Gastric Cancer (2005) 8: 47–49
DOI 10.1007/s10120-004-0305-4

Case report

Metastatic signet ring cell gastric carcinoma presenting as an infrarenal aortic aneurysm

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Abstract
Metastases to liver, lungs, bone, and adrenal glands are common events in advanced gastric carcinoma. Occasionally, metastases to other parts of the body, such as the prostate gland [1] the gluteal muscle [2], or the cervix [3] are described. However, these are rare events in the natural history of the disease. We report an unusual case of a signet ring cell gastric carcinoma, initially presenting as an infrarenal aortic aneurysm. Following resection of the aneurysm, the spread of lymphangiosis carcinomatosa into the aortic wall and infiltration of signet ring cells into an adjacent lymph node were noted. The primary tumor, a signet ring cell gastric carcinoma, was detected by a subsequent esophago-gastro-duodenoscopy

Key words Signet ring cells · Gastric carcinoma · Metastasis · Aneurysm

Case report

A 74-year-old man was admitted with signs of subileus. His past medical history was unremarkable. He complained about progressive loss of appetite over the previous 3 weeks, accompanied by recurrent vomiting, starting 2 days prior to admission. According to the patient, the most recent bowel movement had occurred 3 days before admission. The physical examination was significant only for mild abdominal pain. A nasogastric tube was inserted, which produced approximately 1.5 l of gastric contents, with no signs of acute bleeding. Results of routine laboratory tests were unremarkable, except for elevated serum creatinine (1.3 mmol/l). Ultrasound examination revealed a large infrarenal aortic aneurysm and grade 1 urinary retention of the left kidney. The aortic aneurysm presented with an eccentric lumen and a large thrombotic mass. The size of the aneurysm was 10×11.4 cm. A magnetic resonance imaging (MRI) scan was performed, which confirmed the initial diagnosis (Fig. 1). The observed urinary retention of the left kidney could be attributed to compression of the ureter by the aneurysmatic tumor. In addition, the radiologist noted several slightly enlarged lymph nodes in the retropancreatic region. The patient underwent surgical resection of the aortic aneurysm. An aorto-iliac bypass (Y-prosthesis) was implanted. Acute renal failure occurred on postoperative day 2. The patient was treated with hemodialysis. In addition, the patient developed sepsis, which was effectively treated with antibiotics (cephalosporin and aminoglycosides). Despite the optimal treatment progressive weight loss was noted. On a postoperative computed tomography (CT) scan, a large retroperitoneal hematoma was detected. The initially described enlarged retropancreatic lymph nodes were seen more clearly, and additional lymph nodes were noted in the projection of the lesser gastric curvature, close to the upper pole of the left kidney, and in the paraaortic region.

Review of the resected section of the aorta revealed lymphangiosis carcinomatosa and infiltration of signet ring cells into an adjacent lymph node. In addition, atherosclerotic deposits were detected in the resected sections (Fig. 2A). This supported an assumption that the aneurysm had developed beforehand and had been infiltrated secondarily by gastric tumor cells. This secondary infiltration may have been responsible for the marked modifications of the aortic wall, which in turn, resulted in the formation of a very large aneurysm.

The primary tumor, a signet ring cell gastric carcinoma was detected by subsequent esophago-gastro-duodenoscopy (Fig. 3 shows a biopsy specimen). Due to the deteriorating condition of the patient, neither another open surgical intervention nor regional or systemic chemotherapy was attempted. A percutaneous endoscopic gastrostomy was performed, and the patient

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Received: June 18, 2004 / Accepted: September 21, 2004

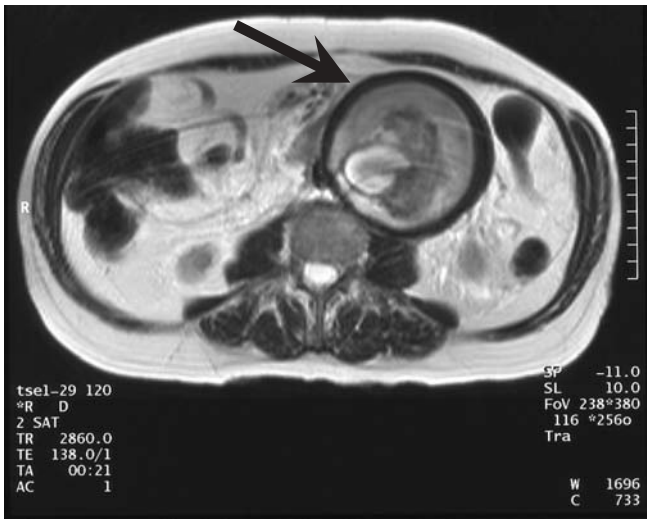

Fig. 1. Magnetic resonance imaging (MRI) scan of the abdomen shows an abdominal aortic aneurysm (*arrow*), partly thrombosed, 11.4 cm in diameter

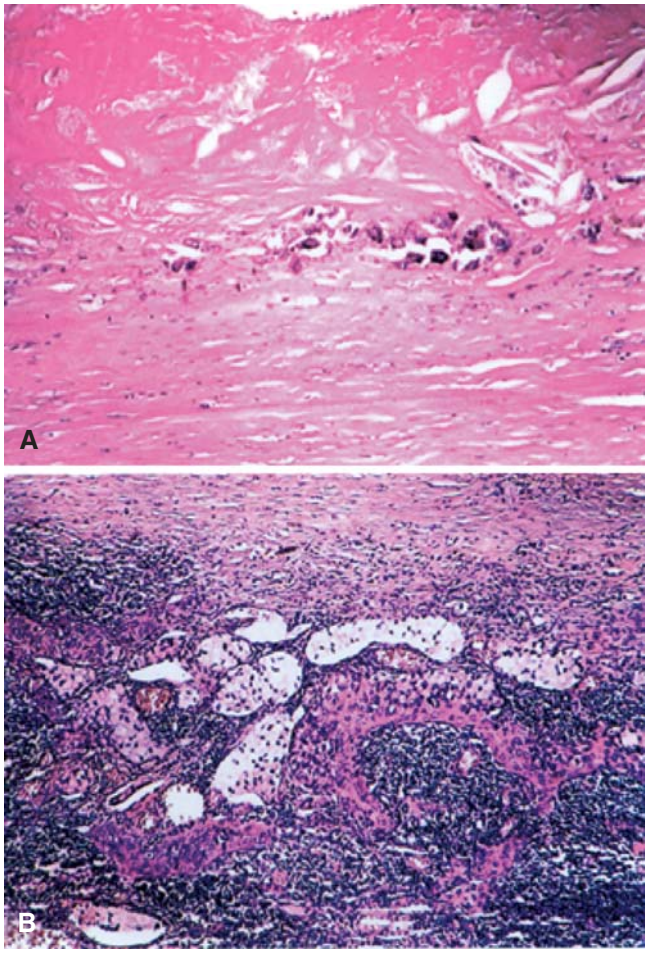

Fig. 2A,B. Section of the resected aneurysm. **A** The aortic wall with atherosclerotic plaques on its luminal side and **B** infiltrating cells of a signet ring cell carcinoma in the adventitia. **B** H&E, ×100

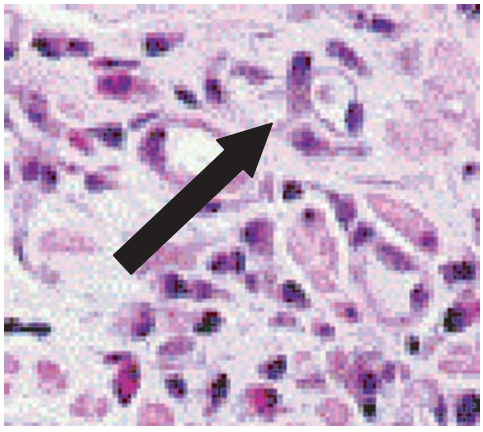

Fig. 3. Biopsy specimen of gastric ulcer with infiltrating cells (*arrow*) of a signet ring cell carcinoma. H&E, ×400

was transferred to a geriatric ward. Unfortunately, the patient died 6 weeks thereafter, due to tumor-related cachexia.

Discussion

Metastases to liver, lungs, bone, and adrenal glands are common events in advanced gastric carcinoma. Occasionally, metastases to other organs, such as the prostate gland [1], the gluteal muscle [2], or the cervix [3] are described. To our knowledge, this is the first report of the lymphogenic metastasis of a signet ring cell gastric carcinoma to an aortic aneurysm. The histopathological diagnosis of signet ring cell carcinoma relies on morphological parameters [4]. Signet ring cell histology is found in 3% to 39% of gastric cancer cases and has been reported to be a feature of poor prognosis in advanced gastric cancers [5]; however, in a recent large series, these findings could not be confirmed [6]. In the patient reported here, infiltration of tumor cells into the aortic wall was noted. The microscopic picture was described by the pathologist as "lymphangiosis carcinomatosa". Histopathological analysis of the surgical specimen did not reveal continuous infiltration from the site of the primary tumor. In addition, neither peritoneal carcinosis nor any other organ involvement could be detected intraoperatively. Thus, in this patient, lymphogenic metastasis seemed to have occurred. A review of the literature revealed several reports of unusual sites of gastric carcinoma metastasis, such as the bulbar conjunctiva [7], intramuscular metastasis [2], metastasis to an inguinal hernia [8], and metastasis to various other sites [9–11]. In 1967, the simultaneous occurrence of an aortic aneurysm and a gastrointestinal malignancy was first reported in the literature [12]. In the present patient, the aortic aneurysm was resected, because its diameter

exceeded the threshold of a 5.5-cm diameter, above which elective surgery is generally recommended [13,14]. However, had the presence of a gastric carcinoma been known beforehand, careful assessment of the optimal timing for a subsequent surgical intervention would have been performed. Several studies addressing this particular problem have been reported [15–17]. The overall goal is to prevent tumor cell seeding and contamination of the prosthesis. In most patients, the event with the greater life-threatening potential, i.e., the aneurysm, will be addressed first [15]. In patients with known colorectal cancer and an abdominal aortic aneurysm of 5.5 cm or more, treating the colorectal cancer first may result in life-threatening rupture of the aneurysm. On the other hand, primary treatment of the abdominal aortic aneurysm may significantly delay the treatment of colorectal cancer. According to Baxter et al. [16], concomitant treatment presents a safe alternative. If anatomically suitable, the abdominal aortic aneurysm may be considered for endovascular repair, followed by a staged colon resection. The presence of an abdominal aortic aneurysm of less than 5.5 cm does not affect colorectal cancer treatment. However, in the present patient, the primary tumor was not yet detected at the time of the initial surgery. Furthermore, the primary tumor might have been unrecognized until further progression. The slightly enlarged lymph nodes detected by the initial MRI scan certainly could have given rise to further diagnostic procedures at that time. However, the observed enlargement was only very moderate and no further signs or symptoms of a malignant disease were present. Thus, no additional diagnostics (such as CT scans with i.v. and oral contrast) were performed. Such scans would most likely have confirmed the diagnosis of concomitant aortic aneurysm and gastric cancer prior to surgery. However, in the present patient, the treatment sequence, i.e., resection of the aneurysm followed by adequate intervention for the gastric cancer, would have been pursued anyway, because the aneurysm was potentially life-threatening.

We have presented a rare case of a gastric malignancy metastasizing into an aortic aneurysm. Clinicians should be aware of this unusual circumstance, because it may have an impact on therapy.

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