fit in the visual field, observed on colonoscopy.

an excessive loss of this ion. Patients can be admitted with major neuromuscular and cardiovascular symptoms: flaccid quadriplegia, areflexia, respiratory failure, arrhythmias and sudden death. Hypokalaemia produces characteristic changes on the electrocardiogram, although they are not seen in all patients. There is a depression of the ST segment, decrease in the amplitude of the T wave and an increase in the amplitude of the U wave, which occurs at the end of the T wave. In this patient, the electrocardiogram revealed an elongation of the corrected QT (QTc) distance (with bifid T wave or temporary U waves) and a prolonged QTc interval (with bifid T wave or prominent U wave), all in accordance with the hypokalaemia.

Figure 2. Gross pathology of the lesion: a 16 cm broad-based sessile lesion having a cauliflower-like appearance.

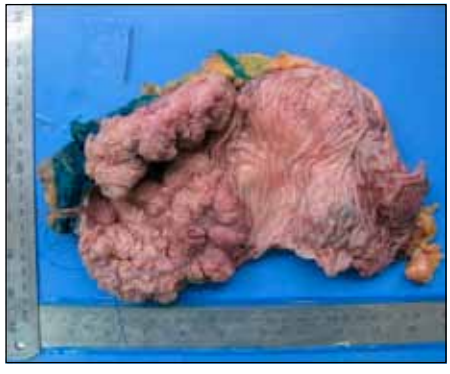
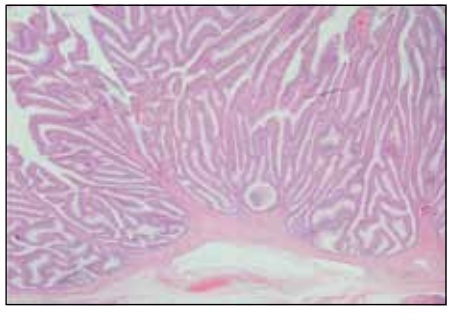


Figure 3. Villous adenomatous lesion with low grade dysplasia showing finger-like papillary projections with delicate fibrovascular cores. Note that the villi project perpendicular to the muscularis mucosa. The muscularis mucosa layer remains intact and there is no evidence of submucosal invasion (haematoxylin and eosin x 2).



McKittrick–Wheelock syndrome is a reversible disease when treated, so early diagnosis is essential. A late diagnosis may result in temporary or permanent renal failure requiring haemodialysis (Popescu et al, 2005). In the long term, when there is no diagnosis of the primary pathology, the process is prolonged; the lesion grows, and the patient is admitted with a progressed disease in which endoscopic treatment is difficult. In villous lesions neighbouring the anal canal, endoscopic treatment or abdominopelvic resection should be performed. In this case, a patient with chronic diarrhoea for about 6 years, the villous adenoma was diagnosed 5 years ago by colonoscopic biopsy, but the patient did not agree to undergo endoscopic resection or operative treatment. Meanwhile, the diarrhoea persisted, and the size of the lesion increased. A Miles procedure was performed with excision of the mass from the rectosigmoid region and a permanent colostomy. Eighteen months after the operation, the patient was alive without any problems.

Any untreated adenoma can be life threatening as it may change into colorectal cancer as well as villous adenoma. The treatment of villous adenoma should consist of fluid and electrolyte replacement therapy, endocavitary irradiation, endoscopic resection and surgical resection. After endoscopic treatment or surgical resection, the renal functions recover completely.

In this case, after surgical resection, the complaints of chronic diarrhoea decreased, and the fluid and electrolyte imbalance was permanently improved. **BJHM**

DiSario JA, Burt RW, Kandrick ML, McWhorter WP (1994) Colorectal cancers of rare histologic types compared with adenocarcinomas. *Dis Colon Rectum* **37**(12): 1227–80

McKittrick LS, Wheelock FC (1997) Carcinoma of the colon. 1954. *Dis Colon Rectum* **40**(12): 1494–5; discussion 1495–6

Payne CM, Fass R, Benstein H et al (2006) Pathogenesis of diarrhea in the adult: diagnostic challenges and life- threatening conditions. *Eur J Gastroenterol Hepatol* **18**(10): 1047–51

Popescu A, Orban-Schiopu AM, Becheanu G, Diculescu M (2005) McKittrick-Wheelock syndrome - a rare cause of acute renal failure. *Rom J Gastroenterol* **14**(1): 63–6

Pugh S, Thomas GA (1994) Patients with adenomatous polyps and carcinomas have increased colonic mucosal prostaglandin E2. *Gut* **35**(5): 675–8

Smelt AH, Meinders AE, Hoekman K, Noort WA, Keirse MJ (1992) Secretory diarrhea in villous adenoma of rectum: effect of treatment with somatostatin and indomethacin. *Prostaglandins* **43**(6): 567–72

LEARNING POINTS

- Villous adenomas may lead to electrolyte–fluid disturbances associated with diarrhoea and hypokalaemia.
- Secretory diarrhoea and hypokalaemia caused by villous adenoma is known as McKittrick–Wheelock syndrome.
- McKittrick–Wheelock syndrome is a reversible disease when treated, so early diagnosis is essential. A late diagnosis may result in temporary or permanent renal failure requiring haemodialysis.
- Untreated cases of secretory villous adenoma result in death. Treatment of these patients should consist of fluid and electrolyte replacement therapy, endocavitary irradiation, endoscopic resection and surgical resection. After surgical resection, the renal functions recover completely.