



# Gastric Perforation and Peritonitis Secondary to Incidental Ingestion of Wire Grill Bristle



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## Introduction

- Foreign body ingestion often leads patients to the emergency department!
- Foreign body ingestion is much more common in the pediatric population than the adult population<sup>2</sup>
- In adults that are not institutionalized, the most frequently reported foreign bodies ingested include food boluses and bones<sup>3</sup>
- Though relatively rare, the prevalence of reported cases of grill bristle ingestion has increased in the last ten years<sup>4</sup>
- The first reported case of wire grill bristle ingestion was in 1952<sup>5</sup>
- Approximately 130 cases of wire grill brush injuries present to the emergency department per year<sup>6</sup>
- In 2012, the Center for Disease Control and Prevention issued a warning regarding the risk of wire grill bristle ingestion<sup>6</sup>
- The most common location of an ingested grill bristle to lodge is in the oropharynx<sup>7</sup>
- Injuries to the esophagus were more frequently reported than intra-abdominal injuries<sup>8</sup>
- Of the rare cases in which the grill bristle passed further into the GI tract, the most common presenting symptoms included "sharp", "colicky", or "stabbing" abdominal pain<sup>9</sup>
- Of reported grill bristle ingestion cases involving small bowel perforation, all were visible on abdominal CT<sup>8</sup>
- Wire grill bristle ingestions were most reported during the summer months of June, July and August<sup>4</sup>
- Other grill-cleaning methods have also been researched as an alternative to wire grill brushes<sup>9</sup>

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## Case Description

### History

- 65-year-old Caucasian male
- Presented to ED complaining of two days of worsening suprapubic and left sided flank pain
- Associated symptoms: subjective fevers, chills, and urinary hesitancy
- Past medical history: nephrolithiasis; seven prior episodes, most recently 10 years ago
- Patient stated the pain felt exactly like the other times he had nephrolithiasis
- Review of systems: denied nausea, vomiting, chest pain, palpitations, dyspnea, hematuria or penile discharge

### Objective Findings

- Vitals: temperature – 98.7°F, pulse – 74 bpm, respirations – 18 breaths/min, blood pressure – 158/84 mmHg, O<sub>2</sub> saturation – 98% on room air
- General: Patient alert and oriented, in no acute distress
- Respiratory: Normal work of breathing, no respiratory distress, lungs clear to auscultation bilaterally
- Cardiovascular: Regular rate and rhythm, +S1 S2, no murmurs, rbs or gallops
- Abdomen: obese, softly distended, moderate left lower quadrant and suprapubic tenderness, bowel sounds hypoactive, no rebound tenderness, guarding or peritoneal signs
- CBC revealed leukocytosis of 20.8 thousand/uL, rest within normal limits, basic metabolic panel within normal limits
- Non-contrast CT abdomen/pelvis: 4 mm stone in left distal ureter with no evidence of hydronephrosis, as well as multiple tiny foci of free air in the abdomen and a linear foreign body in antral region of stomach
- Repeat CT abdomen/pelvis with contrast: free air recognized again, as well as the linear foreign body in antrum of the stomach – radiology suggested it was possibly a bone or toothpick lodged vertically through the stomach

### Hospital Course

- Patient admitted for management of possible pyelonephritis and observation of foreign body and pneumoperitoneum
- Started on IV ciprofloxacin and metronidazole for coverage of enteric flora in the case of gastrointestinal perforation, as well as ceftriaxone for possible pyelonephritis
- On hospital day two, patient developed fever of 101°F, was more distended, and had voluntary guarding on exam
- GI was consulted to attempt endoscopic removal of foreign body, but attempts were unsuccessful
- Decision was made to go to operating room for exploratory laparoscopy

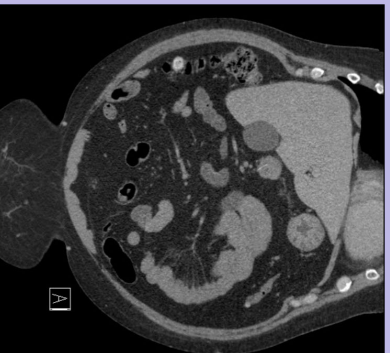


Figure 1: Computed tomography with contrast revealing foreign body identified in antrum of stomach

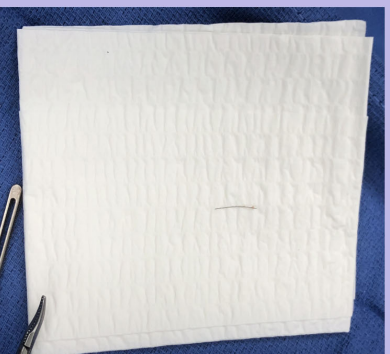


Figure 2: Wire grill bristle found and removed laparoscopically

## Patient Management

### Operative Findings

- Patient underwent exploratory laparoscopy with CO<sub>2</sub> endoscopy and removal of foreign body from posterior wall of stomach
- The foreign body was found to be sharp and metallic, identified as wire bristle from grill cleaning brush
- Foreign body was removed without further complications, and no repair was necessary as foreign body was even smaller than suture needle

### Post-Operative Course

- POD#1: patient had decreased pain, and leukocytosis improved to 14.3 thousand/uL
- Patient continued on IV ceftriaxone, ciprofloxacin and metronidazole for gastric perforation and possible pyelonephritis
- POD#2: patient's leukocytosis continued to downward to 13.0 thousand/uL
- POD#3: patient's leukocytosis resolved to 9.8 thousand/uL, and he had return of his bowel function
- POD#4: Patient discharged home with two more days of oral antibiotics to complete a total seven-day course
- Plan for close outpatient follow-up within one week of discharge

### Diagnosis

- Pre-operative diagnosis: foreign body ingestion with possible pyelonephritis
- Post-operative diagnosis: sepsis secondary to probable perforation from posterior gastric antrum perforation from foreign body ingestion

## Discussion

- Those who grill often should be made aware of the risks of using a wire grill brush to clean the grill, and closer inspection for residual bristles prior to cooking should be taken when using this cleaning modality<sup>9</sup>
- Incidental ingestion can lead to lodging and perforation anywhere throughout the gastrointestinal tract, most commonly in the oropharynx or esophagus<sup>8</sup>
- Use of esophagogastroduodenoscopy for foreign body ingestion has a high success rate, but can depend on factors such as the patient's age, the visualization of the foreign body on imaging, and the type of foreign body ingested<sup>6</sup>
- In 2016, Wong et al published an algorithm on the management of wire grill bristle ingestion found in the upper digestive tract, but did not consider management of the rarer cases of lodging further past the oropharynx or esophagus<sup>10</sup>
- The use of ultrasound may aid in locating the foreign body intraoperatively when it cannot be found clinically or removed during attempts at removal<sup>11</sup>
- Further research should consider this imaging modality in more complex cases, such as in this patient, in which locating the foreign body intraoperatively may be difficult<sup>11</sup>

## Conclusion

- Though rare, emergency department visits due to incidental ingestion of wire grill bristles has been rising in recent years
- Clinicians should have a high clinical suspicion for wire grill bristle ingestion in those with a chief complaint of vague abdominal pain and a history of recently eating grilled foods, especially during peak grilling season
- Further consideration of an algorithm for management when the grill bristle is found further along the GI tract should be considered in future research
- For those who choose to use wire grill brushes for cleaning, careful inspection of the grill prior to cooking should be done to prevent incidental ingestions with potential subsequent complications
- Alternative grill-cleaning methods may also be considered to prevent this type of injury