

Osseous Metaplasia in a Rectal Inflammatory Polyp in an Adolescent Patient: A Case Report and Review of the Literature

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ABSTRACT

Osseous metaplasia/heterotopic bone formation is a well-known phenomenon encountered in various neoplastic and non-neoplastic conditions. Osseous metaplasia in colorectal polyps is extremely rare. We report a case of osseous metaplasia in a rectal inflammatory polyp in a 17-year-old man with a longstanding history of painless rectal bleeding. The patient was referred to our facility for evaluation of a four-month history of painless rectal bleeding, as well as rectal prolapse and episodes of fecal urgency. A total colonoscopy revealed an approximately 1.0 cm tan-red sessile and pedunculated polyp in the rectum. No other abnormalities were identified in the colon. The polyp was removed via snare polypectomy. On gross examination, the polyp measured 1.2 x 1.1 x 0.8 cm and was quadrisectioned and submitted entirely for histologic examination. Sections of the polyp showed fragments of denuded polypoid colonic mucosa with inflammatory granulation tissue formation and overlying purulent debris. The inflammatory granulation tissue was composed of abundant dilated small blood vessels, a marked mixed acute and chronic inflammatory infiltrate, and active fibroblast proliferation. At the junction of the intact colonic mucosa and the adjacent inflammatory granulation tissue, multiple foci of woven bone formation without bone marrow were identified. Osseous metaplasia most likely occurs by osteoblasts differentiating from fibroblasts secondary to inflammation, tissue damage, or substances such as bone morphogenetic proteins released from neoplastic cells. Osseous metaplasia could also be caused by dystrophic calcification in necrotic tissue. To our knowledge, this is the eighth reported case of osseous metaplasia in a rectal inflammatory polyp.

Keywords: *Osseous metaplasia, Inflammatory polyp, Rectum, Adolescent*

Introduction

Osseous metaplasia in mucosal polyps, although rare, is a phenomenon that has been reported in the various organs such as nasopharynx, endocervix among others (Jacono *et al.*, 2001; Alsaqobi and Al-Brahim, 2018). Osseous metaplasia in benign colorectal polyps is very rare, with only 21 previous cases (Amir *et al.*, 2019). Inflammatory rectal polyps comprise seven of these cases (Amir *et al.*, 2019; Oono *et al.*, 2010; Zemheri *et al.*, 2015; Odum *et al.*, 2012; Sperling and Friedman, 1981; Castelli and Roberts, 1992). We report a case of osseous metaplasia in a rectal inflammatory polyp of a 17-year-old man with

abdominal pain and painless rectal bleeding.

Case Report

Our patient was a 17-year-old man with a longstanding history of abdominal pain and painless rectal bleeding. He described heavy bleeding with every bowel movement and rectal prolapse during defecation, with exfoliation of the prolapsed mucosa on one occasion. He also experienced severe flatus with emesis if he tried to resist, episodes of fecal urgency, and intermittent episodes of nausea and vomiting. Medications consisted of only one Claritin 10 mg tablet per os each day. The patient was referred to our facility for evaluation of a four-month history of painless rectal bleeding, as well as rectal prolapse and episodes of fecal urgency. Physical examination revealed a soft, nontender, nondistended abdomen with no masses nor hepatosplenomegaly and normal bowel sounds. Laboratory studies showed no significant abnormalities, including a normal erythrocyte sedimentation rate (ESR) and c-reactive protein level (CRP).

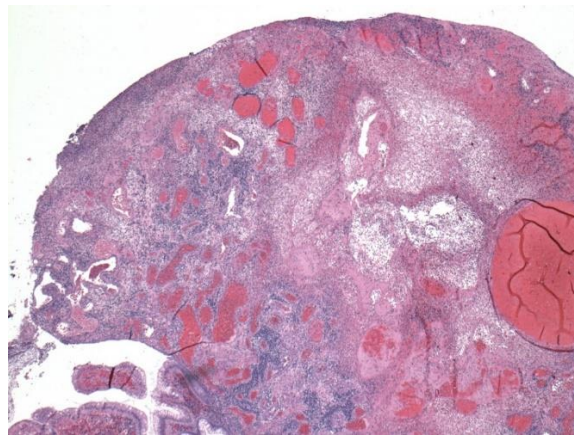


Figure 1: (HE, x 20) Rectal polyp composed of non-neoplastic columnar mucosa with inflammatory granulation tissue formation.

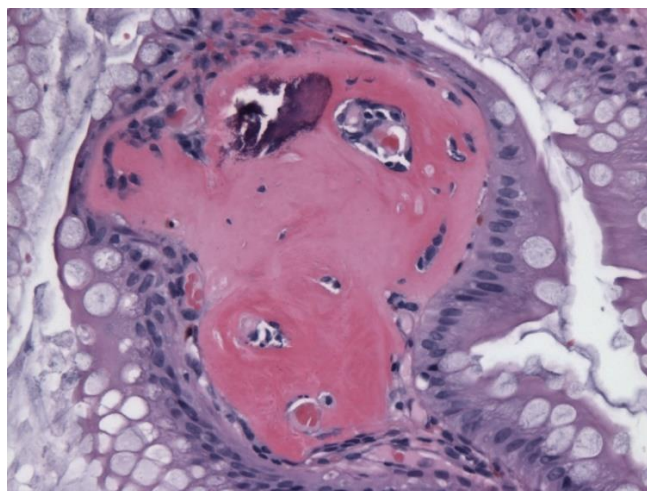


Figure 2: (HE, x 200) Osseous metaplasia.

A total colonoscopy revealed an approximately 1.0 cm tan-red sessile and pedunculated polyp in the rectum. The polyp was removed via snare electrocoagulation. No other abnormalities were identified in the colon. A random colon biopsy was also obtained. On gross examination, the polyp measured 1.2 x 1.1 x 0.8 cm and was quadrisectioned and submitted entirely for histologic examination. Sections of the polyp showed fragments of denuded polypoid colonic mucosa with inflammatory granulation tissue formation and overlying purulent debris (Fig. 1). The inflammatory granulation tissue was composed of abundant dilated small blood vessels, a marked mixed acute and chronic inflammatory infiltrate, and active fibroblast proliferation. At the junction of the intact colonic mucosa and the adjacent inflammatory granulation tissue, multiple foci of woven bone formation without bone marrow were identified (Fig. 2). Sections of the random colon biopsy showed no significant histopathologic changes.

Discussion

Osseous metaplasia/heterotopic bone formation is a well-known phenomenon encountered in various neoplastic and non-neoplastic conditions. However, osseous metaplasia/heterotopic bone formation in colorectal inflammatory polyps is extremely rare with seven previous case reports (Amir *et al.*, 2019; Oono *et al.*, 2010; Zemheri *et al.*, 2015; Odum *et al.*, 2012; Sperling and Friedman, 1981; Castelli and Roberts, 1992). Patients with inflammatory colorectal polyps containing osseous metaplasia/heterotopic bone formation exhibit similar clinicopathologic characteristics (Amir *et al.*, 2019; Oono *et al.*, 2010; Zemheri *et al.*, 2015; Odum *et al.*, 2012; Sperling and Friedman, 1981; Castelli and Roberts, 1992). Rectal bleeding is the most common presenting symptom. Inflammatory polyps with osseous metaplasia/heterotopic bone formation have been reported solely in the rectum (Amir *et al.*, 2019; Oono *et al.*, 2010; Zemheri *et al.*, 2015; Odum *et al.*, 2012; Sperling and Friedman, 1981; Castelli and Roberts, 1992). The most commonly affected patients are younger males, with a male: female ratio of 6:1 and patient age ranges of 9 to 39-years-old with one elderly patient of 74 years of age. The size of the polyps ranges from 8 to 12 mm with one large polyp measuring 95 mm. Given the close similarities between these reported cases, inflammatory polyps with osseous metaplasia/heterotopic bone formation should be designated as a sovereign diagnostic entity.

The pathophysiology of osseous metaplasia is unknown; however, multiple theories have been formulated. Recent theory postulates that osseous metaplasia most likely occurs by osteoblasts differentiating from fibroblasts secondary to inflammation, tissue damage, or substances such as bone morphogenetic proteins (BMPs) (Jacono *et al.*, 2001). BMPs and transforming growth factor β -1 (TGF β -1) have also been shown to be involved in ectopic bone formation (Jacono *et al.*, 2001). Most BMPs are members of the TGF β superfamily and play an integral role in the formation of new bone. Studies have shown that non-osteogenic mesenchymal cells, such as extramedullary fat and myoblasts, may undergo

osteogenic differentiation in the presence of BMP-2 (Jacono *et al.*, 2001). Others have postulated that repeated trauma could induce osseous metaplasia, which could be pertinent to our patient who endured recurrent rectal prolapse on defecation (Alsaqobi and Al-Brahim, 2018).

In summary, we have reported a case of osseous metaplasia/heterotopic bone formation in a rectal inflammatory polyp in a 17-year-old man with a longstanding history of painless rectal bleeding. Most of the reported cases of rectal inflammatory polyp with osseous metaplasia/heterotopic bone formation have been seen in young males, suggestive of a distinctive disease entity.

References

Alsaqobi A and Al-Brahim N. Osseous metaplasia of the cervix: A rare transformation can mimic a tumor – Literature review. *Case Rep Path* 2018.

Amir AA, Nouli KA, Sheikh SS. Benign prolapsing inflammatory rectal polyp with osseous metaplasia mimicking rhabdomyosarcoma botryioides. *J Ped Surg Case Rep* 2019.

Castelli MF and Roberts J. Ossification in a benign rectal polyp. *Am J Gastroenterol* 1992; 87: 543-544.

Jacono AA, Sclafani AP, Van TD, McCormick S, Frenz D. Metaplastic bone formation in nasal polyps with histologic presence of transforming growth factor β -1 (TGF β -1) and bone morphogenetic proteins (BMPs). *Otolaryngol Head Neck Surg* 2001; 125: 96-97.

Odum, BR, Bechtold ML, Diaz-Arias A. Osseous metaplasia in an inflammatory polyp of the rectum: A case report and review of the literature. *Gastroenterology Res* 2012; 5: 74-78.

Oono Y, Fu KL, Nakamura H, Iriguchi Y, Oda J, Mizutani M, Yamamura A, Kishi D. Bone formation in a rectal inflammatory polyp. *World J Gastrointest Endosc* 2010; 2: 104-106.

Sperling MH and Friedman CJ. Osseous metaplasia in a benign colon polyp. *Gastrointest Endosc* 1981; 27: 198-199.

Zemheri E, Toprak M, Engin Zerk P, Ozkanli S, Mutus M. Inflammatory rectal polyp with osseous metaplasia. *Med Med J* 2015; 30: 143-146.