

## Clinical Oncology

Moderator: Jeanne Capasse, MD, FACS, NuVance Health, Norwalk, Chair, CT Commission on Cancer

Judges: CT Commission on Cancer

## Pediatric Surgery

Moderator: Christine Finck, MD, FACS, Surgeon-in-Chief | Chief, Division of Pediatric General and Thoracic Surgery | Peter Deckers Endowed Chair in Pediatric Surgery

Judges: Daniel, Solomon, MD, Assistant Professor of Surgery, Yale School of Medicine

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Samuel Butensky, MD	Yale School of Medicine	Disparities in Social Determinants of Health for Gastrointestinal Cancer Patients Within the All of Us Database
Sydney Smilen, DO	Danbury Hospital	Comparative Outcomes of Juvenile Breast Sarcomas: A Focus on Non-Phyllodes versus Phyllodes Variants and their Clinical Implications
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# CLINICAL ONCOLOGY

## Contributors to Racial Disparities in Non-Small Cell Lung Cancer Care: A Multiple Mediation Analysis

Safraz A. Hamid MD, Do H. Lee PhD, Jeph Herrin PhD, James B. Yu MD, Craig E. Pollack MD, Maureen E. Canavan PhD, Lorraine T. Dean ScD, Carol R. Oladele PhD, Jacquelyne J. Gaddy MD, Shelli L. Feder PhD, Pamela R. Soulos PhD, Cary P. Gross MD

Department of Surgery, Yale School of Medicine, New Haven, CT

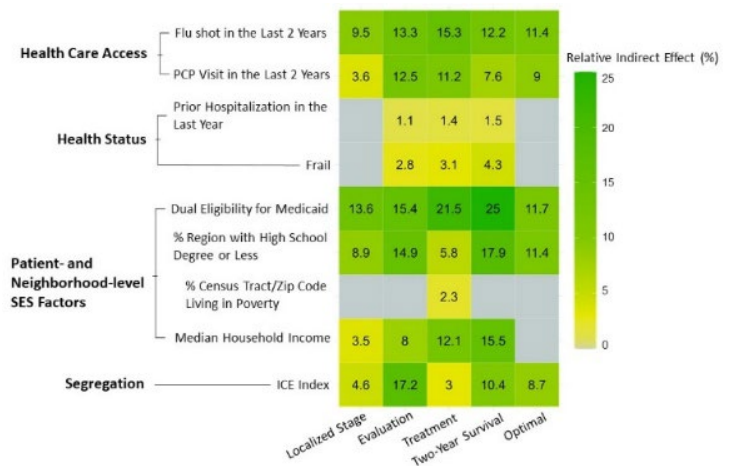
**Introduction:** Black patients with non-small cell lung cancer (NSCLC) are more often diagnosed at a later stage and receive inadequate evaluation and treatment compared to White patients. We aimed to identify factors associated with structural racism that mediate the association between race and NSCLC care.

**Method(s):** We used the Surveillance, Epidemiology, and End Results-Medicare database to identify non-Hispanic Black and White patients diagnosed with NSCLC from 2013 through 2019. Our outcomes were localized stage at diagnosis (stages I-IIIa/NI), receipt of stage-appropriate evaluation, receipt of stage-appropriate treatment, two-year survival, and receipt of “optimal” care, an aggregate metric comprising the first three listed outcomes. We estimated the relative indirect effects of mediators on the association between race and outcomes. Candidate mediators were markers of health status (e.g., frailty), access to care (e.g., receipt of flu shot), socioeconomic status (SES) at the patient (e.g., Medicare-Medicaid dual eligibility) and neighborhood levels (e.g., median household income), and segregation (Index of Concentration at the Extremes).

**Results:** Of the total 69,130 patients, 8.2% were Black. Compared to White patients, Black patients were less likely to be diagnosed at a localized stage (33.2% vs. 40.7%), receive appropriate evaluation (35.1% vs. 42.2%) and treatment (48.7% vs. 59.4%), survive two years after diagnosis (29.2% vs. 36.1%), and receive optimal care (13.5% vs. 19.2%) (all  $p < 0.001$ ). Dual eligibility accounted for the largest proportion of mediating effects for most outcomes, ranging from 13.6% ( $p < 0.001$ ) for localized diagnosis stage to 25.0% ( $p < 0.001$ ) for two-year survival (Figure 1). Receipt of a flu shot had the second largest mediating effects on the associations between race and diagnosis stage (9.5%,  $p < 0.001$ ), treatment (15.3%,  $p < 0.001$ ), and optimal care (11.4%,  $p < 0.001$ ). Neighborhood-level SES accounted for the third largest proportion of the effects of race on each outcome: % of region with high school degree or less for diagnosis stage (8.9%,  $p < 0.001$ ), evaluation (14.9%), and optimal care (11.4%,  $p < 0.001$ ) and median household income for treatment (11.1%,  $p < 0.001$ ) and two-year survival (15.5%,  $p < 0.001$ ). **Conclusion(s):** Markers of structural racism at the individual and neighborhood levels partly explain racial disparities in NSCLC care. Because the effect of these mediators varies along the NSCLC care continuum, levers of change should be adapted based on the phase of care.

**Figure 1. Heat map of relative indirect effects of mediators.** Gray tiles indicate no statistically significant mediation or inconsistent mediation.

PCP = primary care physician; SES = socioeconomic status; ICE = index of concentration at the extremes



## **Disparities in Social Determinants of Health for Gastrointestinal Cancer Patients Within the All of Us Database**

Samuel D. Butensky, MD<sup>1</sup>, David G P. Su, MD<sup>1</sup>, Nita Ahuja, MD MBA FACS<sup>1</sup>, Caroline Johnson, PhD<sup>2</sup> and Sajid A. Khan, MD FACS<sup>1</sup>

<sup>1</sup> Department of Surgery, Yale University School of Medicine, New Haven, CT, 06510

<sup>2</sup> Department of Environmental Health Sciences, Yale School of Public Health, New Haven, CT, 06510

**Introduction:** We utilized the All of Us (AoU) database to have high-level access to social determinants of health (SDOH) information for patients with gastrointestinal (GI) cancers.

**Method(s):** The AoU database Controlled Tier Dataset (v7) was queried for patients with 10 gastrointestinal (GI) cancers who completed the SDOH survey. The SDOH survey was divided into sections based on validated survey scales.

**Results:** 10,790 patients completed the SDOH survey and had GI cancer. The majority were white (90%), non-Hispanic (99.1%), female (58.4%), and heterosexual (92.8%). Colon cancer made up 76.2% of primary site cancers. There were significant racial disparities among survey responses in five sections of the SDOH survey. Black patients scored higher than White patients on Everyday Discrimination (2.1 vs. 1.6,  $p < 0.001$ ), Negative Neighborhood (2.0 vs. 1.5,  $p < 0.001$ ) and Spiritual Experiences (4.6 vs. 3.2,  $p < 0.001$ ); Black patients scored lower than White patients on Social Support (3.7 vs. 3.9,  $p < 0.001$ ). They also scored higher than Asian patients on Spiritual Experiences (4.6 vs. 3.2,  $p < 0.001$ ) but lower on Neighborhood Positive (3.7 vs. 4.0,  $p < 0.001$ ). Concerning gender inequalities, there were no significant differences observed in the SDOH survey.

**Conclusion(s):** Our findings highlight significant racial disparities in five of the SDOH survey subsections but no gender disparities. Black patients feel the most discriminated, least supported, and most negative about their neighborhood, but they are the most spiritual. Further studies include comparing these results against matched controls within AoU.

# Comparative Outcomes of Juvenile Breast Sarcomas: A Focus on Non-Phyllodes versus Phyllodes Variants and their Clinical Implications

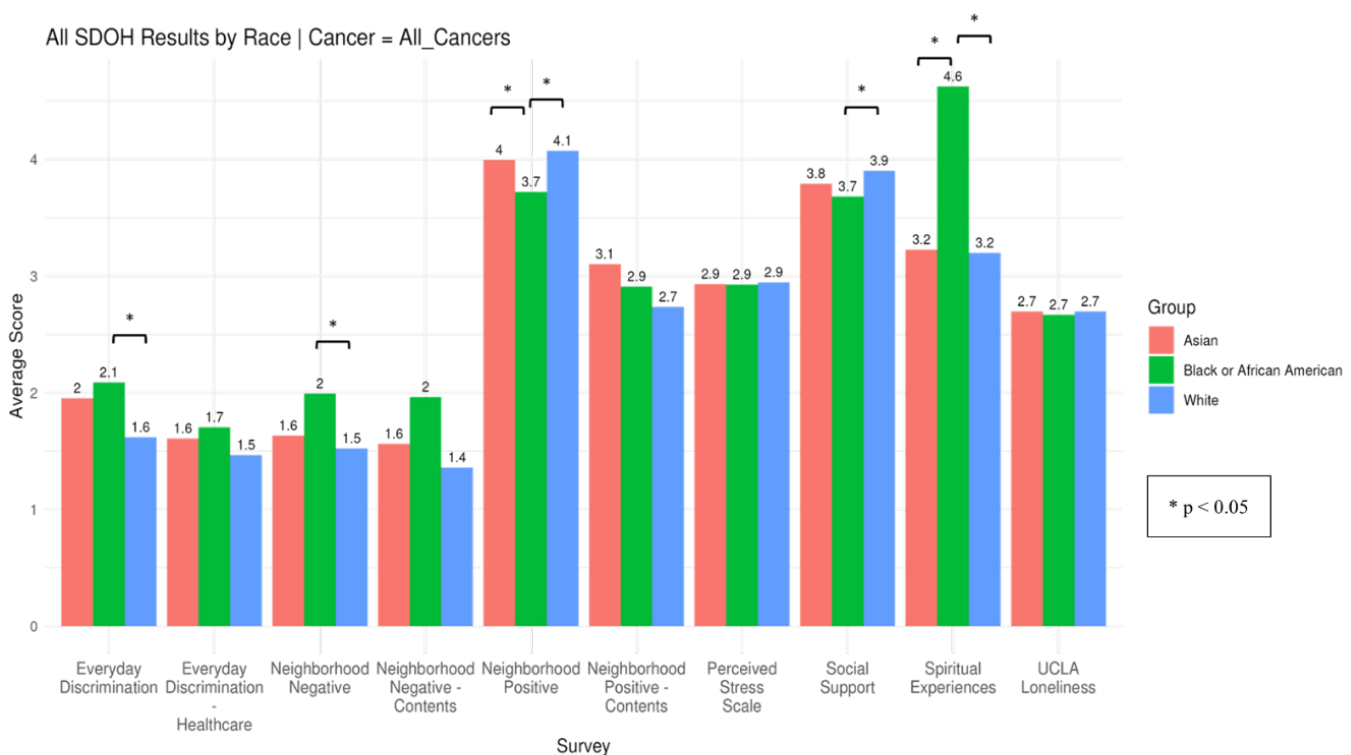
Sydney Smilen DO, Keerthi Vengatesan MD, Xiang Da Dong MD  
Danbury Hospital General Surgery Residency Program

**Introduction:** Phyllodes tumors are a rare fibroepithelial tumor that accounts for less than 0.5% of all breast tumors, and are even more rare in the pediatric population, presenting unique challenges in diagnosis and management. In this paper, we first highlight the rare and diverse presentation of these tumors, as well as the management and outcomes. Although the dominant form of juvenile sarcomas of the breast is the phyllodes type sarcoma, we demonstrate that non-phyllodes sarcomas of the breast are associated with worse outcomes compared to phyllodes.

**Method(s):** The SEER research database, using 17 registries, was searched to evaluate patients ages 0-29 years with soft tissues sarcomas of the breast over a 21-year span between 1990-2021. 256 patients were identified, 185 with phyllodes tumors and 71 with non-phyllodes tumors.

**Results:** Among the 256 patients with soft tissues sarcomas, the median overall survival rate from the age of diagnosis exceeded 101 months (about 8 and a half years), with 85% of patients still alive at the time the data was collected. However, from that data, the overall survival rate for non-phyllodes tumors was significantly lower than the phyllodes tumors with a  $P < .0001$ .

**Conclusion(s):** Using the SEER database, we found that the majority of juvenile sarcomas of the breast are of the phyllodes type of sarcomas, however, non-phyllodes sarcomas of the breast have worse outcomes compared to the total population.



# PEDIATRIC SURGERY

## Case Report: A Unique Finding of Burkitt Lymphoma Identified as Lead Point in Pediatric Ileocolic Intussusception

Ryan Pettit MD, Cynthia Lin MD, Gerard Weinberg MD FACS  
Stamford Hospital, Stamford Health

**Introduction:** We present a unique case of pediatric ileocolic intussusception requiring exploratory laparotomy, revealing the presence of cecal edema as lead point responsible for intussusception, found on pathology to be Burkitt lymphoma. Intussusception is more common in males, and it is more common in children aged six to 18 months than adults, occurring when a portion of bowel folds into an adjacent section. It typically presents with waxing and waning abdominal pain, vomiting, abdominal distention, and bloody stools. In children, there may be an antecedent viral infection leading to hyperplasia of immune tissue; other etiologies include Meckel diverticulum, cystic fibrosis, Henoch-Schonlein purpura, appendicitis, or tumor. Here we present ileocolic intussusception in a pediatric patient found to be caused by Burkitt lymphoma found within the cecum.

**Case Presentation:** An otherwise healthy five year old boy, born a monozygotic twin at full term after normal gestation and delivery, presented with intermittent severe abdominal pain, low grade fever, constipation, and nausea/vomiting all of which worsened in intensity over the past 24 hours, prompting presentation. These symptoms had been intermittent the past two to three weeks. His abdomen was moderately-tender in the right lower quadrant without a palpable mass. A CT scan was obtained which showed an ileocolic intussusception without obvious lead point. The patient was taken for decompression using an air enema which failed. Given the patient's unique age for intussusception, the decision was made to proceed to the operating room where an exploratory laparotomy was performed, revealing a firm cecum and severely dilated small bowel loops proximal to the colon. After complete reduction of the intussusception, the bowel appeared patent but the cecum remained firm and a mass could not be excluded prompting cecotomy which revealed an edematous cecal mucosa, particularly adjacent to the ileocecal valve. A biopsy of this tissue was taken and appendectomy was performed. Post-operatively the patient recovered uneventfully and was discharged on postoperative day 2. Pathology reported the cecal tissue biopsied to contain sheets of monomorphic lymphocytes with vesicular chromatin and punctate nucleoli, consistent with high grade lymphoma consistent with Burkitt lymphoma. The remainder of the patient's care was undertaken at an outside pediatric institution at the request of the patient's family.

**Conclusions:** Burkitt lymphoma accounts for 34% non-Hodgkin lymphoma in children and predominantly affects males. Its presentation may vary by race, predominantly affecting mandibular and maxillary bones in children of African descent, while more frequently affecting bowel in children of non-African descent. Burkitt lymphoma at early stages of disease have four year event free survival of 98% and four year overall survival rate of 99% with chemotherapeutic agents. The definitive treatment for intussusception due to Burkitt lymphoma is laparotomy with resection and anastomosis. Though rare, Burkitt lymphoma should remain in the differential for a pediatric patient presenting with intussusception.

## Laparoscopic Resection of a Rare Intraabdominal Extralobar Pulmonary Sequestration

Blake Acquarulo MD, MPH<sup>1</sup>, Danielle Dougherty MD<sup>2</sup>, J Leslie Knod MD<sup>2</sup>

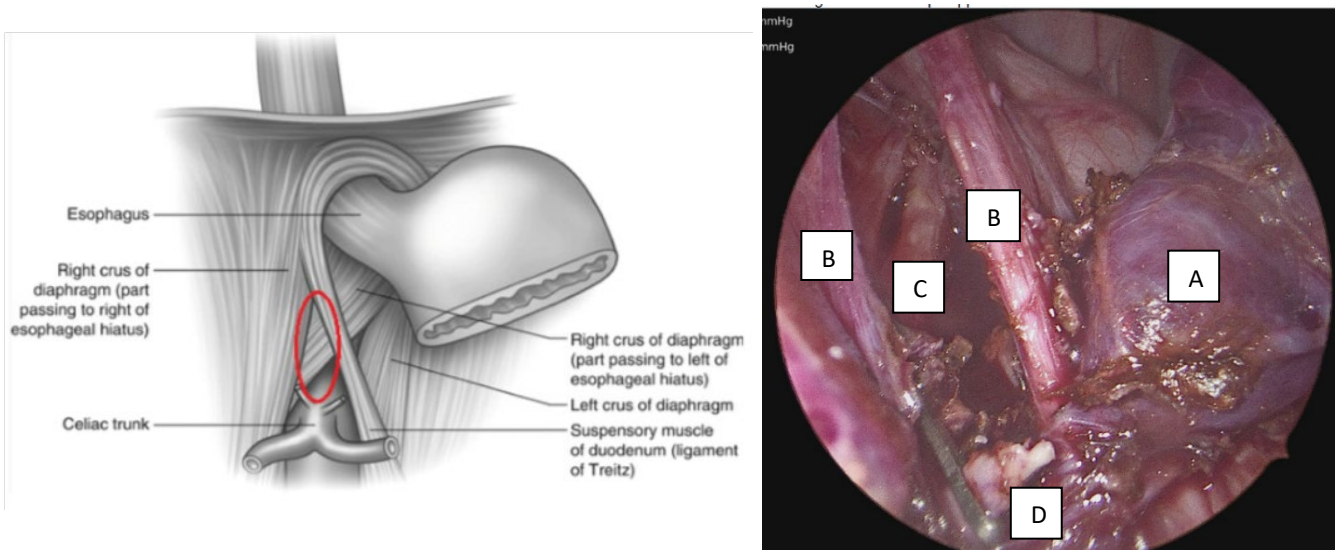
<sup>1</sup>University of Connecticut Health Center, Farmington, CT

<sup>2</sup>Connecticut Children's Medical Center, Hartford, CT

**Introduction:** Pulmonary sequestrations are non-functional lung tissue that do not have normal communications with the tracheobronchial tree and have their own systemic arterial supply. They are further characterized by their relationship to the visceral pleura of the lung. Extralobar sequestrations, which make up 25% of pulmonary sequestration cases, are most commonly found between the lower lobes and the diaphragm. Reportedly less than 10% of extralobar pulmonary sequestrations are sub-diaphragmatic. Their vasculature typically arises from a systemic artery such as the descending thoracic aorta and occasionally from the intercostal, celiac, or splenic arteries. We present a case of rare intraabdominal extralobar pulmonary sequestration in a pediatric patient.

**Case Presentation:** This is an 11-month-old girl with clinical history of a prenatally diagnosed abdominal mass as well as acid reflux and feeding difficulties. Postnatal evaluation included ultrasound and computed tomography as well as esophagram and upper gastrointestinal study to rule out rare communication with the foregut. Differential diagnosis included pulmonary sequestration, vascular malformation, foregut duplication cyst, or other tumor. Patient underwent laparoscopic resection of the epigastric mass which was located within the right crus of the diaphragm and extended into the posterior mediastinum superiorly and inferiorly to the level of the pancreas. The mass was supplied by two systemic feeding vessels likely off the celiac trunk. The right crus muscles were surgically approximated to reduce the risk of future hernia formation. Pathology confirmed the diagnosis of extralobar pulmonary sequestration without malignant. The patient was discharged home on post-operative day 1 and recovered uneventfully with resolution of GERD and feeding issues.

**Discussion:** Intraabdominal extralobar pulmonary sequestrations are rare entities, and thorough preoperative imaging can assist surgical planning but often cannot definitively diagnose them. In addition to pathological confirmation, surgical resection provides the additional benefits of reducing risk of malignant degeneration and allowing for intra-operative evaluation of other possible anomalies, including diaphragmatic hernia. In this case, it also improved her clinical symptoms (reflux and feeding issues) as it likely caused external compression of the esophagus just above the gastroesophageal junction. The patient's quick recovery postoperatively highlights the value of the minimally invasive surgical approach.



**Figure 1a & 1b:** Illustration (1a) and intra-operative imaging (1b) demonstrating mass location. Mass (A) removed from its bed within the right crus muscle (B). Exposed retroperitoneal musculature noted deep (C). Second systemic feeding artery noted on the inferior medial aspect of the mass with surgical clips (D).

# Cholecystectomy Following Sleeve Gastrectomy in Pediatric and Young Adult Patients - Evaluating the Risk Factors

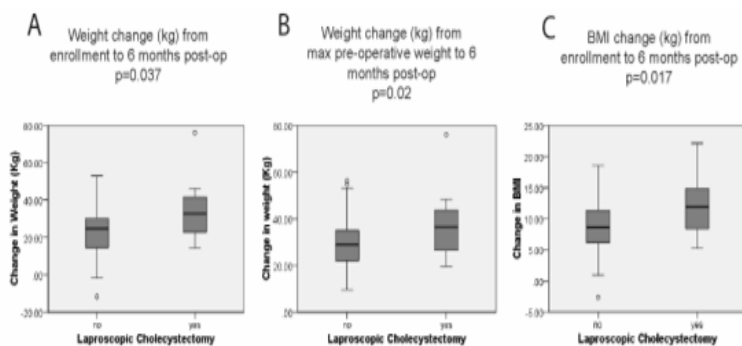
Megan G Anderson BS<sup>1,2</sup>, Prabhath Mannam BS<sup>1,2</sup>, Christine Finck MD<sup>1,2</sup>, FACS, James Healy MD, MPH, FACS<sup>1,2</sup>  
 University of Connecticut School of Medicine<sup>1</sup>, Connecticut Children’s Department of Surgery<sup>2</sup>

**Introduction:** In pediatric patients with obesity, the use of laparoscopic or robotic sleeve gastrectomy (SG) is increasing. Amongst adults, cholelithiasis is a common post-operative complication, however few studies have evaluated the rate of biliary disease requiring cholecystectomy in the pediatric population. In this study, we sought to identify possible risk factors, both pre-operative and post-operative, for later requiring a cholecystectomy (LC) following bariatric surgery.

**Method(s):** This is a single-center, retrospective chart review of patients aged 12-23 who underwent sleeve gastrectomy at a freestanding academic children’s hospital after 01/01/2014. Patients who had a LC prior to, or during their sleeve gastrectomy were excluded. Data regarding demographics, medical/surgical history, and follow-up were retrospectively evaluated from a bariatric registry. Patients were categorized as having a post-operative cholecystectomy (LC) vs. not having a post-operative LC (No LC) and data were analyzed using descriptive statistics and comparative statistics such as Fisher’s exact test for categorical data, student’s t-test for normally distributed continuous data, and Mann-Whitney U Test for non-parametric continuous data.

**Results:** A total of 140 patients met inclusion criteria with 14 (10%) undergoing a LC after their sleeve gastrectomy. There were no significant differences in demographics (Table 1). Patients in both groups had similar rates of diabetes, acanthosis, and sleep apnea, however, patients who underwent LC were more likely to have a history of asthma (71.4% vs. 39.7%,  $p = 0.043$ ). Post-operatively, those who had a LC were most likely to have presented to the emergency department within one year (69.2% vs. 30.2%,  $p = 0.01$ ) and be re-admitted to the hospital within 30 days of their LSG for a reason other than re-operation (21.4% vs. 2.4%,  $p = 0.014$ ). Notably, those who underwent LC had significantly more weight loss within the first 6 months following their sleeve gastrectomy when compared to their enrollment weight (median 32.8kg, IQR [19.7-45.6] vs. median 24.7kg, IQR [14.65-30.175],  $p = 0.037$ ) and maximum pre-operative weight (mean 38.0  $\pm$ 16.1kg vs. 29.5  $\pm$ 10.25,  $p = 0.020$ ) (Figure 1AB). Patients drop in BMI within the first 6 months was also statistically significant (mean 12.0  $\pm$ 5.3 vs. 8.75  $\pm$ 4.0,  $p = 0.017$ ) (Figure 1C).

**Conclusion(s):** Pediatric patients undergo post-sleeve cholecystectomy at a similar rate to that reported for adults (approximately 10%). In our institution’s experience, pre-operative risk factors for requiring cholecystectomy included having a history of asthma. Those who had a higher rate of weight loss within the first 6 months of surgery were also more likely to develop gallstones and require a cholecystectomy (Figure 1), reflecting the precipitation of cholesterol stones with rapid weight fluctuation. Additional research will be required to determine whether Ursodiol prophylaxis should be recommended for pediatric patients at a higher risk of developing gallstones.



Characteristics	All Patients (n=140)	Laparoscopic Cholecystectomy (n=14)	No Laparoscopic Cholecystectomy (n=126)	p-value
Age at surgery, mean (SD)	16.9 (2.2)	16.8 (1.9)	17.0 (2.2)	0.829
Sex, n (%)				1.00
Male	40 (28.6)	4 (28.6)	36 (28.6)	
Female	100 (71.4)	10 (71.4)	90 (71.4)	
Race, n (%)				0.394
White	53 (37.9)	6 (42.9)	47 (37.3)	
Black/African American	31 (22.1)	1 (7.1)	30 (23.8)	
Other	56 (40.0)	7 (50.0)	49 (38.9)	
Ethnicity, n (%)				0.259
Not Hispanic or Latino	74 (52.9)	5 (35.7)	69 (54.8)	
Hispanic or Latino	66 (47.1)	9 (64.3)	57 (42.5)	
Insurance, n (%)				0.771
Public	91 (65.5)	10 (71.4)	81 (64.8)	
Private	48 (34.5)	4 (28.6)	44 (35.2)	

Figure 1. Weight and BMI changes amongst patients who did and did not have a post-operative LC.

## A Rare Case Report: Plastic Bezoar-Induced Bowel Obstruction in an Adolescent Patient with Pica

Carolina Vigna, MD<sup>1</sup>; Danielle Dougherty, MD<sup>2</sup>; Peter Townsend, MD<sup>2</sup>; Jacob Campbell, DO, MPH<sup>2</sup>

<sup>1</sup>University of Connecticut School of Medicine; <sup>2</sup>Connecticut Children's Medical Center

**Introduction:** Pica, a disorder characterized by the ingestion of nonnutritive, nonfood substances, can pose clinical challenges and result in serious gastrointestinal complications. We present a case of a 17-year-old female who ingested plastic materials leading to a bowel obstruction requiring surgical intervention.

**Case:** Patient is a 17-year-old female with a history of pica who presented to the ED with abdominal pain, nausea, and emesis after reporting to have ingested a latex glove and a balloon three and six days prior to presentation, respectively. Presenting exam revealed epigastric and mid-abdominal tenderness. Laboratory evaluation revealed a microcytic anemia (Hgb: 10.2, MCV: 73). Abdominal x-ray revealed stool in colon, no evidence of small bowel dilation, and prominent appearing stomach and duodenum.

The patient was admitted and started on treatment for anemia with iron supplementation. She underwent an EGD<sup>a</sup> during which two large plastic foreign bodies, likely crumpled gloves, were removed from the esophagus. The procedure was aborted thereafter due to superficial trauma/irritation to the esophagus. Several additional foreign bodies were observed in stomach but not removed due to prior trauma. Plans were made to perform a second EGD with surgical team on standby should the foreign bodies not be amenable to endoscopic retrieval. All gastric foreign bodies were removed endoscopically at that subsequent procedure. However, the patient continued to experience significant abdominal pain and multiple emetic episodes. A small bowel follow through was performed to ensure no residual foreign bodies. The scout film was concerning for small bowel obstruction, leading to a CT abdomen and pelvis<sup>b</sup>, which revealed a distal ileal obstruction with what appeared to be impacted foreign material, dilated bowel proximally and decompressed distally, as well as moderate to large volume ascites.

Given the low likelihood of these foreign bodies passing through the ileocecal valve decision was made to proceed with surgery. She underwent an exploratory laparotomy<sup>c</sup>. Two areas of conglomerated hard foreign bodies were found approximately 40 cm from ileocecal valve and distal terminal ileum. Both were milked through a single longitudinal enterotomy. A plastic and hair bezoar was obtained<sup>d</sup>, and the enterotomy was then closed transversely.

The patient is now tolerating a regular diet and having bowel function. She was evaluated by psychiatry with plans for outpatient cognitive-behavioral therapy focused on anxiety management and behavioral interventions.

**Discussion:** Pica is a well reported, though not well understood, eating disorder more frequently seen in children. Identified risk factors include stress, abuse, neglect, low socioeconomic status, underlying mental health disorder, and nutritional deficiencies, including iron deficiency anemia<sup>1,2</sup>. About 80% of ingested foreign bodies pass spontaneously, 15-20% are retrieved endoscopically and less than 1% require operative intervention<sup>3</sup>. Treatment approach varies depending on the ingested material. Batteries, magnets and sharp objects require urgent removal, while other materials, such as plastic, can be monitored for spontaneous passage or require endoscopic removal. Interestingly, there have been cases reporting the formation of hard bezoars after rubber glove ingestion. It has been suggested that polyvinyl chloride, usually present in gloves and ballons, undergoes a chemical transformation when exposed to gastric acid, resulting in the change in consistency<sup>4</sup>, leading to challenges in endoscopic removal, as seen in our case, ultimately requiring surgical management.

