

Case Reports

Carcinoid Tumor and Bariatric Surgery

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Carcinoid is a rare gastrointestinal tumor. We have noticed a high incidence of carcinoid in our patient population during the gastric reduction-duodenal switch operation. Further studies are needed to identify any potential correlation between morbid obesity and carcinoid tumors.

Key words: Carcinoid tumor, morbid obesity, bariatric surgery, duodenal switch operation

Introduction

Carcinoid is a rare tumor that affects multiple organ systems with an incidence of 1-2 per 100,000 people.¹ The pathophysiology of carcinoid is thought to be tumors arising from neuroendocrine cells that secrete multiple hormones and biogenic amines, predominantly serotonin. Carcinoid tumors are the most common gastrointestinal endocrine tumors. They have been reported to comprise up to 55% of such tumors. Although most carcinoid tumors are asymptomatic, patients who experience symptoms (5%) can have debilitating effects. Based on the data from the End Results Group (1950–1969) and the Third National Cancer Survey (1969–1971) which analyzed 2,837 cases in the United States, the most common site of carcinoid tumor is the appendix, then rectum, then ileum, bronchi and lungs, and stomach.² The clinical manifestations consist of attacks of severe cyanotic flushing of the skin that lasts from minutes to days, watery stools, bronchoconstrictive attacks, paroxysmal hypotension, and edema. The diagnosis is typically made by measuring 24-hour urine 5-hydroxy-indole acetic acid (5HIAA), a

metabolite of serotonin.³

Between November 1999 and 2001, 198 patients underwent the gastric reduction-duodenal switch (GRDS) operation for the treatment of morbid obesity. Of these, 3 patients (1.5%) were found to have carcinoid tumor of the small bowel.

GRDS is a hybrid bariatric operation that encompasses both a restrictive and a limited absorption capability for a sustained weight loss. GRDS is our preferred bariatric operation because of its effectiveness and long-term success rate.⁴⁻⁸ The patients with carcinoid and their findings are presented.

Case Reports

Case 1

A 51-year-old African-American male, with BMI 43.2, without complaints of any symptoms of carcinoid, was scheduled to undergo GRDS. During the procedure, at the time of exploration, he was found to have multiple small (<1.0 cm) nodules in both lobes of the liver. Further exploration of the peritoneal cavity identified 6 small nodules in a 10-cm segment of the small bowel 150 cm proximal to the ileocecal valve. Subsequently, segmental small bowel resection, biopsy of the liver nodules and appendectomy were performed. The GRDS operation was postponed. The final pathology showed metastatic carcinoid. The patient's 24-hour urine 5-HIAA was <10 mg (normal 0-8 mg). CT of the abdomen, with and without IV contrast, did not identify any deep lesions in the liver and in fact failed to visualize any of the superficial lesions seen at the time of the laparotomy. The patient remained asymptomatic and GRDS was performed 6 months later. The decision to perform weight loss surgery on this patient with metastatic carcinoid

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was based on a lengthy discussion between the patient, the treating oncologist and the surgical team. The consensus was that the patient would succumb to the co-morbidities of his obesity (diabetes, hypertension, hypercholesterolemia, and sleep apnea) much earlier than the carcinoid syndrome would have occurred. To date, 1 year post-operatively, the patient remains asymptomatic. His BMI is 30.8, and he is cured of his diabetes, hypertension, hypercholesterolemia, and sleep apnea. His repeat 1-year 24-hour urine 5-HIAA was 11 mg (mildly elevated).

Case 2

A 39-years-old female with BMI 60.8 with no symptoms of carcinoid underwent GRDS. During the laparotomy, the total length of the small bowel from the ileocecal valve to the ligament of Trietz was 700 cm. Approximately 250 cm from the ileocecal valve a small nodule was noted. The GRDS operation was completed and included a limited resection of the small bowel, after exploration of the peritoneal cavity confirmed no evidence of metastasis. Pathology report confirmed the frozen section finding, revealing a single carcinoid nodule measuring 0.7 cm. The patient is 13 months post-operative, and asymptomatic from her incidental carcinoid tumor. She has been cured of her diabetes, sleep apnea (off continuous positive airway pressure), and hypertension.

Case 3

A 54-year-old female with BMI 53.6 underwent GRDS. During laparotomy, a nodule was found in the small bowel 200 cm proximal to the ileocecal valve. The patient's small bowel was measured to be 775 cm. Exploration of the peritoneal cavity identified no evidence of metastasis. The patient underwent a segmental resection of the small bowel and completion of the GRDS operation. She is 8 months postoperative, and her recovery and weight loss are on course as expected.

Discussion

Carcinoid tumors have been associated with various pathologic processes including, but not limited to, Cushing's syndrome, acromegaly, multiple endocrine neoplasia I, Zollinger-Ellison syndrome, and pernicious anemia. After performing GRDS on

a morbidly obese cohort, we have found an incidence of 1.5% versus 0.002% in the general population.¹ There have been no reported associations with morbid obesity.

Carcinoid tumor remains one of the most misdiagnosed and overlooked diseases in medicine because of its indolent course and low detectability rates. As in Case 1, CT scans have a low positive predictive value in detecting the primary and also metastases of carcinoid tumors. Because carcinoid tumors are highly vascularized, they appear isodense relative to the liver and make detection difficult.⁹ It has been recommended that CT scans be performed before and after administration of IV contrast material.¹⁰ Even utilizing this recommendation, many carcinoids are still undiagnosed. Therefore, CT scan is not a reliable preoperative screening tool for carcinoid of small bowel.¹¹

Our patient population comes from different geographical and socioeconomic backgrounds. The occurrence of carcinoid tumors and morbid obesity may have been fortuitous. Further reports may indicate a relationship between carcinoid and morbid obesity.

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