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Letter to Editor

Pathology Section

Rectal Adenocarcinoma with Heterotopic Ossification in Metastatic Lymph Nodes: An Unusual Case

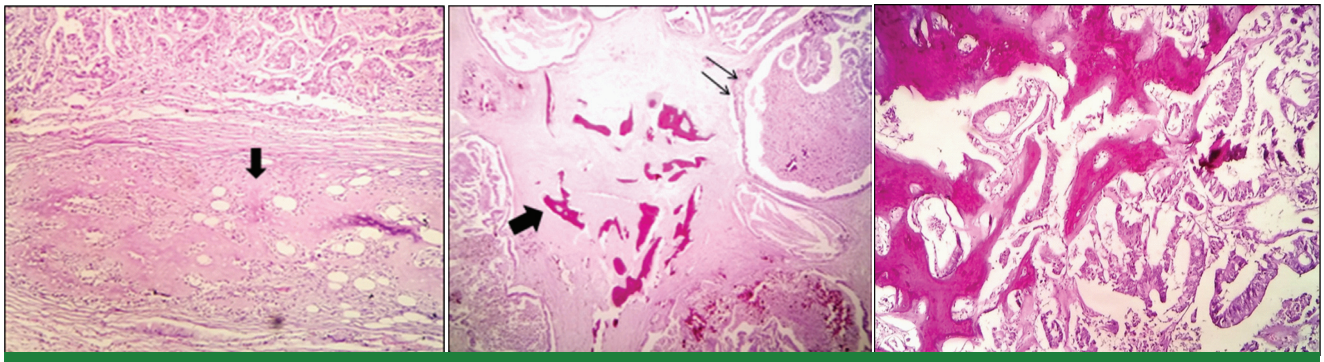
MALINI GOSWAMI

Sir,

A 78-year-old male presented with chronic constipation and bleeding per rectum since 5 months. Clinical examination revealed pallor, abdominal distension and a mass per rectum. Colonoscopy revealed a growth at 10-12 cm from anal verge. CECT revealed circumferential thickening of recto-sigmoid colon with intramural polypoidal component with lymphadenopathy and mesenteric as well as liver deposits. Anterior resection was done and sent for histopathologic examination. Gross examination revealed a large fungating tumour in the rectum and sigmoid colon measuring 8 x 8 x 1.9 cm, grey white, solid in appearance and firm in consistency. Microscopic examination revealed moderately differentiated adenocarcinoma infiltrating the perirectal fat with 11 out of 22 lymph nodes showing metastasis. Three of the lymph nodes exhibited extensive foci of well-formed mature bony trabeculae rimmed by osteoblasts admixed with the glandular elements [Table/Fig-1-3]. These foci were seen adjacent to areas of tumour necrosis and calcification. A diagnosis of adenocarcinoma with heterotopic ossification was rendered excluding other differential diagnosis like metaplastic carcinoma on the basis of the fact that the bony component was non neoplastic. The management of the patient was no different from usual Stage III adenocarcinoma; the patient received adjuvant chemotherapy after surgery.

Heterotopic ossification, also known as osseous metaplasia, is a rare phenomenon happening in both benign and malignant tumours of various organs including those of the lung, breast, thyroid, parotid and pancreas [1]. Ossification may be observed throughout the gastrointestinal tract and has been described in benign colonic polyps, mucocele of the appendix, gastric carcinoid and adenocarcinoma [2]. Dukes reported that the incidence of ossification of rectal cancer is less than 0.4% [3]. The earliest documented cases were in 1923 by Hasegawa who first described two cases of rectal adenocarcinoma with bone formation [2]. There are less than 20 reported cases of heterotopic bone formation in rectal carcinoma and only one case apart from this case showing bone in the metastatic lymphnode [3].

The most common histologic type associated with such a phenomenon, unlike this case, is mucinous adenocarcinoma, with the heterotopic bone consisting of osteoblasts rimming irregularly deposited osteoid [2]. Many theories to explain the pathogenesis of bone formation have been described. The most commonly accepted postulation for the cell of origin for osseous metaplasia in colonic adenocarcinoma was the one suggested by Rhone and Horowitz who hypothesized that ossification might be a consequence of metaplastic pluripotent mesenchymal cells. The Bone Morphogenetic Proteins (BMPs) are a family of bioactive proteins, of which 20 diverse types have been cloned [2]. The immunohistochemical expression of BMPs in colonic adenocarcinoma was studied by Imai et al. They observed that BMP-5 and BMP- 6 were perceptible in the cytoplasm of



[Table/Fig-1]: Mature bone formation (arrow) adjacent to adenocarcinoma,H&E,100X. **[Table/Fig-2]:** Central areas (single arrow) shows mature bone and peripheral areas (two arrows) show cribriform glands with central areas of necrosis, H&E,100X. **[Table/Fig-3]:** Mature calcified bony trabeculae admixed with well-formed glands of adenocarcinoma, H&E,400X.

tumour cells, but were weakly expressed in the osteoblast-like cells adjacent to the nearby bone. The surrounding mesenchymal cells intensely expressed BMP-2 and BMP-4 while tumour cells and osteoblast-like cells faintly expressed these proteins. This pattern suggests that the tumour cells chiefly produce BMP-5 and BMP-6 and they may induce proliferation of surrounding mesenchymal cells into preosteoblasts and osteoblasts expressing BMP-2 and BMP-4. In comparison to other BMPs, BMP-2 and BMP-4 are powerful inducers of osteoblastic differentiation [4].

In conclusion, osseous metaplasia in rectal carcinoma has no prognostic significance, but a consciousness of the phenomenon is vital to prevent the overdiagnosis of bone invasion by carcinoma or misdiagnosis of metaplastic carcinoma.

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AUTHOR(S):
1. Dr. Malini Goswami

PARTICULARS OF CONTRIBUTORS:
1. Senior Resident, Department of Oncology (Oncopathology), Yenepoya Medical College, Mangalore, Karnataka, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Dr. Malini Goswami,
Senior Resident, Department of Oncology (Oncopathology), Yenepoya Medical College, Mangalore-575018, Karnataka, India.
E-mail: malinig87@gmail.com

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