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Colonic Adenocarcinoma with Osseous Metaplasia: A Case Report

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Abstract

Heterotopic ossification is an uncommon finding characterized by formation of mature bone elements in the stroma of the benign and malignant tumours. Here, we report a case of heterotopic ossification in adenocarcinoma in the ascending colon.

Keywords: Heterotopic ossification; Osseous metaplasia; Adenocarcinoma; Gastrointestinal tract; Colon; Right hemicolectomy; Benign colonic polyps; Gastric carcinoid; Adenocarcinoma

Introduction

Heterotopic ossification is an infrequent phenomenon in the gastrointestinal tract but has occurred in both benign and malignant tumours [1,2]. The majority of ossification is reported in gastrointestinal tumours of the lower gastrointestinal tract, of which most affected tumours are well or moderately differentiated carcinoma [3]. The overall incidence of heterotopic ossification is 0.4%4. Thus, very little is known about the phenomenon.

Case Report

A 59-year-old female presented with bleeding per-rectum, acute onset abdominal pain for five days. Endoscopy performed showed a mass in the ascending colon, right hemicolectomy was done. On gross examination, the specimen was 33.0 cm in length, ascending colon showed an ulcero-proliferative mass measuring 4.0x 4.0x 3.0 cm. Cut surface of the lesion is grey tan, friable and gritty to cut. Microscopic examination showed a tumor in the ascending colon arranged in a complex glandular and focal cribriform pattern, exhibiting moderate nuclear anaplasia. The surrounding stroma shows fibrous areas and mature bony trabeculae of varying thickness rimmed by bland looking osteoblasts were seen. Histopathological diagnosis of moderately differentiated adenocarcinoma with Osseous metaplasia was made. Twenty lymph nodes resected from the specimen were free of Tumour. Proximal, distal and serosal margins are free of tumour. Microsatellite stability testing performed showed retention of nuclear expression in MLH1, MSH2, MSH6 and PMS2. Thus, MMR by Immunohistochemistry showed proficient status (Figure 1 & 2).

Discussion

Osseous metaplasia can occur anywhere in the gastrointestinal tract, it was reported in benign colonic polyps, gastric carcinoid, adenocarcinoma and mucocele of the appendix [5,6]. Osseous metaplasia in the gastrointestinal tract was first described by Dukes in 19394 in English literature. In 1923, Hasegawa first described two cases of rectal adenocarcinoma with bone formation [7].

Osseous metaplasia has been reported in malignancies of other organs such as breast, thyroid, lung parotid, and pancreas. Though osseous metaplasia is commonly associated with slow-growing neoplasms in younger individuals [8]. The course and prognosis of adenocarcinoma with osseous metaplasia is same as colonic adenocarcinoma without osseous metaplasia.

Pathogenesis is unclear and hypothesized to involve bone morphogenic proteins. The accepted hypothesis for the cell of origin for osseous metaplasia in colonic adenocarcinoma was proposed by Rhone and Horowitz [9]. They postulated that ossification might result from metaplasia of pluripotent mesenchymal cells into osteoblasts. The bone morphogenetic proteins (BMPs) are a family of bioactive proteins. Imai et al studied the immunohistochemical expression of BMPs in colonic adenocarcinoma and found that BMP-5 and BMP6 were prominent

in the cytoplasm of tumor cells, but were weakly expressed in the osteoblast-like cells adjacent to the nearby bone. This pattern of staining suggests that the tumour cells produce BMP-5 and BMP-6, which causes proliferation of mesenchymal cells into preosteoblasts and osteoblasts expressing BMP-2 and BMP-4.7

Figure 1: Gross – Shows a portion of right hemicolectomy specimen with ascending colon mass.

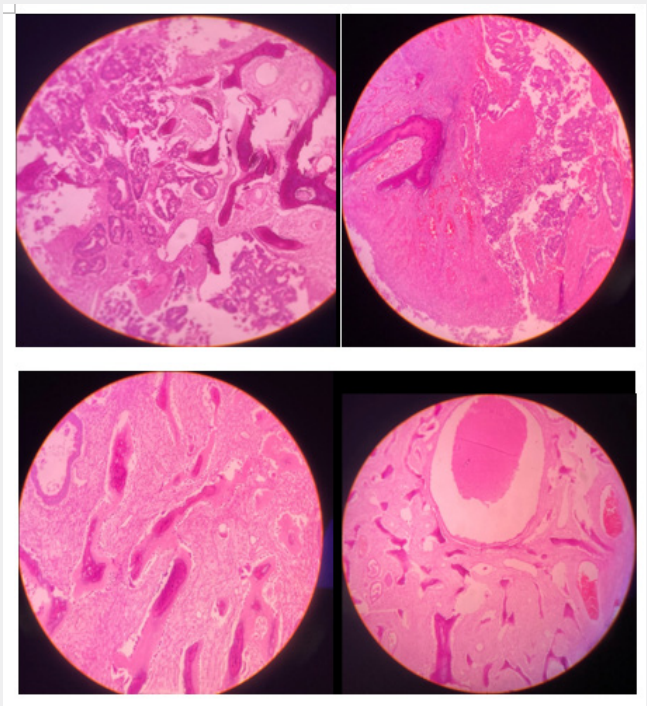

Figure 2(a-d): Microscopy: Sections shows fragments of moderately differentiated adenocarcinoma with stroma displaying benign mature bony trabeculae.

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In the Gastro-intestinal tract, osseous metaplasia has been reported in carcinomas of colon, caecum and rectum. Colonic involvement seems to be rarer as compared to rectum as per reported cases [5].

In the differential diagnosis, the osteoid stromal response needs to be differentiated from true sarcomatous differentiation that is characterised by aggressive course and poor prognosis. The carcinosarcomas are tumours with both carcinomatous and sarcomatous differentiation. The osseous metaplasia presents with benign bone formation. Sarcomatous differentiation exhibit features of osteosarcomatous, chondrosarcomatous or liposarcomatous differentiation. Whenever mature bone fragments are found in the malignant tumours, bony invasion by the adjacent tumour should be excluded by means of clinico-radiological correlation before diagnosing it as osseous metaplasia [10].

Conclusion

Awareness of osseous metaplasia is important to avoid diagnostic confusion with carcinosarcoma and local bone invasions that have different treatment and prognosis.

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