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Small Bowel Adenocarcinoma in a Nigerian Man: A Case Report

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Authors' contributions

This work was carried out in collaboration between all the authors. Author ACJ designed the study, managed the literature search, wrote part of the initial manuscript and performed a critically review of the manuscript. Author AMA participated in the study design and reviewed the manuscript. Author MAA participated in the study design and reviewed the manuscript. Author TOA wrote part of the initial manuscript. All authors approved the final manuscript.

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Case Study

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ABSTRACT

Malignancies of the small bowel are a rare occurrence with a worldwide incidence of less than 1.0 per 100,000 populations. Only 2% of the total annual incidence of digestive cancers occurs in the small intestine as compared to approximately 57% in the large intestine. This is in spite of the fact that the small intestine constitutes about 75% of the entire length and 90% of the absorptive surface area of the gastrointestinal tract while the large bowel measures only about 1.5 meters in length.

We report an 84-year old Nigerian man with ileal adenocarcinoma who presented initially with nonspecific symptoms. We faced a diagnostic dilemma because of the vagueness of his symptoms and the fact that all the initial endoscopic and radiologic investigations performed were negative despite a severely elevated plasma carcinoembryonic antigen and the finding of an umbilical

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metastatic nodule. The diagnosis was made after 7 weeks of the initial presentation when the patient had exploratory laparotomy because of newly developed features of complete intestinal obstruction.
This report highlights the need for physicians to heighten their index of suspicion for small bowel malignancies whenever a patient presents with features suggestive of gastrointestinal malignancy but conventional endoscopic or imaging modalities yielded negative results.

Keywords: Small bowel cancers; small intestinal malignancies; small intestinal adenocarcinoma; small intestinal tumors; Nigeria.

1. INTRODUCTION

Malignancies of the small bowel are a rare occurrence with a worldwide incidence of less than 1.0 per 100,000 population [1]. Only 2% of the total annual incidence of digestive cancers occurs in the small intestine as compared to approximately 57% in the large intestine [2]. This is in spite of the fact that the small intestine constitutes about 75% of the entire length and 90% of the absorptive surface area of the gastrointestinal tract while the large bowel measures only about 1.5 meters in length [1-3].

Historically, adenocarcinoma used to be the most common subtype of the small bowel cancer, but a rising incidence of carcinoid tumor has recently made it the most common, [4-6] with the distribution as follows: carcinoid (35%-42%), adenocarcinoma (30%-40%), lymphoma (15%-20%) and sarcomas/gastrointestinal stromal tumors (10%-15%).[1] However, histologic subtypes distribution differs across the small intestine, with adenocarcinoma presenting as the commonest cancer of the duodenum despite that it consists of only 4% of the small bowel length [6,7].

In a single-center hospital-based case series, Adekunle and Ajayi reported 34 cases of small bowel cancers between 1960 to 1970 in Nigeria [8]. In a more recent multicenter study in Southwestern Nigeria, small bowel cancers constituted 1.7% (12 cases) of all reported histologically confirmed malignant gastrointestinal tumors (713 cases) [9]. The small bowel tumors included 5 cases (41.7%) of adenocarcinoma, 4 cases (33.3%) of lymphoma, 2 cases (16.7%) of carcinoid tumors and 1 case (8.3%) of metastatic choriocarcinoma. However, we found no exclusive case report of small bowel adenocarcinoma (SBA) from Nigeria in our literature review.

In this article, we report a case of ileal adenocarcinoma in a Nigerian man. The low index of suspicion at initial presentation, the diagnostic challenges and the paucity of publications on SBA in Nigerians necessitated this effort.

2. CASE PRESENTATION

An 84-year-old man was admitted to our hospital because of abdominal discomfort of three weeks. There was a history of nausea but no vomiting. He had anorexia and constipation. No history of diarrhea. He also had an occasional nonproductive cough. There was no dyspnea, orthopnea or paroxysmal nocturnal dyspnea.

He was a known patient with hypertensive heart disease and a three-vessel coronary artery disease. One of the vessels had been stented. He also had transurethral resection of the prostate for benign prostatic hypertrophy about two years before presentation.

He smoked cigarette occasional as a young man but stopped smoking 40 years before presentation. He was a social alcohol drinker.

On examination, the abdomen was full and moved with respiration. The bowel sound was hyperactive. A tender Sister Mary-Joseph's nodule was found. There was coarse crepitation in the lower lung zones posteriorly. The remainder of the examination was essentially normal.

He was evaluated for community-acquired pneumonia and intra-abdominal malignancy.

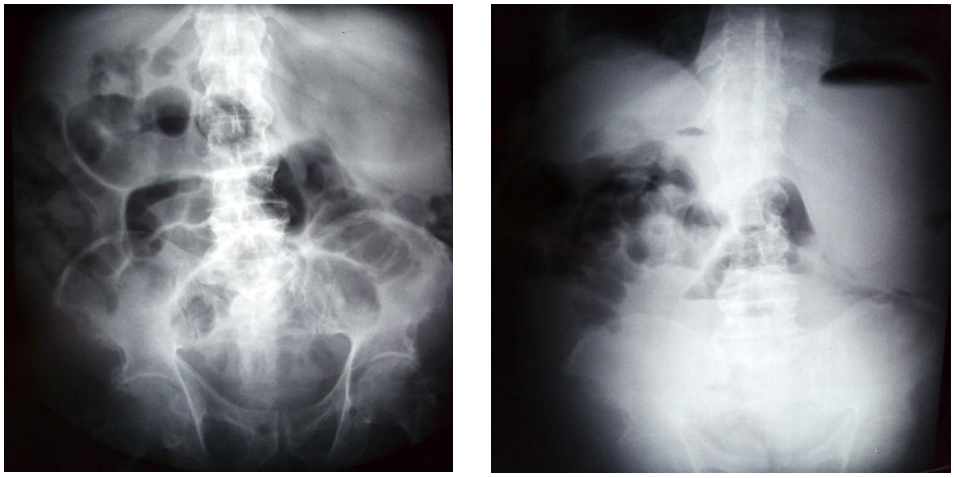
His carcinoembryonic antigen was markedly elevated (117.6 ng/ml; normal: 0-2.5 ng/ml). The prostate-specific antigen was normal (0.7 ng/ml; normal: 0-4 ng/ml). The chest x-ray showed an area of inhomogenous opacity in the right lower lung zone with air bronchogram sign, indicative of pneumonic consolidation. Both esophagogastroduodenoscopy (EGD) and

colonoscopy showed no evidence of malignancy. Histology of gastric biopsy showed Helicobacter pylori-associated chronic gastritis. Abdominopelvic ultrasonography and computed tomographic scan (CT scan) showed enlarged prostate gland, ascites and a simple left renal cyst.

He had a course of antibiotics for community-acquired pneumonia. He also had a manual evacuation of feces during the course of the admission for fecal impaction. The patient got well and was discharged on H. pylori eradication therapy to the clinic for follow up.

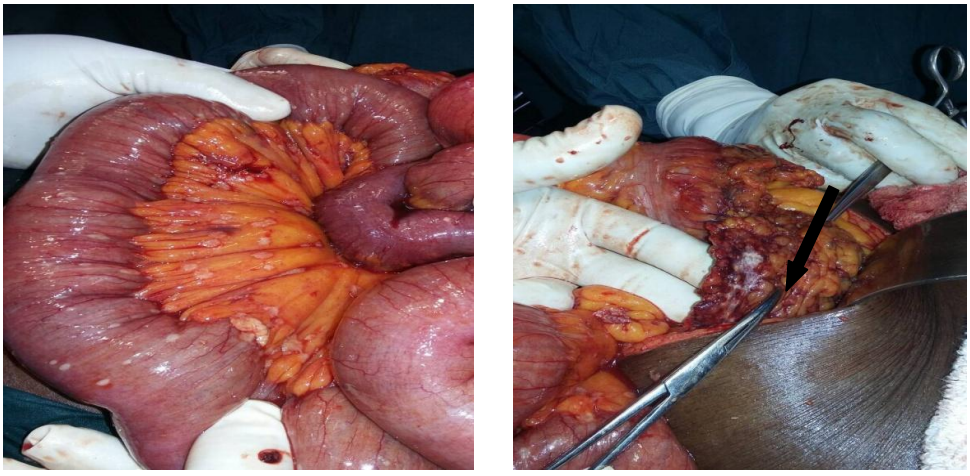
The patient was stable until seven weeks after the initial admission when he presented again with constipation, abdominal pain, gross abdominal distension and acute urinary retention. Plain abdominal x-ray showed features of bowel obstruction [Fig. 1]. He then had an emergency exploratory laparotomy.

The intra-operative findings included 1.5 liters of serous ascitic fluid, grossly dilated jejunum and proximal ileum, narrowing of the distal ileum at about 30 cm from the ileocaecal junction, and widespread tumor deposits on the entire small bowel and its mesentery with umbilicated



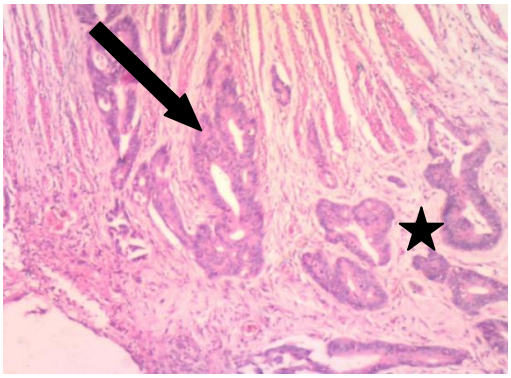
A. Supine plain abdominal x-ray **B. Erect plain abdominal x-ray**

Fig. 1. Plain supine and erect abdominal x-rays of an 84-year-old man showing centrally located dilated small bowel loops with multiple air-fluid levels. There is also dilatation of the right peripheral bowel loops. There is increased ground glass opacity in the lower abdomen suggestive of ascites

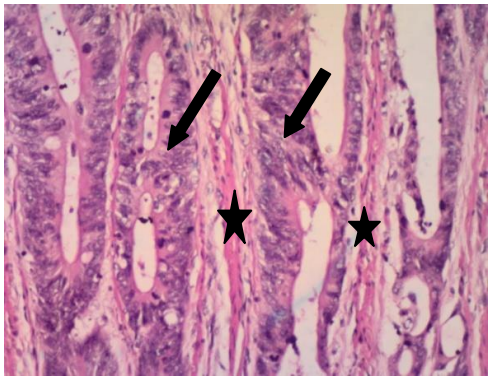


A. Multiple tumor deposits on the small intestine and mesentery **B. Large tumor deposits on the omenteum**

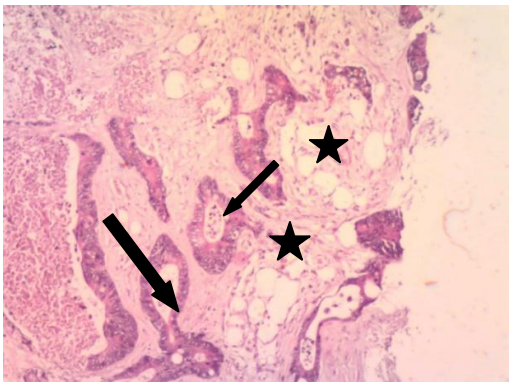
Fig. 2. Tumor deposits in the small intestine, mesentery and omentum of an 84-year old man



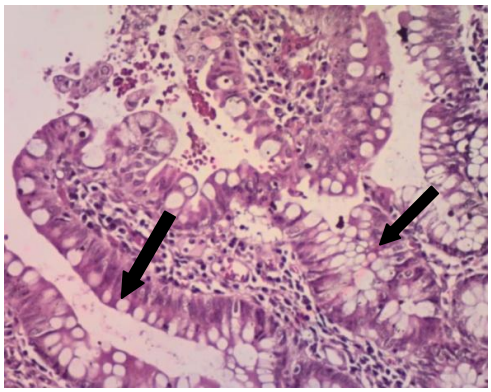
A. Photomicrograph of invasive adenocarcinoma showing malignant glands penetrating through the muscle wall (arrow) into the serosa (star). (Hematoxylin and eosin stains, X40)



B. Photomicrograph of invasive adenocarcinoma showing malignant glands (arrows) infiltrating the muscle wall (stars). (Hematoxylin and eosin stains, X100)



C. Photomicrograph of invasive adenocarcinoma showing malignant glands (arrows) within the omentum (star). (Hematoxylin and eosin stains, X40)



D. Photomicrograph of the ileal mucosa showing dysplastic columnar epithelium (arrows). (Hematoxylin and eosin stains, X100)

Fig. 3. Photomicrographs of small bowel adenocarcinoma in an 84-year old man

nodules. There was an aggregated mass of tumor nodules in the distal ileum. There were multiple interloop adhesions between the tumor nodules in the distal ileum. A large tumor mass was seen in the greater omentum. Few tumor deposits were also found in the large bowel [Fig. 2].

Adhesiolysis, ileal resection, ileo-ileal anastomosis and omental biopsy were performed. At the end of the surgery, the patient had cardiac arrest and all effort to resuscitate proved abortive.

Histology of the resected small bowel (ileum) showed a malignant epithelial neoplasm composed of moderately pleomorphic cells that were disposed of predominantly in glandular patterns. The tumor cells had large hyperchromatic to vesicular nuclei with prominent nucleoli and scanty cytoplasm. These malignant glands were haphazardly arranged and had penetrated through the muscularis propria into the serosa and the omentum. The focus of dysplastic columnar epithelium was also seen within the mucosa. Overall features were in keeping with a moderately differentiated invasive adenocarcinoma of the ileum with pathological staging $T_4N_xM_x$ [Fig. 3].

3. DISCUSSION

There is limited information in regard to the risk factors and pathogenesis of SBA due to its rarity. The larger proportion of the cases is sporadic in nature, though there are inherited cancer syndromes such as familial adenomatous polyposis (FAP), Peutz-Jeghers syndrome and

hereditary nonpolyposis colorectal cancer (HNPCC) that are associated with an increased risk of SBA [1,3,6]. Crohn's disease and celiac disease, which are both related to small bowel inflammation, are the two most common conditions associated with sporadic SBA [3,6]. Other risk factors that are associated with SBA include sporadic colorectal cancer (CRC); behavioral and environmental factors like cigarette smoking, alcohol consumption, consumption of red meat and smoked/salted fish, obesity; and biliary tract diseases like cholecystitis and gallstone [1,3].

SBA shares several similarities with CRC in several respects since they both arise from adenomatous polyps, sometimes co-occur in the same individuals, and have similar pattern of incidence rates by country [10,11]. However, there is a significant difference in the rate of *APC* mutations between SBA and CRC [5]. The rarity of SBA together with the lack of *APC* mutations suggest that the incidence difference between SBA and CRC could be as a result of a difference in the early initiation phase of carcinogenesis [6].

A very interesting observation about SBA relates to its 50-fold lower incidence than CRC despite that the large bowel is just about one-fifth of the gastrointestinal tract [6,11]. Although certain hypotheses have been proposed to explain the seeming resistance of the small bowel to carcinogenesis, there is inadequate experimental evidence to substantiate any [3,6]. The proposed hypotheses include the rapid turnover of the small intestinal mucosal epithelium that prevents the accumulation of cells with genetic damage, the increased mucosal immune surveillance provided by the large number of lymphoid tissue in the small bowel, and the intrinsic nature of the small bowel and its content such as the rapid transit time, a lack of bacterial degradation activity and a dilute alkaline environment that allows less exposure to dietary carcinogens [3,6].

Small intestinal neoplasms often present with nonspecific symptoms like abdominal pain and weight loss. Other symptoms include nausea and vomiting, gastrointestinal bleeding (melena and hematochezia), diarrhea with mucoid stool, palpable abdominal masses, intestinal obstruction and sometimes intestinal perforation [3,6,12]. Majority of the patients present in the sixth or seventh decade of life [3,6,11].

Dabaja et al., in a single-center study of 217 patients with SBA, reported that 66% of the patients had abdominal pain, 40% had intestinal obstruction and 24% had bleeding at the point of diagnosis [12]. Bowel obstruction was mostly observed in distally located tumors (jejunal and ileum) compared to duodenal tumors (47% vs 34%; $p = 0.06$) [12]. The occurrence of SBA decreases from the duodenum (52%) to the ileum (10%). Majority of the patients were diagnosed in advanced stages as 39% had lymph node invasion (Stage III) and 35% had distant metastasis (Stage IV) [12]. Amidst the patients with Stage IV disease, the liver was the commonest site of metastasis (59%), followed by carcinomatosis (25%), the pelvis (9%), and the lungs (3%) [12]. Three patients (4%) had adrenal, supraclavicular lymph node, and brain metastasis, respectively.

SBA often presents a diagnostic dilemma. A high index of suspicion is required for diagnosis because of the nonspecific nature of symptoms. Plain abdominal radiographs could reveal evidence of intestinal obstruction, but the sensitivity is low. Tumors in the duodenum could be detected by EGD or barium contrast studies. A study obtained a diagnostic sensitivity of about 90% with either an upper GI series or endoscopy for duodenal lesions [13]. However, upper GI series was diagnostic in 36% and 20% of cases for jejunal and ileal lesions respectively [13]. A sensitivity of 50% was reported for conventional CT scan for duodenal tumor diagnosis in the study [13].

The poor sensitivity of the small bowel barium series caused diagnostic delays in the past. Newer investigative modalities with higher sensitivities and specificities such computed tomographic enteroclysis, magnetic resonant enteroclysis, enteroscopy, and capsule endoscopy are now available for better exploration of the small intestine and should, therefore, enhance early diagnosis [3]. Capsule endoscopy has an advantage over the other diagnostic tests because it is performed as an outpatient procedure. However, it has a major downside compared to the other tests because it is contraindicated in patients with partial or complete intestinal obstruction. Double balloon enteroscopy could serve as a last result when other investigative modalities fail to identify the lesion in suspected cases of small bowel tumors [3]. However; the procedure is cumbersome and less convenient than capsule endoscopy. Hence, it should be used mainly for biopsy or preoperative tattooing [3]. Ancillary laboratory tests for SBA include plasma carcinoembryonic

antigen (CEA) and carbohydrate antigen (CA) 19.9 assays [3]. Baseline values of these tests should be obtained as they are of prognostic value [3].

In regard to the case at hand, we were faced with a diagnostic dilemma initially because of the vagueness of his symptoms and the fact that all the initial endoscopic and radiologic investigations we conducted (EGD, colonoscopy, abdominal ultrasonography and CT scan) were negative despite the severely elevated plasma CEA and the finding of umbilical metastatic nodule. The diagnosis was delayed until 7 weeks after the initial presentation when the patient had exploratory laparotomy because of newly developed features of complete intestinal obstruction. This delay could have been prevented if our index of suspicion for small bowel malignancy was high.

Surgery is the mainstay of therapy for the locoregional disease [3,6,11,12]. Wide local excision with lymphadenectomy is the procedure of choice for lesions located in the third or fourth parts of the duodenum, the jejunum, or the ileum [3,11]. Pancreaticoduodenectomy is preferred for periampullary lesions. The benefit of adjuvant chemotherapy after curative surgery has not been well defined as there are no robust data to support usage [6,11]. Nevertheless, the United States National Cancer Database shows that the use of adjuvant chemotherapy has been increasing [5]. Radiotherapy is usually not indicated, except for pain or obstruction relief, as the tumor is generally radio-resistance [11]. Chemotherapy is the treatment of choice for metastatic diseases or locally irresectable tumors [11,12]. Generally, the use of chemotherapy for the treatment of SBA has imitated chemotherapeutic strategy in CRC [3,11]. Different combinations exist but the combination of fluoropyrimidine and oxaliplatin seems to have consistently shown the greatest activity [6].

The prognosis of SBA is poor at all stages, with a 5-year overall survival rate that ranges from 14% to 33% [3]. The 5-year overall survival correlates with the tumor stage: 50–60% for stage I, 39–55% for stage II, 10–40% for stage III and 3–5% for stage IV [3].

4. CONCLUSION

Small bowel malignancies are rare globally and the report of individual cases of SBA from Nigeria is particularly scarce in the literature. This report highlights the need for physicians to heighten their index of suspicion for small bowel malignancies whenever a patient presents with features suggestive of gastrointestinal malignancy but conventional endoscopic or imaging modalities yielded negative results.

CONSENT

Informed consent was obtained from the next of kin of the patient for the publication of this case report and the accompanying images.

ETHICAL APPROVAL

It is not applicable.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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