Melanosis Enteri Discovered on Capsule Endoscopy of the Small Bowel

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Melanosis in the colon was described as a brownish discoloration of the mucosa caused by the accumulation of pigment in macrophages within the lamina propria. The pigment was initially thought to be melanin or a melanin-like substance. Subsequently, the pigment proved to be lipofuscin, both histochemically and ultrastructurally [1]. There is a strong association between melanosis coli and chronic use of anthraquinone laxatives, and a cause and effect was established in laboratory animals [2]. Melanosis develops in more than 70% of people after chronic use of anthraquinone laxatives (cascara sagrada, aloe, senna, rhubarb, frangula). The condition is reversible, and the pigment disappears within one year of discontinuing the laxatives. The pigment lies within macrophages that swallowed damaged epithelial cells; epithelial abnormalities were found on electron microscopy [3].

A relationship between melanosis coli and the development of colorectal cancer was suspected but not confirmed in a prospective case-control study [4]. Other confounding factors might be involved in the increased risk of colorectal cancer suggested by earlier studies.

Colonic polyps and cancer lack pigment-containing macrophages and are therefore easy to find during colonoscopy in patients with melanosis coli. The pigment is more intense in the right colon compared to the distal colon, probably due to the higher luminal concentration of the pigment and the difference in absorption capacity and macrophage population along the colon [5]. This phenomenon raises the question why melanosis is so rare in the small intestine. Is the absorption of lipofuscin unique to the colon and is the pigment excluded by the small bowel mucosa? The terminal ileum is accessible on colonoscopy, and pigmentation of the terminal ileum should not be missed. It is expected that the terminal ileum will be pigmented heavily while the colon is involved in melanosis coli, but this is not true.

We describe a case of extensive melanosis of the small bowel in a woman with melanosis coli as first demonstrated by capsule endoscopy.

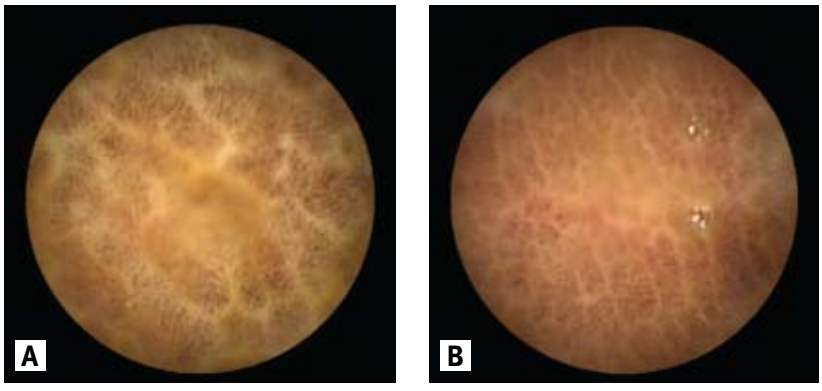
PATIENT DESCRIPTION

A 79 year old woman was admitted for evaluation with capsule endoscopy of iron deficiency anemia and positive fecal occult blood test. Before examination her transferrin, iron and ferritin levels were normal because she was on chronic iron therapy. On admission her hemoglobin was 7.2 g/dl which rose to 10.6 g/dl after blood transfusion. Iron therapy was discontinued a week before capsule endoscopy.

Her medical history disclosed ischemic heart disease, acute myocardial infarction, transient ischemic attack, chronic renal failure, cholelithiasis, hypothyroidism and chronic constipation, and she had undergone carotid endarterectomy. Her medications included aspirin, omeprazole, nifedipine, amiloride hydrochloride, simvastatin, furosemide and isosorbide mononitrate. She had been taking various types of laxatives for the last 20 years.

A month before the capsule endoscopy she underwent gastroscopy and colonoscopy, which demonstrated normal upper gastrointestinal tract but severe melanosis coli. Capsule endoscopy revealed severe extensive melanosis along the small bowel, starting in the proximal jejunum and reaching the terminal ileum [Figures A and B]. Partial villous atrophy was

Melanosis enteri – pigmentation of **[A]** the proximal jejunum and **[B]** proximal ileum in a patient with melanosis coli



also noted in the same areas of the small bowel.

Further investigation included blood carotene level, xylose absorption test and quantitative stool collection for fat; all were normal. Vitamin B12 level was 695 pmol/L (normal 138–781). The patient was followed for 8 years until her death at age 87.

COMMENT

The pigment in melanosis coli is localized within the colon as there is usually no pigment deposition in the small intestine. Anthraquinone laxatives cause damage to the colonocytes; the damaged organelles are sequestrated in the autolysosomes of macrophages and result in lipofuscin bodies. Since the small bowel, especially the terminal ileum, is rich in macrophages, there is no reasonable explanation for small bowel sparing by this process. It is possible that the rich microbial flora in the colon is responsible for the difference. Another explanation may be the structural difference between colonocytes and enterocytes, which have villi and a more developed brush border.

To the best of our knowledge this is the first report of an extensive distribution of small bowel pigmentation in a woman with melanosis coli, as demonstrated by capsule endoscopy. Our patient underwent capsule endoscopy for investigation of iron deficiency anemia and positive fecal occult blood test. The intense brown pigmentation, starting in the proximal jejunum and reaching the terminal ileum, was very similar to the pigmentation along the colon; thus the same pathophysiology is assumed. The effect of a massive pigment sequestration in the small bowel on absorption of food constituents, vitamins, minerals, water and electrolytes is not known. Because the small intestine is responsible for normal food absorption, in contrast to the limited ability and importance of the colon in this regard, melanosis enteri may have a substantial effect on the health status of the patient.

Since visualization of the small bowel by capsule endoscopy and double balloon enteroscopy became common practice, we believe that additional cases of melanosis enteri will be diagnosed and characterized. In these cases the nature and outcome of melanosis enteri should be investigated.

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