Mckittrick-Wheelock Syndrome a Rare Cause of Secretory Mucous Diarrhea Complicated with Obstruction: A Case Report and Literature Review

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Abstract

McKittrick-Wheelock Syndrome is an uncommon condition of mucous/watery diarrhea secondary to rectal villous adenoma. The consequent dehydration and electrolytes can lead to acute renal failure and severe acidosis. The diagnosis is reached after elimination of more common causes plus confirmation of distal colorectal lesion with villous component. Here, we present an unexpected complication of the condition leading to the diagnosis of this condition. Disease awareness is needed to reach to early diagnosis and prevent unnecessary complications and sequelae of delay management.

Keywords: Mckittrick-Wheelock Syndrome; Mucous Diarrhea; Rectal Neoplasm; Rectal Polyp; Rectal Mass.

Introduction

McKittrick-Wheelock Syndrome (MWS) is a rare condition marked by extreme electrolyte disturbances and acute kidney injury (AKI) secondary to chronic secretory diarrhea that is almost always caused by a rectal villous adenoma. The diagnosis and management of this condition is complex requiring a multidisciplinary approach and a keen understanding of the condition's pathophysiology. The exact prevalence and incidence of this condition is unknown. However, 5% of colorectal adenomas are villous and only 3% of them are secretory active. Moreover, only a fraction of them would present with such phenomena.[1] Hence, we present a case of an elderly male patient who had recurrent presentations with electrolyte imbalance and AKI secondary to diarrhea and a delayed diagnosis of MWS after developing an unusual complication.

Case Report

A seventy-Three-year-old gentleman presented to our center with a four-day history of constipation, abdominal distension and poor oral intake. He was hemodynamically stable. His abdominal examination was unremarkable apart from a palpable 2x2 cm rectal mass found on digital rectal examination. Surprisingly, two years prior to this presentation he sought medical attention for history of recurrent mucus and bloody diarrhea of two years duration requiring hospitalized twice for severe dehydration and electrolytes disturbance. As part of his work-up he was booked for colonoscopy which have shown a villous adenoma with low-grade dysplasia from a rectal growth. Unfortunately, he was kept on surveillance instead of undergoing endoscopic or surgical resection due to lack of endoscopist experience to resect such large laterally spreading tumors and lack of awareness of such growth can

cause mucus diarrhea. His medical co-morbidities included; dementia, primary hypertension, chronic kidney disease, dyslipidemia, benign prostate hyperplasia, and a right ectopic kidney.

His laboratory investigations demonstrated electrolyte imbalances, specifically hypokalemia and hyponatremia. This was followed by a computed tomography (CT) scan of his abdomen and pelvis, which revealed an irregular large polypoid intra-luminal projecting mass involving the upper rectum to the mid-rectum over a 11 cm segment occupying the whole lumen causing a closed-loop large bowel obstruction (Figure 1).

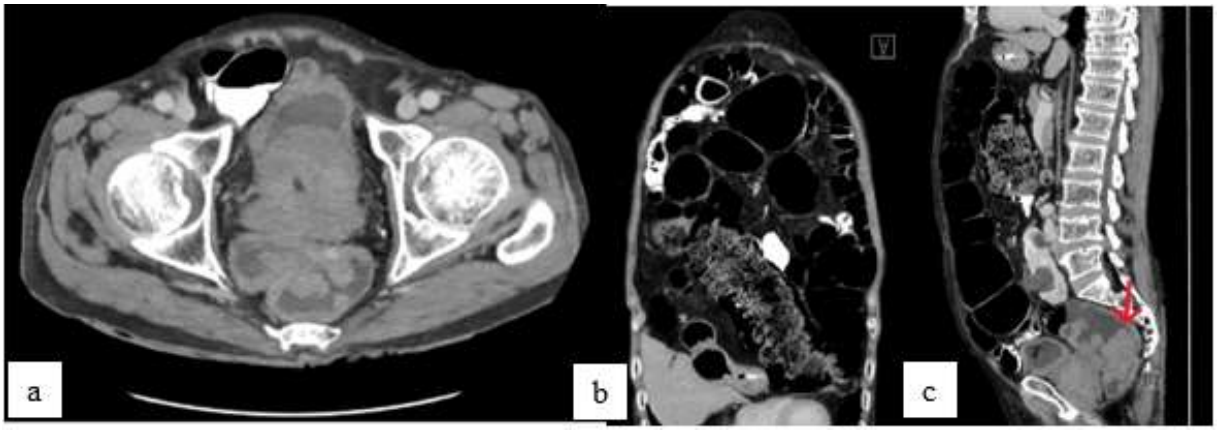

Figure 1: (a) Cross section of abdominopelvic CT-scan with IV and oral contrast showing a polypoidal mass in the upper rectum causing luminal narrowing. (b) Coronal section of abdominopelvic CT-scan with IV and oral contrast showing large bowel obstruction with air and fecal matter. (c) Sagittal section of abdominopelvic CT-scan with IV and oral contrast showing multiple projection like polypoidal upper and mid rectal mass (marked with red arrow) causing luminal narrowing and large bowel obstruction with dilated large bowel loops.

He was admitted, resuscitated and then taken for diagnostic laparoscopy and diverting loop colostomy given that he was found to be a high-risk patient for iatrogenic perforation during endoscopic stenting. Intraoperative findings confirmed a dilated colon up to the rectosigmoid junction with no peritoneal or liver lesions. Immediate post-operative period was uneventful and he was discharged home. Afterward, he had a colonoscopy as an outpatient, which revealed a polypoidal rectosigmoid lesion and the biopsy histopathology result displayed a villous adenoma with low-grade dysplasia.

Unfortunately, after four weeks the patient was admitted with painful prolapsed congested stoma. Conservative management strategies have failed to reduce the prolapsing segment. Consequently, he was taken again to the operation theater for resection of prolapsing segment and creation of double-barrel stoma. During his recovery, the patient was taken for a second colonoscopy as the histopathological findings did not correlate with the radiological findings and additionally to the concern that the first biopsy might have not been representative given the length and nature of a lateral spreading polypoidal tumor. However, the second biopsy revealed findings consistent with the previous assessment. Moreover, a pelvic MRI was performed, which showed a 11cm long segment of mural thickening of the upper and middle rectal wall with numerous polypoidal lesions carpeting the mucosal surface which was distended with intra-luminal mucin (Figure 2). Given the overall clinical picture a diagnosis of McKittrick–Wheelock syndrome was made.

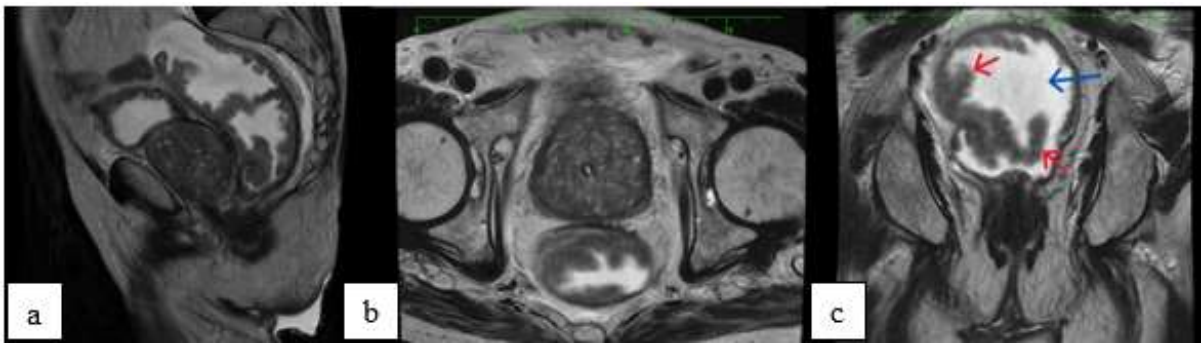

Figure 2: (a) Sagittal section of pelvic MRI with IV contrast showing thickened upper and middle rectal wall with multiple projection like mass with large amount of intra-luminal lumen. (b) Cross section of pelvic MRI with IV contrast showing middle rectum wall thickening with multiple projection like mass. (c) Coronal section of pelvic MRI with IV contrast showing multiple projection like mass of the middle and upper rectum (marked with red arrow) with large amount of intra-luminal fluid (marked with blue arrow).

Two months later, the patient presented again to the emergency department with complaints of dehydration, vomiting, low stoma output, and abdominal pain. On this presentation, he reported significant muco-watery diarrhea via rectum despite diversion. His laboratory investigations revealed hyponatremia and hypokalemia, necessitating admission and urgent medical management. During his hospital stay it was measured that he was passing around 1-2Kg of muco-watery diarrhea per rectum with normal stoma output. Therefore, a decision was made with the patient and his relatives to proceed with surgical resection in order to treat the cause of his recurrent hospitalizations and to closure his colostomy.

After the patient stabilization, he was scheduled for an elective laparoscopic ultra-low anterior resection with colorectal anastomosis. Intra-operative, the lesion was found to extend from the upper rectum to the lower part of the mid rectum, consisting of multiple scattered polyps along the lumen. The procedure was uneventful. The patient was discharged on the fourth postoperative day. In the two weeks follow-up clinic review, the patient was found to be well, no more diarrhea has been reported. The histopathology report of the final specimen shows a 9×12 cm papillary lesions with a thickness ranging from 1 to 1.5 cm. Microscopically, the lesions is consistent with a rectal villous adenoma with low grade dysplasia (Figure 3).

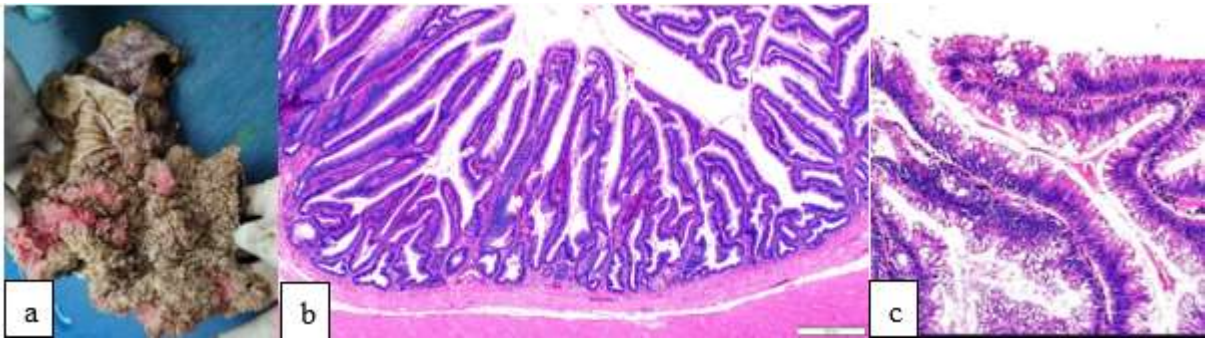

Figure 3: (a) Gross picture of the adenoma with papillary/ fur-like surface and no gross evidence of invasion. (b) H&H stain low magnification, showing variably sized villi lined by columnar cells with low grade dysplasia and many goblet cells. There is no high-grade dysplasia or evidence of invasion. (c) H&H stain high magnification, villous adenoma with low grade dysplasia.

Discussion

McKittrick-Wheelock Syndrome is a condition caused by a hypersecretory villous adenoma mostly located in the rectum. This adenoma is responsible for the excessive loss of fluids and electrolytes, explicitly sodium and potassium, causing severe consequences such as hypovolemic shock, significant electrolyte imbalances, and if not managed promptly, acute renal failure. The phenomenon was first described by McKittrick-Wheelock in 1954, however the first case was reported in 1940 by Robert W. Garis. The literature indicates that patients with MWS

can experience symptoms for a long period of time with a median time to diagnosis is 24 months and the median age of diagnosis is 69 years.[1-3]

Although MWS is usually caused by a pre-cancerous adenoma, there have been reports of MWS secondary to a malignant polyp/mass usually due to delayed diagnosis.[4,5] The polyp is usually located in rectum (60.5%) or rectosigmoid junction (32.4%) and rarely located higher.[1] Histologically, they are usually villous or tubulovillous with many goblet cells, however the increase hypersecretion is not fully understood yet.[5] Jacob et al, have hypothesized that MWS is a cyclic nucleotide-mediated diarrheas due to his finding that adenylate cyclase, cyclic AMP content, and a cyclic AMP-dependent protein kinase were significantly higher in secretory villous adenoma.[6] Whereas, Steven et al. hypnotized that MWS is a Prostaglandin (PG) E2-mediated secretory diarrhea due to his finding of high PGE2 levels in patient with hypersecretory villous adenoma.[7]

According to the largest systemic review of MWS, the most common clinical characteristics were diarrhea (92.2%), mass on digital rectal exam (42%), nausea and/or vomiting (40.1%), and weakness and/or fatigue (40.1%). Less commonly were weight loss (23.7%), altered Glasgow Coma Scale (19.8%), syncope/ dizziness (14.8%), anorexia (14%) and bleeding per rectum (12.5%).[1]

The most common electrolytes disturbance is hyponatremia, hypokalemia and hypochloremia. This is usually associated with high urea and creatinine level secondary to dehydration. Those abnormalities are due to large volume of mucous diarrhea. The recorded median volume of stool was 2 liters (L) per day, but it may reach up to 5L per day.[1] The discharge usually contains sodium, potassium and chloride which correlate to the associated electrolytes disturbance with such condition. Furthermore, the sodium and chloride content are usually excessed the normal loss of these electrolytes in stool.[1,8] Using this information, urinary chloride can limit the differential diagnosis significantly. A low urinary chloride (< 10 mmol/L) differential diagnosis is vomiting, excessive nasogastric suctioning, diuretic use, cystic fibrosis and MWS.[8] Most of those differentials can be excluded by history alone.

A Computed Tomography (CT) scans can show an intraluminal polypoid or circumferential mass in rectosigmoid/rectum. In reported case the CT-scan was always able to detect a rectal/rectosigmoid mass as usually MWS is caused by large adenomas. Furthermore, there was no direct role seen for Magnetic resonance imaging (MRI) in the diagnosis of MWS but can be used in selected cases; i.e. local staging of malignant polyp (adenocarcinoma / rectal neuroendocrine).[1,4] Generally, imaging helps in assessing the extent of the tumor and planning for surgical intervention. In our case the imaging helped us to decide to take the patient for a laparoscopic ultra-low anterior resection of rectum which would be satisfactory to establish an R0 resection without compromising the possibility of establishing bowel continuity.

There are no definitive reported diagnostic criteria, therefore the diagnosis of MWS is usually reached after complicated clinical course and comprehensive work-up which include laboratory work-up, imaging, endoscopy and histopathological examination. Moreover, the differential diagnosis of secretory diarrhea is vast, some examples include; infections, inflammatory bowel diseases, bile acid malabsorption, diabetes-related diarrhea, factitious diarrhea, carcinoid tumors, gastrinomas, VIPomas and colorectal neoplastic lesions.[9]

McKittrick-Wheelock Syndrome should always be actively managed. The initial treatment focuses on the correction of dehydration and electrolyte imbalances to stabilize the patient's condition, enhancing their recovery and reducing their risk of developing complications. Indomethacin and/or octreotide have been used as effective treatment to control the diarrhea. This treatment option should be used as a bridging treatment only as the number of patients treated with such approach is limited in literature and in addition to reports of failed treatment in some cases.[1,10] Likewise, defunctioning stomas have been attempted but have always failed to control the diarrhea.[1]

The curative therapy for MWS management is to resect the adenoma. This can be achieved through either endoscopic approach or surgical resection. The choice of the approach being determined by the adenoma's size, location, or histological characteristics. This is supported by the mortality rate of patients whom did not have surgery reaching to 61.5%.[1] Moreover, resection of the lesion will evade the progression to malignancy in a non-malignant Polyps.

Endoscopic resection is considered for relatively small and/or pedunculated lesions that can be fully excised with endoscopic mucosal resection (EMR).[11] However, there is a reported case of very large lesion (24.5 x 17.0 cm) being excised using endoscopic submucosal dissection (ESD).[12] Up till now, there are reported case of patient

will require multiple sessions of endoscopic resection and some reports the need to proceed to surgical resection. Likewise, trans-anal excision can be attempted in lesions located in lower rectum if they are small enough to be fully excised without functional compromise.[1]

Most patients are treated with radical resection as most lesions are large in addition to ongoing suspicion of malignancy. Restorative or non-restorative anterior resection or abdominoperineal resection are the most common surgical approach.[1] The surgical approach are usually decide by multiple factors including lesion characters in addition to patient co-morbidity, functional status, surgical history and patient preference. Multidisciplinary team (MDT) meeting are the best way to make a holistic and sound clinical decision for both benign and malignant MWS.

In our case we have faced some diagnostic challenges. Although the patient had history of diarrhea and biopsy proven rectal villous adenoma on a colonoscopy, this history was reached out to only after the patient started to have mucous diarrhea post diversion. Additionally, his initial presentation to our service was large bowel obstruction secondary to large upper rectal mass. His presentation gave a picture of possible malignancy, which led to repeat the colonoscopy and biopsy twice to rule it out. Moreover, patient was having dementia which led to getting poor and fragmented history. Ultimately, leading to delayed diagnosis and management.

Conclusion

McKittrick-Wheelock Syndrome is a challenging diagnosis and most of the time is overlooked. The exclusion of more common causes of diarrhea such as; infections, inflammatory condition and endocrine/exocrine disturbance are necessary prior to considering this condition. However, there are subtle features of this condition can guide the clinician to include this condition to the working differential diagnosis such as large amount of mucous predominant watery diarrhea despite fasting with low urinary chloride. Complete resection of the causative lesion is treatment of choice.

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