A Case Of Duodenal And Small Bowel Perforation Due To Grill Brush Wire Bristle Ingestion With Successful Laparoscopic Retrieval

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Abstract

Grill brush wire bristle ingestion is a growing phenomenon encountered in emergency rooms today. We present a case of a 56 year-old man with bristle ingestion resulting in a delayed diagnosis of duodenal and distal small intestinal perforation. The patient underwent successful laparoscopic retrieval under fluoroscopic guidance with minimal morbidity. We aim to raise awareness of the propensity of these wire bristles for gastrointestinal perforation as well as the utility of early CT scanning.

KEYWORDS: grill brush, bristle, wire, perforation, fluoroscopy
Introduction

Accidental grill brush wire bristle ingestion has received more attention in the mass media of late due to the increasing frequency of such patients presenting to emergency rooms. The use of old and overused grill brushes is often causes such events, with wires getting stuck in the grill grating before being incorporated into cooked foods. The vast majority of these bristles get lodged in pharynx or upper aerodigestive tract requiring laryngoscopic or endoscopic extraction. However, these thin wire bristles have a high propensity for gastrointestinal perforation and extraluminal migration which can require surgical intervention. The diagnosis and management of such cases can be challenging due to the variability in presentation and medical professionals’ lack of experience with this issue. In this report, we describe a case of bristles perforating the duodenum and distal small bowel, ultimately requiring surgical retrieval.

Case Report

A 56-year-old healthy male presented to the emergency department with throat pain on a Saturday night after an evening of backyard grilling. He admitted to using a grill brush with wire bristles to clean his grill and surmised that some bristles may have subsequently become ingested with his food. He promptly came to the ED due to throat pain after eating a burger, fearing he might have ingested a bristle. The patient had no abdominal pain, and he otherwise appeared nontoxic. X-rays obtained in the emergency room showed one bristle in his pharynx and four in his abdomen. He underwent emergent laryngoscopy by the ear, nose, and throat physician and had a 5 cm bristle removed from his pharynx and left piriform sinus. A completion EGD and push enteroscopy by gastroenterology revealed no other foreign bodies in the small bowel and no evidence of any perforation. He was then admitted to the hospital floor for observation. General surgery was consulted the next day, and the patient continued to have no abdominal symptoms. Repeat abdominal films showed the persistent foreign bodies. As the patient appeared well and had no abdominal complaints, it was recommended that he be discharged with the expectation that he would eventually pass the bristles. He was given instructions to return to the hospital should he have abdominal pain or otherwise become ill.

The patient returned to the hospital three days later with right upper quadrant and left sided abdominal pain. He was otherwise well-appearing with normal vital signs and labs. He had some mild tenderness in the above-mentioned areas on physical exam. Abdominal x-rays showed only three bristles at this time, though
they appeared to be in the same locations as his prior study. He was admitted to the hospital and general surgery and gastroenterology were consulted. Due to the persistent location of the three bristles on x-ray, it was surmised that the bristles were extraluminal. The patient underwent a noncontrast CT of the abdomen which confirmed this suspicion. One bristle was seated above the gallbladder, one in the lesser sac, and one in the small bowel mesentery. With these findings and the patient’s persistent abdominal pain, the decision was made to attempt laparoscopic surgical retrieval. He underwent a diagnostic laparoscopy and extraction of the three bristles assisted by fluoroscopy. On laparoscopic exploration, there was no peritoneal blood, bile, or feculent material. The bristle near the gallbladder was easily identified via direct visualization and extracted. The other two bristles were not readily visualized and required localization using fluoroscopy. Once localized, the bristles required opening of the lesser sac and dissection of the small bowel mesentery for extraction. Postoperative abdominal films showed no other bristles in the abdomen. The patient tolerated the procedure well, and he made an uneventful recovery. He was discharged on postoperative day two, complaining only of incisional pain. Although he had no signs of systemic toxicity, the patient was discharged on a seven-day course of Augmentin due to the known gastrointestinal perforation.

Discussion

Ballenger et al. reported the first incidence of wire bristle ingestion in 1952, when they described a case of esophageal perforation in a Northwestern University student who ultimately required cervical mediastinoscopy for extraction. However, wire bristle ingestion has received much more attention in recent years. Patients arrive with a variety of presentations, with the majority of cases having bristles lodged in or perforating the upper aerodigestive tract. A review of case reports shows several cases of lingual abscesses, bristles lodged in the pharynx, and esophageal perforation. These bristles can often be identified and removed under direct visualization, laryngoscopy, and/or endoscopy. However in cases of pharyngeal or esophageal perforation, patients often require surgical neck exploration. Less commonly, these bristles migrate to the stomach, small bowel, and even colon before perforating. The largest case series of bristle ingestion involving twelve patients describes a minority of patients with small bowel and sigmoid colon perforation requiring laparotomy. While laparotomy may be required for bristles that are difficult to locate, some providers have tried to avoid laparotomy for the morbidity of the incision. In fact, there have been case reports of bowel perforation in which patients were treated with laparoscopic exploration and retrieval.
Our case highlights the importance of having a high suspicion for gastrointestinal perforation and extraluminal migration. Our patient was able to pass one bristle in his stool, but based on his imaging, it is very likely that the remaining three bristles perforated his GI tract soon after ingestion. They likely remained stuck in mesentery soon after perforating, and so they appeared in the same locations on abdominal films. Because of the high likelihood for perforation, we recommend at least initial surveillance abdominal films in patients with known bristle ingestion to identify any intraabdominal bristles. If bristles are seen intraabdominally, we recommend early CT scanning to ascertain the exact locations of these bristles and further serial imaging as needed. Our patient had recurrent abdominal pain as his main operative indication. But even in asymptomatic patients, we would recommend early imaging and urgent surgical retrieval of perforated bristles due to the theoretical risks of intraabdominal sepsis, abscess formation, enteroenteric fistula formation, and vascular erosion. Skilled providers can potentially avoid laparotomy and safely retrieve bristles laparoscopically using intraoperative fluoroscopy for localization if needed.

Grill brush wire bristle ingestion is an increasingly recognized phenomenon, and patients are arriving in emergency rooms with a variety of presentations. Providers should have a high suspicion for ingestion and gastrointestinal perforation. Patients are best served with early imaging and surgical consultation for expedient bristle extraction using minimally-invasive means if possible.
Figure 1. Lateral neck x-ray showing bristle in the pharynx
Figure 2. Initial abdominal x-ray showing four intraabdominal bristles
Figure 3. Interval abdominal x-ray showing three bristles in similar locations as on prior study
**Figure 4.** CT image showing a bristle next to the gallbladder
Figure 5. CT image showing a bristle in the lesser sac.
Figure 6. CT image showing a bristle in the small bowel mesentery
Figure 7. Intraoperative laparoscopy photo showing a bristle in the lesser sac
Figure 8. Intraoperative laparoscopy photo showing a bristle being retrieved from the lesser sac
Figure 9. Intraoperative laparoscopy photo showing a bristle being extracted
Figure 10. Intraoperative fluoroscopy image showing approximate bristle localization in small bowel mesentery
References


