use as indicators of care quality. We hypothesized that IBD care could be improved through a structured quality improvement (QI) program.

Methods: We utilized the Breakthrough Series Collaborative approach developed by the Institute for Healthcare Improvement to improve care for adults with IBD. We identified primary and secondary drivers of urgent care need for patients including those at high risk for ER use, and a multi-stakeholder panel developed 19 practice change ideas that could influence those drivers. Between January 2018 and May 2019, clinical sites participating in a QI collaborative across the United States tested and implemented various change ideas, shared ongoing results during coached monthly webinars, and participated in 3 in-person meetings to learn QI methods and share best practices. Patient-reported outcomes (PROs) were collected at clinical visits, including recent ER use and hospitalizations, use of steroids and narcotics, and measures of care utilization. Providers rated whether patients were at high risk for urgent care needs. Site performance on key measures were monitored using statistical control charts, with assessment for common cause (due to chance) variation and special cause (non-random) variation.

Results: We collected data prospectively from 20,382 discrete visits at twenty-six participating clinical practices (14 academic/university, 12 private/community). Disease type included Crohn's disease (58%), ulcerative colitis (39%), and other (3%); 54% were female. During the 15-month project period, improvement with special cause variation was noted across multiple measures. Collaborative-wide decreases were seen in ER utilization (18% to 14%, relative reduction of 22%; Figure), hospitalization (14% to 11%, relative reduction of 21%), steroid use (14% to 10%, relative reduction of 29%), and narcotic utilization (8% to 4%, relative reduction of 50%). Special cause change ideas tested by sites included proactive maintenance of a “high risk” patient list, reserved outpatient visits for urgent needs, “morning-after” contact with patients who went to the ER, patient education about how and when to get help, and proactively scheduling earlier follow-up for high-risk patients.

Conclusions: Outcomes of IBD care were improved using a structured QI program that facilitates small changes in practice structure, sharing of best practices across sites, and ongoing feedback. Spread of successful change ideas may facilitate broad improvement in IBD care and significant cost savings when applied to a large population.

Changes in Key Measures Over Time

Statistical Process Control Chart Showing Monthly Proportion of Patients Reporting Recent ER Utilization

<table>
<thead>
<tr>
<th>Outcome Measure</th>
<th>Baseline Proportion (February, 2019)</th>
<th>Final Proportion (April, 2019)</th>
<th>Relative Change</th>
<th>Type of Variation Seen</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical Remission</td>
<td>0.62</td>
<td>0.45</td>
<td>+0.07</td>
<td>Common Cause Variation</td>
</tr>
<tr>
<td>Perceived Need for Urgent Care</td>
<td>0.26</td>
<td>0.21</td>
<td>-0.05</td>
<td>Special Cause Variation</td>
</tr>
<tr>
<td>ER Utilization (%)</td>
<td>0.18</td>
<td>0.14</td>
<td>-0.04</td>
<td>Special Cause Variation</td>
</tr>
<tr>
<td>Hospitalization</td>
<td>0.14</td>
<td>0.11</td>
<td>-0.03</td>
<td>Special Cause Variation</td>
</tr>
<tr>
<td>Corticosteroid Use</td>
<td>0.12</td>
<td>0.13</td>
<td>+0.01</td>
<td>Special Cause Variation</td>
</tr>
<tr>
<td>NSAID Use</td>
<td>0.14</td>
<td>0.10</td>
<td>-0.04</td>
<td>Special Cause Variation</td>
</tr>
<tr>
<td>% of phone calls to clinic within 1 month</td>
<td>0.11</td>
<td>0.10</td>
<td>-0.01</td>
<td>Common Cause Variation</td>
</tr>
<tr>
<td>Proportion of patients with high risk status</td>
<td>0.14</td>
<td>0.06</td>
<td>-0.08</td>
<td>Special Cause Variation</td>
</tr>
</tbody>
</table>

* p < 0.05.

P022
SHIFTING COST-DRIVERS OF HEALTH CARE EXPENDITURES IN INFLAMMATORY BOWEL DISEASE

Benjamin Click, Rocio Lopez, Susana Arrigain, Jesse Schold, Miguel Regueiro, Maged Rizk

Background: Inflammatory bowel diseases (IBD) are costly, chronic illnesses. Key cost-drivers of IBD healthcare expenditures include pharmaceuticals and unplanned care, but evolving treatment approaches have shifted these factors. We aimed to assess changes in cost of care, determine shifts in IBD cost-drivers, and examine differences by socioeconomic and insurance status over time.

Methods: The Medical Expenditure Panel Survey (MEPS), a nationally representative database that collects data on healthcare utilization and expenditures from a nationally representative sample since 1998 was utilized. Adult subjects with IBD were identified by ICD-9 codes. In order to limit changes in the measure of the Elixhauser comorbidity index or cost-drivers unique to IBD, a control population of rheumatoid arthritis (RA) subjects was generated and matched in 1:1 case to control. Total annual healthcare expenditures were obtained and categorized as outpatient, inpatient, emergency, or drug related. Temporal trends from 1998 to 2015 were created to assess change over time. Per-patient expenditures were compared by disease state and temporal cohort using weighted generalized linear models.

P021
READABILITY AND QUALITY OF ONLINE RESOURCES ON NUTRITION AS IT RELATES TO IBD

Ali Khan, Scott Baumgartner, Vinay Rao, Marie Borum

Background: Nutrition plays an essential role in inflammatory bowel disease (IBD). Optimizing nutritional status can help prevent malnutrition, osteoporosis, and may be an effective primary therapy for many patients. Patients with IBD are increasingly turning to the Internet for information. This study evaluated the readability and quality of online resources discussing nutrition for IBD.

Methods: Google search engine was used to query “nutrition and inflammatory bowel disease” to access the first 100 websites. Websites that were non-accessible, duplicates, videos without transcripts or evaluated animal models were excluded. Websites were categorized as informational or academic/professional. Readability was determined using the validated Flesch-Kincaid Grade Level Calculation. The quality of the information was determined using the validated DISCERN score.

Websites were reviewed for inclusion of a discussion of shared decision making between patients and physicians. Statistical analysis was performed using a two-tailed Fisher’s Exact Test and a two-sample T-test with a significance value set at p <0.05.

Results: 89 of 100 websites met the inclusion criteria. 50 (56.2%) websites were informational and 39 (43.8%) were academic. The average Flesch-Kincaid Grade level was 13.2, with no significant difference between informational and academic websites (13.1 and 13.4 grade levels, respectively; p=0.760). The average DISCERN score was “good” without significant difference between informational and academic websites (45.75 and 45.74, respectively; p=0.994).

Academic websites had significantly more “excellent” DISCERN scores than informational websites (76% and 24%, respectively; p=0.0054). There were no significant difference in “good” or “poor” DISCERN scores between academic and informational websites (p=0.527 and p=0.095, respectively) (Figure 1). Shared decision making between patient and physician was discussed among 33.7% of all sources, significantly more often among informational than academic sources (60% and 0%, respectively; p=0.0001).

Discussion: Patients often self-manage their symptoms using easily accessible online resources. While our study demonstrated near identical DISCERN scores between academic and informational websites, the average Flesch-Kincaid Grade Level exceeded the NIH recommended 6th grade reading level. Informational websites, however, were more likely to encourage shared decision making between physican and patient. It may be important for academic online resources to specifically emphasize communication that encourages shared decision making between IBD patients and physicians. As the use of online resources continues to increase, further efforts should focus on developing informational resources written at a grade level which is applicable to the general public.

DISCERN Score of Online Nutrition Resources
Results: Total of 641 IBD subjects were identified and matched to 641 RA individuals. From 1998 to 2015, median total annual healthcare expenditures nearly doubled (adjusted estimate 2.20; 95% CI 1.6–3.0) and were 36% higher in IBD compared to RA. In IBD, pharmacy expenses increased 7% to become the largest cost driver (44% total expenditures). Concurrently, inpatient spending in IBD decreased by 40%. There were no significant differences in the rate of change of cost-drivers in IBD compared to RA.

Conclusions: Per-patient healthcare costs for chronic inflammatory conditions have nearly doubled over the last 20 years. Increases in pharmaceutical spending in IBD are mainly driven by biologic therapy, and medical intractability as an indication for surgery (p value 0.01, <0.001, 0.02 respectively). The mean specimen length in Group A was 29.1 cm compared to 29.9 cm in the Group B (p = 0.68). A subgroup analysis of ileocolic resections and small bowel resections was completed. Within the ileocolic group, there was no significant difference in length between groups with respect to the total specimen length (p = 0.92), colonic portion (p = 0.15), and small bowel portion (p = 0.67). Analysis of small bowel resection specimens also found no difference in length between the groups (p = 0.63).

Conclusions: The use of biologics in CD was not associated with reduced specimen length in ileocolic resections and in small bowel resections.

P023
THE ASSOCIATION BETWEEN BIOLOGIC USE AND SPECIMEN LENGTH IN CROHN’S DISEASE
Trevor Wood, Karen Zaghiyan, Phil Fleshner

Introduction: Despite advances in medical management, including the use of biologic agents, up to 80% of Crohn’s patients (CD) ultimately require operative intervention. Additionally, these patients are at risk for additional operative intervention within their lifetime. Given the risk of short bowel syndrome secondary to multiple bowel resections, conservation of bowel length is of paramount importance. A common yet unproven belief in the gastrointestinal community is that intensive preoperative medical therapy might reduce the length of bowel removed at surgery. In this study, we compared specimen length in CD patients treated or not treated with biologic agents before surgery.

Objective: To determine if there is an association between biologic use and reduced specimen length after bowel resection.

Methods: Prospectively generated clinical profiles on consecutive CD patients undergoing their first ileocolic or small bowel resection between November 1999 to July 2019 were reviewed. Patients were classified into 2 groups: Group A patients were treated with biologic agents at any time before surgery while Group B patients had never received a biologic agent. Specimen length was determined by review of pathology reports. In patients with multi-segment resections, the sum of the specimens was recorded. The means of the two groups were compared using Student’s t-test.

Results: The study cohort of 392 patients had a mean age of 36.2 (SD 15.9) years and included 53% males. Group A included 247 (63%) patients and Group B included 145 (37%) patients. Groups were comparable in terms of background demographics with the exception of age, use of preoperative immunomodulator therapy, and medical intractability as an indication for surgery (p value 0.01, <0.001, 0.02 respectively). The mean specimen length in Group A was 29.1 cm compared to 29.9 cm in the Group B (p = 0.68). A subgroup analysis of ileocolic resections and small bowel resections was completed. Within the ileocolic group, there was no significant difference in length between groups with respect to the total specimen length (p = 0.92), colonic portion (p = 0.15), and small bowel portion (p = 0.67). Analysis of small bowel resection specimens also found no difference in length between the groups (p = 0.63).

Conclusions: The use of biologics in CD was not associated with reduced specimen length in ileocolic resections and in small bowel resections.

P024
THE MORE YOU KNOW: YOUNGER IBD PATIENTS AND THOSE ON BIOLOGICS ARE MORE FREQUENTLY ASSESSED FOR HEALTH LITERACY
Scott Baumgartner, Jessica Basso, Daniel Szvarca, Nadeem Tabbara, Lindsay Clarke, Marie Borum

Background: Immunomodulator and biologic therapies are important options for individuals with moderate to severe inflammatory bowel disease (IBD). It is critical that IBD patients are aware of potential side effects of all medications. Health literacy can impact upon patients’ understanding of IBD management. This study evaluated the rate at which university gastroenterologists assess health literacy in IBD patients on immunomodulator and biologic treatment.

Methods: A retrospective chart review of all IBD patients seen in the gastroenterology clinic of a university medical center over a five-year period was performed. Patient age, gender, IBD diagnosis, medications (biologics, immunomodulators), and documented health literacy assessment were recorded. A database was generated using Microsoft Excel. Statistical analysis was performed using Fisher’s Exact Test with significance set at P < 0.05. The study was approved by the institutional IRB.

Results: 392 medical records were analyzed. There were 175 men and 217 women. The mean age was 44.3 years (range 20–82), with 39.5% (n = 154) < 50 years. 278 (71%) had ulcerative colitis (UC), 96 (24.5%) Crohn’s disease (CD), 11 (2.8%) microscopic colitis, and 7 (1.8%) unspecified colitis. 48 were on biologics alone, 30 on biologics with an immunomodulator or aminosalicylate, 224 were on immunomodulators and/or an aminosalicylate and 90 were on other medication regimens. 18 (37.5%) on biologics and 14 (46.7%) on biologics with an immunomodulator or aminosalicylate, 63 (28.1%) on an immunomodulator and/or aminosalicylate and 15 (16.7%) on other medication regimens had a documented health literacy assessment. Patients on a biologic regimen were more often assessed for health literacy compared to those on immunomodulators and/or aminosalicylates (p = 0.012) or other medication regimens (p = 0.0005). Additionally, patients < 50 years were assessed for health literacy more frequently than those >50 years (p = 0.0008).

Discussion: Health literacy enables individuals to make informed medical decisions and follow treatment recommendations. It is important that individuals with IBD understand their medical regimens, especially those on immunomodulator and biologic therapy. This study revealed that health literacy was inconsistently documented, with patients < 50 and those on biologics more frequently evaluated. While this study is limited based on upon size, retrospective design and reliance on literacy documentation, it supports recommendations that providers assess individuals’ understanding of their condition and treatment. Ensuring patients’ IBD health literacy will optimize clinical care and outcomes.

P025
THE PRIOR AUTHORIZATION PREDICAMENT: AN EVALUATION OF TIME TO INITIATION OF BIOLOGIC THERAPY IN IBD PATIENTS
Vinay Rao, Scott Baumgartner, Danielle Kirelik, Katherine Negreira, Jessica Gibilisco, Karon Chawla, Jenny Dave, Samuel Kallus, Marie Borum

Introduction: Health literacy among inflammatory bowel disease (IBD) patients has been reported to be lower than the general population. While health literacy can impact upon patients’ understanding of IBD management, this is particularly important in IBD patients, who are often prescribed multiple medications with potentially life-threatening side effects. Ensuring patients’ IBD health literacy can impact their understanding of their condition and treatment. Ensuring patients’ IBD health literacy will optimize clinical care and outcomes.

Methods: A retrospective chart review of all IBD patients seen in the gastroenterology clinic of a university medical center over a five-year period was performed. Each chart was reviewed for age, gender, IBD diagnosis, medications (biologics, immunomodulators), and documented health literacy assessment were recorded. A database was generated using Microsoft Excel. Statistical analysis was performed using Fisher’s Exact Test with significance set at P < 0.05. The study was approved by the institutional IRB.

Results: 392 medical records were analyzed. There were 175 men and 217 women. The mean age was 44.3 years (range 20–82), with 39.5% (n = 154) < 50 years. 278 (71%) had ulcerative colitis (UC), 96 (24.5%) Crohn’s disease (CD), 11 (2.8%) microscopic colitis, and 7 (1.8%) unspecified colitis. 48 were on biologics alone, 30 on biologics with an immunomodulator or aminosalicylate, 224 were on immunomodulators and/or an aminosalicylate and 90 were on other medication regimens. 18 (37.5%) on biologics and 14 (46.7%) on biologics with an immunomodulator or aminosalicylate, 63 (28.1%) on an immunomodulator and/or aminosalicylate and 15 (16.7%) on other medication regimens had a documented health literacy assessment. Patients on a biologic regimen were more often assessed for health literacy compared to those on immunomodulators and/or aminosalicylates (p = 0.012) or other medication regimens (p = 0.0005). Additionally, patients < 50 years were assessed for health literacy more frequently than those >50 years (p = 0.0008).

Discussion: Health literacy enables individuals to make informed medical decisions and follow treatment recommendations. It is important that individuals with IBD understand their medical regimens, especially those on immunomodulator and biologic therapy. This study revealed that health literacy was inconsistently documented, with patients < 50 and those on biologics more frequently evaluated. While this study is limited based on upon size, retrospective design and reliance on literacy documentation, it supports recommendations that providers assess individuals’ understanding of their condition and treatment. Ensuring patients’ IBD health literacy will optimize clinical care and outcomes.

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