Upsal J Med Sci 83: 115–118, 1978

Solitary Calcaneal Metastasis as the First Sign of Gastric Cancer

A Case Report

D. BERGQVIST and J. MATTSSON

From the Department of Surgery, Kärnsjukhuset, Skövde, Sweden

ABSTRACT

A case of gastric adenocarcinoma is reported where the first symptom was a solitary calcaneal metastasis. The metastatic symptoms occurred in previously fractured bone, one year before the onset of gastric symptoms. This history is rare and the eight cases found in the literature where gastric cancer has started with solitary bone metastasis are reviewed.

INTRODUCTION

Gastric carcinoma is associated with a high frequency of distant metastases at diagnosis (12). The real frequency of skeletal metastases is lower and is in fact not known. It depends on the method and the time of diagnosis. Donn (11) reports 17.5% skeletal metastases in a necropsy series, whereas other authors state that the figure is less than 6 (13).

From the clinician's point of view solitary bone metastasis is extremely rare as the debut sign of gastric cancer, and only eight cases are previously reported in the literature.

Therefore, we found it of interest to report on a patient where the first sign of the disease was solitary calcaneal metastasis.

CASE REPORT

A male, aged 76 years, had appendicitis in 1931 and was treated for hypertension and slight heart incompensation for a few years. In 1971, he fractured the left calcaneal bone (Fig. 1). In December 1974, he had pain in his left foot; at plain X-ray it was primarily interpreted as osteitis, but later a malignant tumour was suspected (Fig. 2). A biopsy (May 1975) showed metastasis from a visceral adenocarcinoma (kidney, thyreoid, or gastrointestinal tract). Therefore investigations were begun to localize the primary tumour. All laboratory investigations proved normal (Haemoglobin 124 g/l, White cells 6.9×10^9/l, SR 22 mm, Bilirubin 7 μmol/l, Alkaline phosphatase 5.8 μkat/l, Alanine-aminotransferase 0.82 μkat/l, Acid phosphatase total 10.7 μU/l, Acid phosphatase Tartrate inhibited 0.8 μUl, serum electrophoresis showed a transferrin band but was otherwise normal, weight 78 kg, length 168 cm). X-rays (lungs, urography, colon, stomach (a small diaphragmatic hernia), angiographies of coeliac, and superior mesenteric and renal arteries) were normal. Scintigrams of liver and thyroid were normal. A skeletal scintigram showed increased uptake only in the left foot, where the metastasis was located. Because of very severe pain in the foot, a left below-knee amputation was made in June 1975. Microscopy showed a largely necrotic metastasis of adenocarcinoma. For another half-year, the patient was free of any symptoms, and a prosthesis enabled him to live quite normally. In December 1975, however, he became tired and developed dysponea. A lung X-ray showed a left-sided bronchopneumonia. This was treated, but he developed anorexia, vomiting, tiredness, anaemia and a palpable liver. A gastric X-ray now showed an infiltration near the cardia. This was verified by gastroscopy, which showed a gastric adenocarcinoma of medium-high differentiation. He deteriorated rapidly, with a growing liver. A scintigraphic investigation showed the liver to be occupied by metastases. A skeletal scintigram also showed metastases in the columna. Ascites, haematemesis, and melaena were conclusive signs, and he died of a circulatory collapse. Autopsy showed advanced gastric carcinoma, with metastases in lymph nodes, liver, and lungs. No other primary malignancy was found.

DISCUSSION

The prognosis of gastric carcinoma is still bad, although earlier gastroscopic diagnosis and more radical surgery appear to give better results. In large materials the five-year survival rate for radically operated patients is still about 20% (6, 17, 20, 23). The possibility of cure is mostly influenced by the presence or otherwise of metastases. Gastric carcinoma can give metastases to any tissue, the most common site being local lymph nodes (18, 21). Other factors of prognostic significance are histological grading, type of growth, extension, and localization in the stomach (17). The age of the

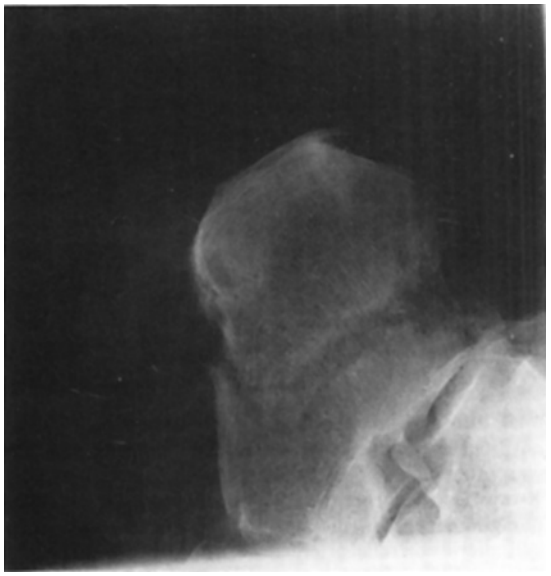

Fig. 1. Lateral radiograph of the calcaneal fracture (1971).

tumour is also important, although LaDue et al. (15) and Lawrence et al. (17) state that the duration of symptoms bears no relation to the resectability. However, Mori & Mori (19) have published a case where an intracranial metastasis was resected, the patient later being radically operated on for the primary tumour, a gastric carcinoma, but they do not give the follow-up time.

Skeletal metastases of gastric carcinoma are not common. Frequencies between 0 and 22% are given, though the usual figure is less than 6% (3, 11, 13). The reported incidence depends on the diagnostic procedure. In a recent autopsy material from Sweden it is 8.8% (2). The frequency of bony metastases at diagnosis of the primary tumour is unknown. It seems to be higher in the relatively young patient (13, 16). The most common localization of bony metastases, from gastric carcinoma, are bones with red marrow (13). Solitary bone metastasis as the first sign of a gastric carcinoma is very rare but interesting and important from the clinician's point of view. There are only a few earlier reports, ours being the ninth (Table I). The case reported by Birla & Bowden (4), however, rather seems to be a pancreatic cancer, judged from the findings during operation and the histological examination. As the table shows, the information on the other cases is very sparse, most of them being published some time ago and none of them being radically operated.

It is interesting that the first clinically overt metastasis in our patient was localized in calcaneus, where 3 years earlier he had a fracture. According to Cole (7, 8), traumatized tissue has lower resistance to cancer cells than normal tissue. "Trauma encourages the 'take' of cancer cells" (6, 7).

The negative X-ray of the stomach was judged to

Fig. 2. Lateral and frontal radiographs of the metastasis in calcaneus (1974).

Table I. *Summary of reported cases of solitary metastasis to bone as debut sign of gastric carcinoma*

Author	Age	Sex	Bone	Debut to death (months)	Time from debut of metast. to GI sympt. (months)
Tilling (22)			humerus	?	?
Konjentzny (14)	old	F	os calcis	?	?
	old	M	humerus	?	?
Barclay (1)	34	M	clavicle	1	?
Bertin (3)	70	F	tibia	?	?
Bockus (5)	30	M	vert. L_4	?	?
Debernardi et al. (10)	55	M	mandible	?	?
Birla & Bowden (4)	59	F	os pubis	13	7
Own case	76	M	os calcis	14	12

be certain, thus solitary skeletal metastasis, as the first sign of gastric cancer, was not considered; therefore gastroscopy was not thought to be indicated in our patient. There were no other signs of metastases and the patient was free from symptoms for half a year after the amputation, when his gastric carcinoma had grown to such an extent that local symptoms were found. One year elapsed between calcaneal and gastric symptoms. By then, there was a picture of advanced and incurable malignancy.

Skeletal metastases as the debut of a malignant disease is a relatively common clinical problem. Although this means incurability, a correct diagnosis of the primary tumour is important when planning palliative treatment. In rare instances gastric carcinoma can debut as a solitary osseous metastasis, and the primary tumour can be slight; therefore X-ray pictures of the stomach are insufficient. In the investigation of this category of patients, gastroscopy must be an early diagnostic procedure.

REFERENCES

1. Barclay, I. B.: Two unusual gastrointestinal cases. Br J Radiol *13:* 273, 1940.
2. Berge, T. & Lundberg, S.: Cancer in Malmö 1958–1969. An autopsy study. Acta Pathol Microbiol Scand Sect. A. Suppl. *260,* 1977.
3. Bertin, E. J.: Metastasis bone as the first symptom of cancer of gastrointestinal tract: Report of three cases. Am J Roentgenol Radium Ther Nucl Med *51:* 614, 1944.
4. Birla, R. K. & Bowden, L.: Solitary bony metastasis as the first sign of malignant gastric tumor or of its recurrence. Ann Surg *182:* 45, 1975.
5. Bockus, H. L.: Gastroenterology, Volume 1, 2nd ed. W. R. Saunders Co., Philadelphia and London, 1963.
6. Casell, P. & Robinson, J. O.: Cancer of stomach: a review of 854 patients. Br J Surg *63:* 603, 1976.
7. Cole, W. H., McDonald, G. O., Roberts, S. & Southwick, H. W.: Dissemination of cancer—Prevention and therapy. Appleton-Century-Crofts Inc., New York, 1961.
8. Cole, W. H.: The mechanism of spread of cancer. Surg Gyn Obstet *137:* 853, 1973.
9. Copeland, M. M.: Skeletal metastases arising from carcinoma and from sarcoma. Arch Surg *23:* 581, 1931.
10. Debernardi, G., Roccia, L. & Guasta, G.: A case of precocious mandibular metastasis from initially silent gastric adenocarcinoma. Minerva Stomatol *17:* 679, 1968.
11. Donn, F. & McNeer, G.: Metastases of gastric cancer to other organs. *In* Neoplasms of the Stomach (ed. G. McNeer & G. T. Pack). Pitman Medical Publ. Co., London and Philadelphia, 1967.
12. Guiss, L. W.: Pathology of gastric neoplasms. *In* Neoplasma of the Stomach (ed. G. McNeer & G. T. Pack). Pitman Medical Publ. Co., London and
13. Kerr, D. H. & Berger, R. A.: Bone metastasis in carcinoma of the stomach. Am J Cancer *25:* 518, 1935.
14. Konjentzny, G. E.: Der Magenkrebs. Ferdinand Enke Verlag, Stuttgart, 1938.
15. LaDue, J. S., Murison, P. J., McNeer, G. & Pack, G. T.: Symptomatology and diagnosis of gastric cancer. Arch Surg *60:* 305, 1950.
16. LaDue, J. S.: The clinical diagnosis of gastric cancer. *In* Neoplasms of the Stomach (ed. G. McNeer & G. T. Pack). Pitman Medical Publ. Co., London & Philadelphia, 1967.
17. Lawrence, W., McNeer, G., Pack, G. T., Paglia, M. A. & Ashley, M. P.: End result and prognosis. *In* Neoplasms of the Stomach (ed. G. McNeer & G. T. Pack). Pitman Medical Publ. Co., London & Philadelphia, 1967.
18. Maingot, R.: Abdominal Operations. Appleton-Century-Crofts, New York, 1974.
19. Mori, K. & Mori, M.: A solitary intracerebral metastasis of gastric cancer: Report of a case. Brain and Nerve *24:* 615, 1972.
20. Sedgwick, C. E.: Prognosis of carcinoma of the

stomach. *In* Abdominal Operations (ed. R. Maingot). Appleton-Century-Crofts, New York, 1974.
21. Sunderland, D. A.: The lymphatic spread of gastric cancer. *In* Neoplasms of the Stomach (ed. G McNeer & G. T. Pack). Pitman Medical Publ. Co., London & Philadelphia, 1967.
22. Tillin. 1908, Quoted by Martin *in:* Modern Medicine, Its Theory and Practice (ed. William Osler). Lea Brothers & Company, Philadelphia.
23. Öhman, U.: Comment on: Prognosis of Carcinoma of the Stomach could be better. Läkartidningen *73:* 2539, 1976.

Received November 19, 1977

Address for reprints:

David Bergqvist, M. D.
Department of Surgery
Kärnsjukhuset
S-540 01 Skövde
Sweden