

Green Colon

An Unusual Appearance at Autopsy

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One of the authors (V.M.W.) has occasionally noticed patients with unusual and vivid green discoloration of their colons at autopsy. Two cases described here illustrate this phenomenon.

The first patient was a 49-year-old man who was admitted with squamous cell carcinoma of the tongue and underwent a hemiglossectomy. He was in the hospital for 4 days prior to his death. A complete autopsy demonstrated that the cause of death was an acute myocardial infarction. The second patient was an 85-year-old man who suffered from infective endocarditis involving an aortic

prosthetic valve. He was in the hospital for 8 days before his death. A complete autopsy demonstrated that this patient died from complications of infective endocarditis.

At autopsy, each of these patients had a peculiar and very bright diffuse discoloration of most of the length and full thickness of their colons (the Figure shows both the small and large bowel of the second patient). The green discoloration of the large bowel began abruptly at the ileocecal valve and was most concentrated in the cecum. There was also green discoloration of other tissues that were in contact with the large bowel, for example, the mesentery and other peritoneal surfaces (arrow). The content of the large and distal small bowels was similarly bright green. Apart from moderate colonic diverticulosis in the second case, each bowel was otherwise grossly unremarkable. After being stored in formalin overnight, the green color of the bowel lessened, with the formalin taking on a green tint (suggesting a water-soluble pigment). The

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discoloration was completely lost by the time the tissues were sampled for microscopy. The histology of the bowel was unremarkable, and no green color was identified in the microscopic sections prepared with standard processing, embedding, and staining techniques.

Further investigation revealed that each patient had been intubated and ventilated in the intensive care unit immediately prior to his death, the first patient for 4 days and the second for 7 days. Discussion with the intensive care unit nursing staff disclosed a common local practice of coloring the enteral feeding solutions with a blue liquid food coloring (Food, Drug and Cosmetic blue No. 1). In the second patient's nursing notes, the administration of enteral food coloring and the subsequent development of green diarrhea was clearly documented. The rationale for using colored enteral food is to allow easy identification of aspirated gastric contents in suctioned airway fluids. Additionally, the coloring may be potentially useful in identifying the source of fistulous drainage. Discussion with the nursing staff indicated a highly variable practice with respect to the amount of food coloring employed, in some cases using as much as a 1:10 food coloring:feed ratio.

There are few reports describing the use of similar dyes in this clinical setting. Potential problems associated with the use of food coloring include false-positive tests for blood in the stool and gastric fluids, as well as bacterial

contamination of the feeding solutions.¹ The only known side effect of the use of this dye in our institution is the development of green diarrhea. There has been very brief mention of tissue or body fluid discoloration following administration of the food coloring in enteral feeding solutions.^{1,2} Of interest, one 70-year-old patient with multiple organ failure had extensive discoloration of the skin, urine, serum, and tracheal secretions. He subsequently died, and at autopsy all of the "internal organs and tissues (especially the gastrointestinal tract) were green"²; however, this phenomenon was not illustrated or further described.

Following ingestion of the water-soluble dye, it is apparently concentrated in the colon, the site of water reabsorption in the gastrointestinal tract. The concentration in the large bowel wall likely varies, depending on the amount administered. In any circumstance, it appears that the clinical use of this dye has a pathologic correlate at autopsy. There is very little evidence to suggest any serious deleterious functional effect related to the use of the dye. However, awareness of the unusual gross appearance found at autopsy may be of interest and importance to pathologists.

References

1. Metheny NA, Clouse RE. Bedside methods for detecting aspiration in tube-fed patients. *Chest*. 1997;111:724-731.
2. Metheny NA, Wunderlich RJ. A survey of bedside methods used to detect pulmonary aspiration of enteral formula in intubated tube-fed patients. *Am J Crit Care*. 1999;8:160-169.