Fecal Calprotectin as a Future Screening Tool for Large Juvenile Polyps

Global Pediatric Health
January-December 2015: 1–3

DOI: 10.1177/2333794X15623716
gph.sagepub.com
SAGE

Farah Khan, MD[1], Haresh Mani, MD[2], Catherine Chao, MD[1,3], and Suchi Hourigan, MD[1,3]

Introduction

Fecal calprotectin is commonly used as a quantitative marker for intestinal inflammation, predominantly in inflammatory bowel disease; however, the role of this laboratory value has not been well established for patients with juvenile polyps. We present 2 cases illustrating high fecal calprotectin levels caused by very large juvenile polyps.

Case 1

A 10-year-old male presented with intermittent bloody stools and iron deficiency anemia. A calprotectin level was obtained that was abnormally elevated at 575 μg/g (normal <50 μg/g). Subsequently, colonoscopy was performed that showed a giant pedunculated single polyp at the hepatic flexure (4 cm × 2.5 cm × 2.5 cm), which was removed (see Figure 1). The histology was consistent with a juvenile polyp. Six months after the polypectomy, a repeat calprotectin level normalized to <50 μg/g. In addition, due to the large size of the polyp, he had a repeat colonoscopy at 6 months, which was normal without any further polyps being found.

Case 2

A 10-year-old girl with several years of intermittent of abdominal pain, poor growth, and a family history of Crohn's disease presented with a recent history of bloody stools. The patient had a calprotectin level of 1386 μg/g. An endoscopy and colonoscopy performed showed a giant complex polyp at the hepatic flexure (5 cm × 4 cm × 4 cm) and 2 smaller polyps in the sigmoid colon and rectum, which were removed (see Figure 2); pathology was consistent with juvenile polyps. A repeat calprotectin level 1 month after polypectomy had normalized to <50 μg/g and the patient had no further gastrointestinal complaints.

Discussion

Children presenting with complaints of painless rectal bleeding or abdominal pain are found to have juvenile polyps about 0.08% to 3.7% of the time on subsequent colonoscopies.[1] These solitary juvenile polyps are generally sporadic without risk of malignant transformation.[2]

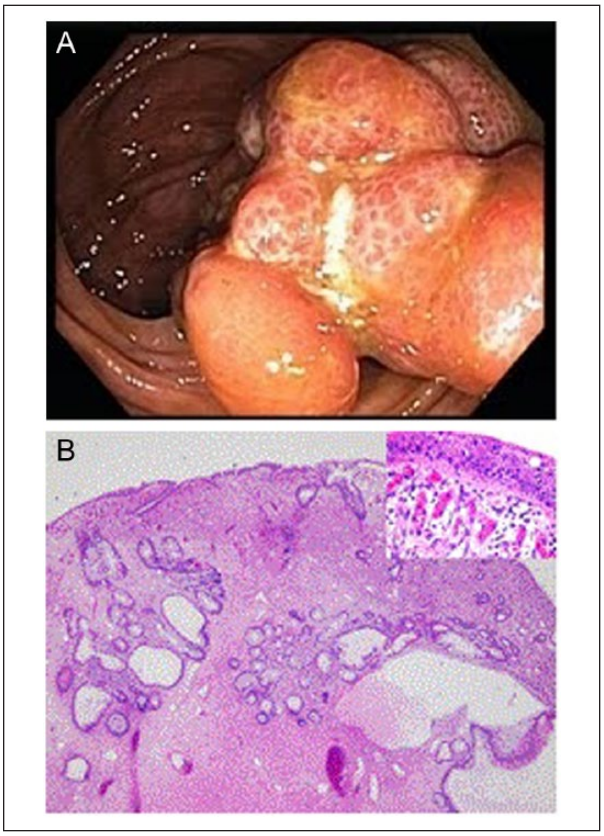

Figure 1. (A) Giant juvenile polyp shown at hepatic flexure. (B) Photomicrograph showing the typical histologic features of a juvenile polyp with expanded lamina propria and dilated crypts (hematoxylin-eosin, 20×). The inset (upper right corner) shows marked surface inflammation (hematoxylin-eosin, 400×).

[1]Inova Children's Hospital, Fairfax, VA, USA
[2]Inova Fairfax Hospital, Fairfax, VA, USA
[3]Pediatric Specialsits of Virginia, Fairfax, VA, USA

Corresponding Author:
Farah Khan, Inova Children's Hospital, 3300 Gallows Road, Fairfax, VA 22042, USA.
Email: farah.khan@inova.org

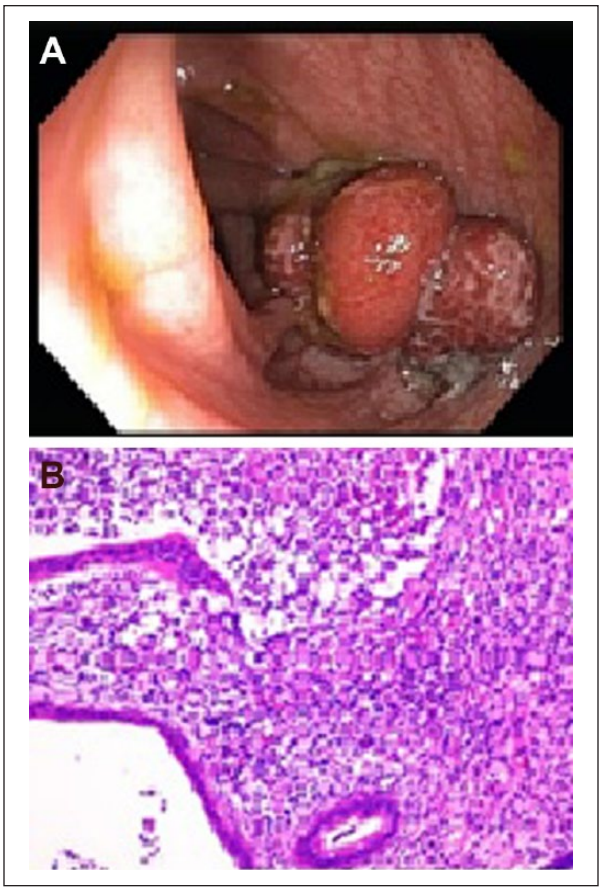

Figure 2. (A) Giant complex polyp shown at hepatic flexure. (B) Higher power shows an acute inflammatory infiltrate in the lamina propria, breaking into and filling the dilated crypts (hematoxylin-eosin, 200×).

Traditionally, a raised fecal calprotectin level has been correlated with intestinal mucosal inflammation such as inflammatory bowel disease, infectious diarrhea, necrotizing enterocolitis, and diverticular disease.[3]

Calprotectin has been shown to have an excellent sensitivity, specificity, and positive predictive value in diagnosis of chronic diarrhea attributable to organic causes such as celiac disease, Crohn's disease, and cow's milk intolerance.[4] A prospective study in 2003, which included adults and children, showed that in the pediatric population the higher cutoff for fecal calprotectin, 100 μg/g, showed a positive predictive value of 94% with a 95% confidence interval.[4] Even with a lower cutoff of 50 μg/g, the positive predictive value was measured at 96%.[4] Calprotectin has also been shown to be increased in the detection of adenomatous colonic polyps in adults.[5]

Calprotectin is an antimicrobial protein in the cytoplasm of granulocytes, monocytes, and macrophages of stool and plasma.[3] Release of this protein is suspected to be a consequence of cell disruption and death.[6] It is not surprising that given the high presence of inflammatory cells within juvenile polyps, fecal calprotectin levels are raised as demonstrated in the 2 reported cases.

To date there have only been 2 reports of the association with raised fecal calprotectin and juvenile polyps.[1,7] Olafsdottir et al reported that children with juvenile polyps had elevated levels of fecal calprotectin when compared to patients with normal colonoscopies, but less elevated levels than patients with active inflammatory bowel disease.[1] However, there were some patients with juvenile polyps who had a normal fecal calprotectin level prior to the removal of the polyp; the size and number of polyps found in patients with normal calprotectin levels is not reported.[1] Pauley-Hunter et al argued that fecal calprotectin does appear to correlate with the degree of inflammation present. They followed 4 children with benign juvenile polyposis, the youngest of whom had 3 total pedunculated polyps removed and had initially presented with a fecal calprotectin level >2500 μg/mL.[7] Our results concur with this, with these unusually large juvenile polyps in the 2 cases reported having high fecal calprotectin levels, supporting the hypothesis that with increasing size of the polyp there may be increasing calprotectin levels.

In our cases, and as previously reported, fecal calprotectin levels normalized after polypectomy.[5,7] This then raises the possibility of using fecal calprotectin along with the current standard stool hemoccult as a screening tool for juvenile polyps, to assess complete removal of all polyps and also possible for polyp recurrence. This laboratory marker may also serve as a noninvasive measure instead of frequently repeating colonoscopy procedures for detecting polyps.

Author Contributions

FK: Contributed to design; contributed to acquisition and interpretation; drafted manuscript; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

HM: contributed to conception; contributed to acquisition and interpretation; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

CC: contributed to conception; contributed to analysis and interpretation; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

SH: contributed to conception and design; contributed to acquisition, analysis, and interpretation; drafted manuscript; critically revised manuscript; gave final approval; agrees to be accountable for all aspects of work ensuring integrity and accuracy.

Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

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