

A New Model of Acute Obstructive Jaundice Management in the Emergency Department

Veronica Ojetti, Vincenzo Perri, Carmine Petruzzello, Andrea Tringali, Dario Sinatti, Antonio Gasbarrini, Guido Costamagna, Francesco Franceschi

INTRODUCTION Is it well known that obstructive jaundice is a frequent cause of access in Emergency Department (ED), with or without cholangitis, and this requires a rapid management with hospitalization in surgical or gastroenterology unit to perform ERCP and to solve the problem. To reduce the problem of overcrowding and too many hospital admissions in Italian's ED were added Brief Observation Unit (BOU), small units located close to the ED in which patients are treated for 48-72h with a significant decrease of regular admission costs. Aim of our study was evaluate the efficacy of a new model of managing acute obstructive jaundice with ERCP procedures directly from BOU, instead of admitting patients to long and unnecessary periods of hospitalization. **PATIENTS AND METHODS** We enrolled from July 2014 to November 2015, 172 consecutive patients (102M/70F mean age 66.7 ± 13.5) who came to our ED of Gemelli Hospital with an acute obstructive jaundice with the indication to perform ERCP. Routine blood tests including LFTs, chest x-ray, EKG, abdominal ultrasound (or CT scan if needed) were performed and the patient sent urgently to perform ERCP. After ERCP patients were hospitalized for a short observation in the BOU. **RESULTS** Indications for ERCP are summarized in the table Overall, 132 / 172 patients (76.7 %) were discharged the day after the procedure or within 48 hours from admission (p<0.0001). Biliary stent clogging, unresectable pancreatic cancer and removal of biliary stones are the diseases in which treatment determined a significantly high probability of discharge directly form BOU, differently from cholangitis with incomplete drainage from other facilities or acute biliary pancreatitis, which always require regular hospital admission (p<0.0001). This model allowed to significantly reduce the total costs of management of those diseases (291 vs 1058 USD per day for each patient; p<0.0001). **DISCUSSION AND CONCLUSIONS** Our study showed the effectiveness of BOU in the managing of patients with acute obstructive jaundice who needs ERCP, especially for those who underwent for removal of biliary stones or biliary stent clogging. All of these patients were admitted to BOU, thereby reducing the cost and time of hospitalization. This approach decreases unnecessary inpatient admission, reduces timing of procedures actuation and allows a faster and appropriate managing of the patients.

	Patients	% of patients	% of discharge after observation
Removal of biliary stones	99/172	57%	71.4%
Biliary Stent Clogging	34/172	19.8%	94.1%
Cholangitis with incomplete drainage	3/172	1.7%	0%
Cholangitis with incomplete drainage from other facility			
Unresectable Pancreatic cancer	35/172	20.3%	85.7%
Acute biliary pancreatitis	2/172	1.2%	0%

Cost-Effectiveness Analysis of Endoscopic Ultrasound-Guided Biliary Drainage (EGBD) Versus Percutaneous Transhepatic Biliary Drainage (PTBD) for Malignant Biliary Obstruction After Failed ERCP

Saowanee Ngamruengphong, Ricky Wat, Gulara Hajjiveya, Amr Ismail, Yen-I Chen, Majidah Bukhari, Yamile Haito Chavez, Vivek Kumbhari, Mouen A. Khashab

Background: EUS-BD has been reported as an effective alternative to PTBD in patients with biliary obstruction after failed ERCP. Previous studies comparing EUS-BD and PTBD revealed equivalent efficacy and safety. However, the cost-effectiveness of EUS-BD as compared to PTBD has not been examined. **Aims:** To analyze the cost-effectiveness of the two strategies in the management of malignant biliary obstruction after failed ERCP. **Methods:** A decision-analytic Markov model was constructed to evaluate the cost effectiveness of EUS-BD versus PTBD in a hypothetical cohort of 1000 unresectable patients with jaundice due to malignant distal biliary obstruction and failed ERCP, with a time horizon of 12 months. Estimates of technical success, clinical success, adverse event rates, quality of life (QoL) and key transitional probabilities were derived from published literature. Charges of index procedure and reinterventions were calculated from a billing database at our institution. Outcomes including health benefits expressed as Short Form 36 (SF-36) QoL scores, costs in US dollars, and cost effectiveness expressed as an incremental cost-effectiveness ratio (ICER) were calculated. Sensitivity analyses evaluated the influence of parameters on ICER by varying these inputs across plausible ranges. **Results:** In the base-case analysis, EUS-BD was more cost-effective than the PTBD. The strategy of PTBD was dominated by EUS-BD because it was more expensive without clinically significant incremental effectiveness (Table 1). The probability of reintervention among PTBD and EUS-BD over a 12 month follow-up period was 92% and 27%, respectively (Fig 1). The average number of interventions per patient was 3.44 for PTBD and 1.67 for EUS-BD. Although the charges associated with EUS-BD index procedure were significantly higher (\$7,391±3,791/patient) than PTBD (\$3,578±1,699/patient) (p<0.001), the charges associated with EUS-BD reintervention were significant less (\$1,648/patient) than PTBD (\$50,612/patient) (p<0.001). Compared to EUS-BD, the PTBD group yielded an ICER of \$21,961 per QoL at 7 days and \$23,957 per QoL at 30 days. The model was highly sensitive to the likelihood of technical success, charges of index and reintervention procedures. The thresholds at 1-way sensitivity analyses for PTBD to be more cost-effective were: 1) probability of death within 4 weeks >86.27%, 2) probability of PTBD reintervention within 4 weeks in <15.5% of cases, and 3) PTBD reintervention charge of <\$1,409.57. **Conclusion:** EUS-BD was the more cost-effective strategy as compared to PTBD for managing patients with malignant biliary obstruction after failed ERCP. Despite higher index costs, EUS-BD procedure incurred lesser overall charges due to less reintervention costs. These results suggested that EUS-BD is the treatment of choice for these patients at centers with the required expertise.

Table 1. Baseline analysis at 30 days

Strategy	Cost (\$)	QoL (SF-36)	ICER (Incremental Cost-Effectiveness Ratio)
I: PTBD	35,228	74.2	DOMINATED by strategy II
II: EUS-BD	8,874	73	23,957.75

Increasing Burden of Functional Gastrointestinal Disorders: An Analysis of Hospitalizations and Emergency Room Visits

Muhammad H. Bashir, Klaus Bielefeldt, Salman Nusrat

Introduction: Functional gastrointestinal disorders (FGIDs) are increasing in prevalence in United States. These not only result in large number of clinic visits but also lead to significant number of hospitalizations and emergency room (ER) encounters. The aim of this study was to evaluate the inpatient admissions rates, length of hospital stay, characteristics of ER visits and associated cost related to FGIDs in U.S. **Methods:** Using data from the Nationwide Inpatient Sample and National Emergency Department Sample we examined the characteristics of hospitalizations and ER visits for constipation (ICD-9 code 564.0), achalasia (ICD-9 530.0), gastroparesis (ICD-9 536.3), dyspepsia (ICD-9 536.8), fecal incontinence (ICD-9 787.6) and IBS (ICD-9 564.1). We evaluated the time trends of resource utilization from 1997 to 2013 for hospitalizations and 2006 to 2012 for ER visits. We defined FGID as the sum of the above disorders. Fisher's exact test and two-sample t-test were used where appropriate. **Results:** In 2013, functional gastrointestinal disorder was the primary discharge diagnosis for 69,085 hospitalizations (Table 1). Majority of these patients were females (64.12%) and aged between 18 and 64 (56.80%). The mean hospital stay was 3.6 days. Based on regions defined by bureau of census, southern states accounted for majority (40.36%) of these hospitalizations. Only 3.87% of the patients were uninsured and median income for the zip code was not low (>25 percentile) for little more than half of the hospitalizations (56.64%). The mean charges per hospital admission were \$25,607 and resulted in a national bill of \$1,897,145,876. Constipation was responsible for about half of these admission (49.8%). Gastroparesis was associated with longest hospital stay (5.0 days) and achalasia resulted in highest charges per hospitalizations (\$47,707). Between 1997 and 2013, the number of patients discharged with a primary diagnosis of FGID increased from 48,264 to 69,085 (p<0.01). Despite, no significant change in mean duration of hospital stay (3.52 to 3.60 days; P=0.5) the mean charges increased from \$6,926 to \$25,607 (p<0.001) and the aggregate cost increased about 6 folds from \$334,289,540 to \$1,897,145,876. Similarly between 2006 and 2012, we saw an increase in number of ER visits from 574,336 to 823,355 (Table 2). **Discussion:** FGID are common reason for hospitalization and ER visits. Number of discharges secondary to these disorders and associated cost has increased over the last two decades. There are gender and regional differences with females and southern states accounting for the largest proportion. Achalasia has highest mean associated cost for inpatient management and gastroparesis resulted in longest hospital stay. Endoscopic or surgical interventions might have contributed to high charges associated with achalasia in the inpatient setting.

Table 1. Characteristics of Hospitalizations Secondary to Functional GI Disorders

	No. of Discharge 2013	Age (18-64)	Female (%)	Mean hospital stay (days)	Charges per hospitalization 2013	Aggregate Charges 2013	Charges per hospitalization 1997	Aggregate Charges 1997
Constipation	34,420	11,700	58.45	2.9	20,406	704,364,663	5,139	106,503,325
Fecal Incontinence	1,125	495	58.22	4.4	40,362	45,452,282	9,671	13,800,109
IBS	8,100	5,720	77.47	3.7	26,605	215,147,626	6,880	75,144,670
Gastroparesis	16,460	12,810	72.27	5.0	34,585	568,477,666	12,597	50,456,642
Achalasia	5,195	2,950	56.99	4.1	47,707	248,215,416	12,723	32,020,083
Functional Dyspepsia	3,785	2,080	63.67	4.0	30,607	115,488,223	6,337	56,364,711

Table 2. Characteristics of ED Visits Secondary to Functional GI Disorders

	No. of ED visit 2012	No. of ED visit 2006	Age (18-64) (%)	Female (%)	Low Median Income Zip Code (%)	Uninsured (%)
Constipation	713,010	463,650	36.79	57.00	34.68	10.30
Fecal Incontinence	1,733	1,808	32.25	50.65	40.65	9.95
IBS	31,876	35,798	79.44	75.04	32.76	15.99
Gastroparesis	31,451	15,459	86.54	69.99	36.55	11.78
Achalasia	2,399	2,205	50.98	57.02	30.23	12.25
Functional Dyspepsia	42,886	55,416	71.66	61.31	39.48	21.23

Budget Impact of Somatostatin Analogs (SSAs) as Treatment for Metastatic Gastroenteropancreatic Neuroendocrine Tumors (mGEP-NETs) in United States Hospitals

Jesse D. Ortendahl, Sonia J. Pulgar, David Cox, Tanya G. Bentley, Alexandria Phan

Background: With the introduction of new therapies, it is often difficult for hospitals to plan spending limited resources in an effective manner. Lanreotide depot (LAN) was recently approved by the FDA to treat mGEP-NETs to improve progression-free survival. While the

SSAs, LAN and octreotide LAR (OCT), have different approved indications, we built a budget impact model to assist hospitals in estimating financial implications of adoption and diffusion of SSAs as treatment for GEP-NETs. **Methods:** Through a health economic model, the budget impact of alternative SSA utilization scenarios can be explored. A hypothetical cohort of 500 GEP-NET patients is considered the treated population in the model, with the proportion treated with an SSA estimated using published epidemiologic data. Drug acquisition, preparation, and administration costs are included based on a national pricing database and published literature. Published estimates of real-world dosing of OCT are utilized as a model assumption. As LAN was approved recently, real-world dosing was unavailable and the model assumed labeled dosing. Several alternative scenarios for the proportion of patients receiving LAN or OCT were considered to estimate the incremental budget impact to the hospital. **Results:** The model-predicted average per-patient cost for LAN is \$71,442 compared to \$75,508 for OCT. This leads to a decrease in total costs to the hospital with increase in LAN utilization. In the base case, 313 of the initial 500 GEP-NET patients are treated with an SSA. With a hypothetical increase in LAN utilization from 5% to 30% of this population, the model projects that the annual costs to the hospital will decrease by approximately \$318,000. When varying inputs in one-way sensitivity analyses, results were most sensitive to changes in dosing assumptions. **Conclusion:** Results from this model suggest that factors beyond drug acquisition cost can influence the overall budget impact to a hospital. When considering preparation and administration time, and dosing as it occurs in the real world, use of LAN has the potential to reduce health care expenditures associated with SSA treatment for GEP-NETs.

Mo1102

Demographic and System-Based Factors Which Predict No-Shows in an Outpatient Academic Gastroenterology Consultation Practice
Jason D. Jones, Richard B. Weinberg

Background: No-shows, i.e., patients who fail to appear for their outpatient clinic appointment with no advance notice of cancellation or attempt to reschedule, lead to lost revenue, wasted resources, increased wait times, decreased patient satisfaction, and constrained access to specialty care. We therefore analyzed the charts of all patients scheduled for a visit to our outpatient gastroenterology practice in FY14 with the ultimate goal of developing a probability-based scheduling algorithm that uses easily available demographic and system-based data. **Methods:** The electronic medical records of all patients scheduled for an outpatient consultation or follow-up visit during FY14 at a large academic faculty gastroenterology practice (13 faculty) were queried for the following variables: age, gender, marital status, insurance type, distance to the medical center, interval between the appointment date and the date it was scheduled, appointment day of the week, total number of prior appointments made for any medical center clinic, and prior number and percent of previous no shows. The significance of differences in the means of parametric variables among patients who showed for their appointment, cancelled with less than 24 hours notice, and no-showed was determined by ANOVA; the significance of differences among groups in the frequency of categorical variables was determined by Chi-square analysis. New and return visits was analyzed separately. **Results:** Charts for 12,195 visits were analyzed. Statistically significant differences in most study variables were found between Show vs. No Show patients (Table 1). For both new and return visits, No Shows were younger, were less likely to be married, carried a higher percentage of Medicaid, had a smaller total number of prior appointments, and had a higher number and percent of prior no-shows. There was a higher percentage of males in return visit No Shows. There was no difference in the distance to the medical center among groups. Patients were most likely to No Show on Mondays and Fridays. Logistic regression analysis revealed that the parameters with the greatest power to predict the probability of a patient being a No Show were the appointment interval and the total number of previous no-shows at the medical center. **Conclusion:** The probability of a patient being a No Show for an outpatient GI clinic appointment can be predicted by a mathematical model which uses pre-determinable demographic factors such as age, insurance type, appointment interval, number of prior appointments, and number of prior No Shows. The relative predictive power of these factors is most likely specific to each unique practice. Use of this predictive model in conjunction with a probability-based scheduling algorithm could maximize productivity by assuring full clinic schedules while avoiding the pernicious effects of overbooking.

	New Patients		P	Return Patients		P
	Show	No Show		Show	No Show	
N						
Age	55.0 ± 0.3	50.5 ± 0.5	<0.001	54.4 ± 0.2	49.5 ± 0.4	<0.001
% Male	32.7%	41.5%	<0.001	34.2%	37.9%	<0.001
% Married	32.7%	40.5%	<0.001	34.2%	37.9%	<0.001
Distance	31.8 ± 1.1	29.2 ± 2.6	0.151	33.7 ± 0.8	36.6 ± 1.4	0.049
Interval	40.0 ± 0.6	52.7 ± 0.9	<0.001	59.8 ± 0.7	76.4 ± 1.3	<0.001
% Medicaid	4.8%	9.1%	<0.001	6.7%	10.1%	<0.001
# Prior Appts	44.3 ± 0.9	31.9 ± 1.1	<0.001	52.7 ± 0.7	33.8 ± 1.0	<0.001
% Prior NoShows	17.1%	37.8%	<0.001	12.8%	29.2%	<0.001

Mo1103

Post Colonoscopy Emergency Department Utilization is a Poor Quality Indicator

Laurie B. Grossberg, Konstantinos Papamichail, Mandeep Sawhney, Daniel A. Leffler

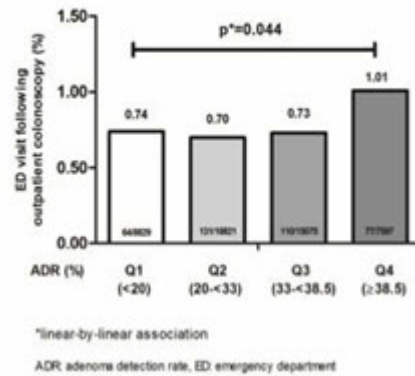
Background: Adenoma detection rate (ADR) is a validated quality measure for colonoscopy. Recently, the Center for Medicare and Medicaid Services has proposed a new quality measure for colonoscopy that assesses unplanned hospital visits within 7 days of endoscopy. It is not known if this measure is influenced by physician performance, or by patient characteristics. Aims: To examine the association between endoscopist ADR and the incidence of emergency department (ED) visits within 7 days of outpatient colonoscopy; and, to identify predictors of ED utilization after colonoscopy. **Methods:** In this retrospective, single-center, cohort study, we evaluated outpatient colonoscopies performed between January 2008 and September 2013 in patients between the ages of 40-85 without a prior history of inflammatory bowel disease. For each endoscopist, an ADR was calculated from 50 randomly selected outpatient colonoscopies that met inclusion criteria. Endoscopists were then divided into quartiles based on their ADR. We determined the rate of ED visits per colonoscopy in each

ADR quartile. We then assessed for potential predictors of ED utilization following procedure. We analyzed the significance of these factors through univariable and multivariable logistic regression (including variables with a p-value of <0.1 from univariable analysis, based on the Backward Wald selection method). Results: 50,322 outpatient colonoscopies performed in 44,047 unique individuals (46.7% males, median age at first colonoscopy 58 years) by 40 endoscopists were reviewed. The highest ADR quartile was associated with a higher rate of ED visits (Figure 1). Univariable analysis identified age, endoscopist ADR, endoscopist volume, ED visit one month prior to colonoscopy, fellow involvement, biopsy, and polypectomy as predictors of ED utilization after endoscopy. Multivariate analysis retained endoscopist ADR, endoscopist volume, ED visit one month prior to colonoscopy, fellow involvement, and polypectomy as independent variables associated with ED utilization after endoscopy (Table 1). The strongest predictor of post colonoscopy ED utilization was ED visit one month prior to procedure [OR 16.1 (95% CI 12.60-20.56)]. Conclusion: Higher endoscopist ADR was associated with increased ED utilization after an outpatient colonoscopy. Other factors including polyp removal and low endoscopist volume were also predictive of post colonoscopy ED visits, however these were minor compared to a recent prior ED visit. Unplanned hospital visits within 7 days of endoscopy are strongly influenced by patient characteristics, and may be a poor quality indicator of colonoscopy.

Table 1: Univariable and multivariable logistic regression analyses of variables associated with ED visits following outpatient colonoscopy.

Variables	Univariable analysis			Multivariable analysis		
	OR	95% CI	P-value	OR	95% CI	P-value
Age at colonoscopy	1.01	1.00-1.01	0.040			
Sex	0.97	0.90-1.05	0.447			
Endoscopist ADR (Q)	1.11	1.00-1.24	0.044	5.53	3.01-9.76	0.029
Endoscopist volume (Q)	0.78	0.68-0.89	<0.001	0.81	0.71-0.93	0.003
Endoscopist years since training (Q)	0.97	0.89-1.07	0.555			
ED visit one month prior to colonoscopy	16.91	12.80-20.78	<0.001	16.19	12.60-20.56	<0.001
Biopsy	1.68	0.86-3.09	0.101			
Fellow involvement	1.48	1.30-1.63	<0.001	1.27	1.03-1.58	0.029
Polypectomy	1.44	1.17-1.78	0.001	1.49	1.21-1.84	<0.001
Singley	1.27	1.02-1.59	0.036			

Figure 1: Post colonoscopy ED visits by endoscopist ADR quartile



Mo1104

Low Adherence to National Guidelines for Proton Pump Inhibitor Prescription in Patients Receiving Combination Aspirin and Anticoagulation

Rajani Sharma, Abhik Roy, Christopher Ramos, Richard Rosenberg, Reuben J. Garcia-Carrasquillo, Benjamin Lebowitz

Introduction: Despite its role in primary and secondary prevention of cardiovascular disease, the use of aspirin doubles the risk of gastrointestinal bleeding (GIB), which increases further with concurrent anticoagulation therapies. Given this increased risk, multidisciplinary guidelines from the American Heart Association and American College of Gastroenterology recommend prophylactic proton pump inhibitor (PPI) use for patients receiving combination aspirin and anticoagulation therapy. This study aimed to determine rates and predictors of adherence to these recommendations for GIB primary prevention. **Methods:** All adult patients discharged from a large, urban, academic, tertiary care hospital on combination aspirin and anticoagulation therapy from July 2009 through June 2014 were retrospectively evaluated for the presence of proton pump inhibitor (PPI) prescription (Rx) on discharge instructions. We used univariate analysis (chi-square and Fisher's exact tests, as appropriate) to assess demographics, and multivariate logistic regression to test for independent associations between demographic factors and PPI prescription at discharge. **Results:** We identified 2422 patients who were discharged on combination aspirin and anticoagulation therapy; the mean age was 68 years and 53.2% were male. The median length of admission was 6 days. Overall, 42.2% were prescribed a PPI at discharge. On univariate analysis, predictors of PPI Rx at discharge included: increased age (ages 60-69: 47.1% vs. age <60: 37.9%, p=0.0003), race/ethnicity (white: 47.3% vs. other all other races: 37.1-40.2%, p=0.0002), aspirin dose at discharge (325 mg: 55.1% vs. 81 mg: 39.4%, p<0.0001), marital status (married: 46.2% vs. not married: 39.4%, p=0.0009) and PPI Rx prior to admission (96.6% vs. 3.40%, p<0.0001). On multivariate analysis, significant predictors of PPI Rx at discharge were: ages 60-69 years (OR 1.61, 95% CI 1.17-2.23, p=0.0037) and 70-79 years (OR 1.48, 95% CI 1.06-2.06, p=0.020), and PPI Rx prior to admission (OR 120.03, 95% CI 75.06-191.92, p<0.0001). Lower odds of PPI Rx at discharge were found for patients who were enrolled in Medicaid (OR 0.55, 95% CI 0.35-0.88, p=0.012) or Medicare (OR 0.71, 95% CI 0.51-0.97, p=0.034), Spanish speaking (OR 0.63, 95% CI 0.45-0.87, p=0.0049), and prescribed lower dose aspirin (81mg) (OR 0.40, 95% CI 0.31-0.53, p<0.0001). **Conclusion:** Less than half of patients on combination aspirin and anticoagulation therapy were prescribed PPI at discharge as suggested by guidelines. Older age and PPI Rx prior to admission were predictors of PPI Rx at discharge, while Medicaid or Medicare insurance, Spanish language, and lower