Clinical Imaging 39 (2015) 321–324

Contents lists available at ScienceDirect

Clinical Imaging

journal homepage: http://www.clinicalimaging.org

A rare presentation and diagnosis of juvenile polyposis syndrome and hereditary hemorrhagic telangiectasia overlap syndrome

Henry C. Lin [a,*], Kristin N. Fiorino [a], Carly Blick [b], Sudha A. Anupindi [c]

[a] Division of Gastroenterology, Hepatology, and Nutrition, The Children's Hospital of Philadelphia and University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania
[b] College of Arts and Sciences, University of Pennsylvania, Philadelphia, Pennsylvania
[c] Division of Radiology, The Children's Hospital of Philadelphia and University of Pennsylvania School of Medicine, Philadelphia, Pennsylvania

ARTICLE INFO

Article history:
Received 27 October 2012
Revised 19 February 2013
Accepted 15 May 2013

Keywords:
Hereditary hemorrhagic telangiectasia
Juvenile polyposis syndrome
CT colonography
Polyps
Children

ABSTRACT

We present a unique case of juvenile polyposis and hereditary hemorrhagic telangiectasia overlap syndrome. The patient was found to have polyps on colonoscopy leading to genetic testing revealing an *SMAD4* mutation. In children with *SMAD4* mutation and juvenile polyposis, this overlap syndrome needs to be considered in the differential diagnosis and prompt the clinician to look for telangiectasias on examination and consider surveillance imaging to look for arteriovenous malformations. Our case highlights this clinical relationship and shows how nontraditional imaging using computed tomography colonography (CTC) can provide complimentary information along with colonoscopy. Despite low-dose techniques, CTC does add a radiation burden in the evaluation of these children who are at high risk for malignancy and should be used cautiously.

1. Introduction

Juvenile polyposis syndrome (JPS) is a rare syndrome characterized by multiple polyps in the gastrointestinal (GI) tract [1]. In cases of JPS associated with an *SMAD4* mutation, a rare overlap syndrome of JPS with hereditary hemorrhagic telangiectasia (HHT) can occur and should be considered in the evaluation of these children. JPS associated with HHT carries an increased risk of colorectal cancer, and frequent screening is required, as early diagnosis and detection can prevent complications [2]. Polyps are typically screened through colonoscopy, but computed tomography colonography (CTC) may serve as a supplemental screening tool. We present the imaging findings of this unique case of juvenile polyposis syndrome and hereditary hemorrhagic telangiectasia (JPS-HHT) overlap syndrome.

2. Case report

A 14-year-old boy presented with iron deficiency anemia. Hemoglobin improved with treatment, but he continued with complaints of epistaxis of unknown etiology and migraines. He denied dark urine, jaundice, gingival bleeding, or abnormal bruising. Stool was hemoccult positive. Physical examination was unremarkable for skin or oral mucosal telangiectasias. Family history was significant for arteriovenous malformation (AVM) in maternal grandmother.

To evaluate the cause of GI bleed, the child underwent a colonoscopy that revealed multiple large pedunculated and sessile colonic polyps but no evidence of telangiectasias (Fig. 1). The polyps were histologically consistent with juvenile polyps with muscle in the stalk on both smooth muscle actin and muscle-specific actin stain but with no adenomatous or dysplastic changes in the colonic epithelium (Fig. 2). A low-dose, contrast-enhanced CTC, using the protocol described by Anupindi SA et al. (2005) with air insufflation after a minimal bowel preparation, was obtained for further elucidation of the sessile polyps (CTDIvol 1.99 mGy, DLP 89.40 mGycm, dosimetry phantom of 32 cm) [3]. On CTC, the sessile polyps in the transverse colon appeared integrated within the bowel wall (Fig. 3); an atypical feature of juvenile polyps [3]. There was enhancement of the pedunculated polyps but no masses to suggest an AVM or other vascular lesion. Given the multiple colonic polyps, JPS was suspected. Genetic testing revealed a point mutation of 1342C>T in the *SMAD4* gene.

The combination of colonic polyps, *SMAD4* mutation, and family history of AVM was suspicious for other polyposis associated syndromes, such as HHT. The patient had screening imaging that revealed a left upper lobe pulmonary AVM by computed tomography (CT) scan (Fig. 4), confirming the diagnosis of JPS-HHT overlap syndrome. Current management is focused on endoscopic polypectomy, although a colectomy has also been discussed. The patient is doing well and continues to have routine polypectomy, with over 15 polyps removed to date. The most recent colonoscopy revealed continued presence of multiple pedunculated polyps.

* Corresponding author. Division of Gastroenterology, Hepatology, and Nutrition, The Children's Hospital of Philadelphia, Philadelphia, PA 19104, USA. Tel.: + 1-215-590-3630.
E-mail address: linhc@email.chop.edu (H.C. Lin).

http://dx.doi.org/10.1016/j.clinimag.2013.05.013
0899-7071© 2015 Published by Elsevier Inc.

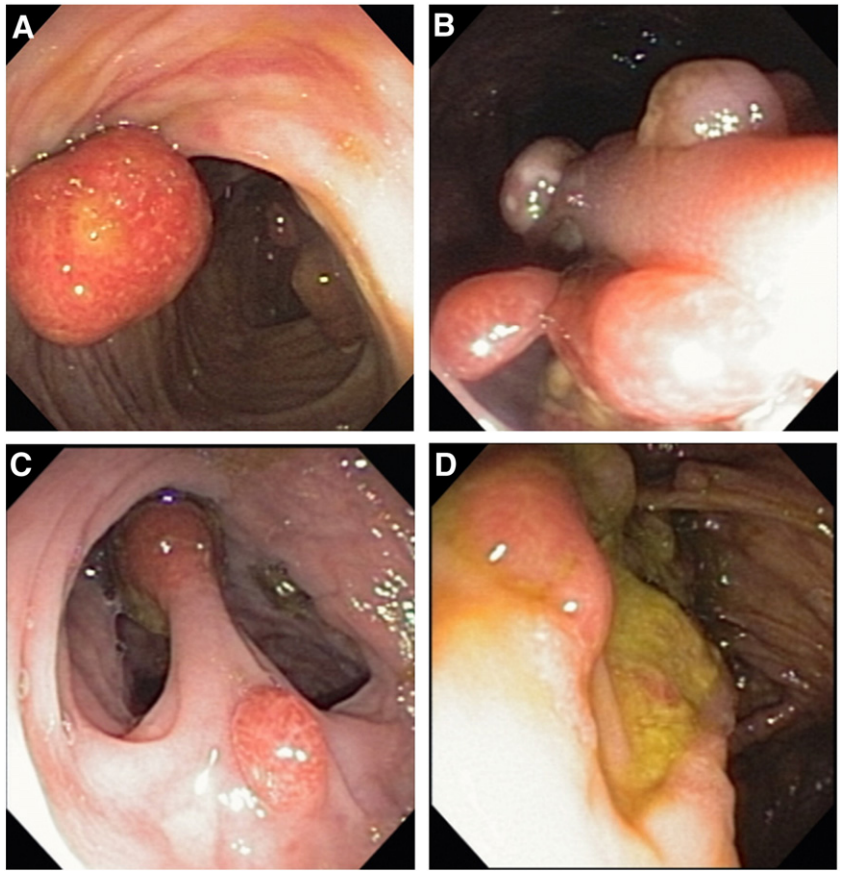

Fig. 1. Eleven-year-old patient who had this colonoscopy. Endoscopic view of pedunculated and mixed colonic polyps in the transverse colon.

3. Discussion

Colonic polyps occur as a single solitary polyp in up to 2% of children but can also occur as a part of a polyposis syndrome such as JPS. JPS, a rare autosomal dominant disorder, is characterized by the presence of more than five polyps in the GI tract. Polyps typically present clinically with rectal bleeding, prompting initial diagnostic work-up via colonoscopy. Juvenile polyps are usually pedunculated and can vary in size up to 50 mm. Histologically, juvenile polyps have distinctive features characterized by inflammatory cells and dilated glands with underlying lamina propria edema. While most polyps are benign, polyps have significant malignant potential, and patients with JPS are at increased risk for early-onset GI cancer with a cumulative lifetime risk of approximately 39% for developing colorectal cancer [1,2]. Extracolonic GI cancers have also been reported in JPS. Such a high predilection for malignancy highlights the need for early screening.

There are three main clinical presentations of JPS: juvenile polyposis of infancy, juvenile polyposis coli, and generalized juvenile polyposis. Juvenile polyposis of infancy presents in infants and is characterized by polyps throughout the GI tract and in some cases resulting in diarrhea, protein-losing enteropathy, and failure to thrive. This infantile form is the most severe and has a poor prognosis with death usually occurring at an early age. Juvenile polyposis coli and generalized juvenile polyposis both appear on the same clinical spectrum. Generalized polyposis is characterized by polyps throughout the GI tract, both in the small and large bowel, whereas, in juvenile polyposis coli, the polyps are limited only to the colon and rectum. Both of these forms typically present later in childhood or adulthood and have a better prognosis [1].

Management of JPS involves frequent surveillance for the presence of polyps by annual colonoscopy with capsule endoscopy. Although endoscopic polypectomy is the primary therapeutic intervention, colectomy is considered in patients with innumerous juvenile polyps or with polyps that show high-grade dysplasia that cannot be fully removed [2]. Genetic testing is helpful for its diagnostic value as well as for genetic counseling of at-risk family members [1].

Mutations in the *SMAD4* or *BMPR1A* gene mutations are found in approximately 50–60% of patients with JPS [1]. Patients with *SMAD4* mutations should be screened for signs of telangiectasias because an overlap syndrome of JPS associated with *SMAD4* mutation and HHT

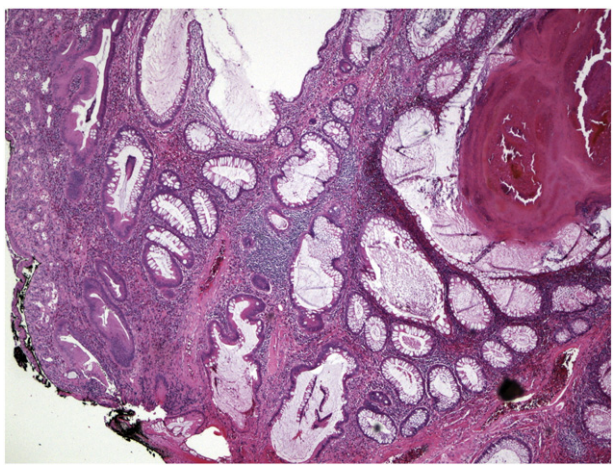

Fig. 2. Eleven-year-old patient with biopsy of polyp obtained during colonoscopy. Hematoxylin and eosin staining of polyp biopsy (40×) shows juvenile polyp with muscle in the stalk and no adenomatous or dysplastic changes in the colonic epithelium.