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Hospital Readmission Following Emergency Room Visit for Cholelithiasis

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Abstract

Background—For patients presenting with symptomatic cholelithiasis, cholecystectomy is the definitive treatment modality. Our goal was to evaluate the surgical follow-up and outcomes in patients seen in the Emergency Department (ED) for an episode of symptomatic cholelithiasis and discharged home for elective follow-up.

Methods—We performed a retrospective review of consecutive patients seen in the ED for cholelithiasis and discharged without hospital admission between August 2009 and May 2014. All patients were followed for two years from the date of initial ED visit. We evaluated outpatient surgeon visits, elective and emergent cholecystectomy rates, and additional ED visits. Cumulative incidence and Kaplan-Meier curves were used to examine the time from the initial ED visit to outpatient surgeon evaluation and the time from initial ED visit to ED readmission.

Results—Seventy-one patients were discharged from the ED with a diagnosis of symptomatic gallstones. 12.6% of patients had an elective cholecystectomy in the two years after the initial visit. In this group, the mean time from the initial ED visit to outpatient surgeon follow-up was 7.7 days and all elective cholecystectomies occurred within one month of the initial visit. Of the 62 patients who did not have an elective cholecystectomy, only 14.5% of patients in this group had outpatient surgeon follow-up at mean time of 137 days from the initial ED visit for symptomatic gallstones. In addition, 37.1% of patients in this group had additional ED visits for gallstone-related symptoms, with 17.7 % of patients having two or more additional ED visits, and 12.9%

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required emergent/urgent cholecystectomy. 43.5% of additional ED visits occurred within one month and 60.9% within three months of their initial ED visit. In patients with additional ED visits for symptomatic cholelithiasis, 60.9% had more than one abdominal Ultrasound (US) or Computed Tomography (CT) scan during the course of multiple visits.

Conclusion—Failure to achieve a timely surgical follow-up leads to multiple ED readmissions and emergent gallstone related hospitalizations, including emergency cholecystectomy. System-level interventions to ensure outpatient surgical follow-up within one to two weeks of the initial ED visit has the potential to improve outcomes for patients with symptomatic biliary colic.

INTRODUCTION

The Society of American Gastrointestinal and Endoscopic Surgeons (SAGES) recommends cholecystectomy for symptomatic cholelithiasis,¹ yet the optimal timing of cholecystectomy relative to the onset of symptoms remains controversial. A recent Cochrane review of randomized controlled trials identified only one trial that addressed timing of cholecystectomy with symptomatic gallstones.² The trial included only 75 patients and randomized patients with biliary colic to cholecystectomy within 24 hours vs. delayed cholecystectomy. While the risk for bias was high, 35% of patients in the delayed group required at least one gallstone-related hospital admission while waiting for elective operation.³

Patients with gallstones often present to the Emergency Department (ED) with an episode of biliary colic without laboratory or ultrasonographic evidence of cholecystitis, common duct stones, or gallstone pancreatitis. In many cases, patients are discharged from the ED with surgical follow-up; however, such follow-up is often not timely or does not occur. System-level issues with scheduling follow-up appointments, patient insurance status, and patient failure to comply are factors that may contribute to lack of appropriate outpatient surgical follow-up.

Previous non-randomized studies also demonstrate that increased wait times for cholecystectomy result in increased risk of recurrent biliary colic and development of gallstone-related complications.^{4–7} Recurrent ED visits and readmissions in patients waiting for elective cholecystectomy have been reported as high as 14% and 11.5% in previous single institutional studies.^{3,5} In a recent study of Medicare beneficiaries, 11% of beneficiaries who did not undergo elective cholecystectomy after an initial symptomatic episode requiring physician or ED visit required emergent gallstone-related hospitalization.⁸ Several studies have demonstrated that admission for complicated gallstone disease is associated with longer operative time, increased length of stay, increased morbidity and mortality, and increased cost.^{3,9}

Our goal was to evaluate the surgical follow-up and outcomes for patients seen by a surgeon in the ED for an episode of symptomatic cholelithiasis and discharged home for elective follow-up in single tertiary referral center. The frequency and timing of outpatient follow-up, as well as, patient outcomes such as incidence of multiple ED visits, elective surgery, and emergent surgery were assessed.

METHODS

Data Source

Patients evaluated by a surgeon and discharged from the Emergency Department (ED) for cholelithiasis and discharged without hospital admission between August 2009 and May 2014 were identified prospectively via surgical consultation and as a part of an ongoing quality improvement project for patients with gallstone disease at the University of Texas Medical Branch (UTMB).¹⁰ Of note, the quality improvement project focused on improving ED surgical consultation rates for patients with acute gallbladder disease, maximizing admissions where appropriate, and performing cholecystectomy on the initial hospitalization.

We performed a retrospective review via our Electronic Medical Record (EMR) to describe the trajectory of these patients. If patients were seen in our ED more than once, the first episode was considered the index episode and patients were followed from that point forward. Gallstones were confirmed on imaging during either the initial ED visit or previous outpatient visits.

Variables

Patient baseline demographic and clinical characteristics included age, gender, race/ethnicity, insurance status, date of visit, associated symptoms, and lab/imaging results at initial ED visit. Frequency of imaging was also recorded for patients with multiple ED visits. Following the index episode, patients were followed for two years following discharge from the ED; the number of patients who had follow-up with a UTMB surgeon was recorded. First surgeon contact was defined as the first date the patient had seen a surgeon, following the initial ED visit, in an outpatient setting.

Outcomes

Cholecystectomy rates were identified following the initial ED visit. Elective and emergent operations were recorded. Elective cholecystectomy was defined as outpatient procedure versus emergent cases in which patients were admitted emergently or urgently from the ED and with cholecystectomy performed prior to discharge. We described the timing of elective cholecystectomy relative to follow-up with a surgeon.

Statistical Analysis

All statistical analyses were performed in SAS 9.3. Categorical variables were compared using chi square tests and continuous variables were compared via student's t test. Cumulative incidence curves were used to examine the time from the initial ED visit to first surgeon contact for patients with both elective and non-elective surgery.

RESULTS

Between August of 2009 and May of 2014, a total of 71 patients were discharged from the ED with a diagnosis of symptomatic gallstones. During that same time period, 960 patients were admitted for acute gallbladder disease. The mean age of all patients was 41.0 ± 14.9

years, 85.9% were women, and 49.3% were white. Fifty six percent (56.3%) of patients were uninsured, 11.2% had Medicare, 11.2% had Medicaid, and 21.1% had commercial or private insurance; 43.7% of patients lived in Galveston, and 77.5% lived within 40 miles of UTMB.

The trajectory of care of patients after the initial ED visit is depicted in Figure 1. Of the entire cohort, 25.4% (N=18) of patients had an outpatient follow-up with a surgeon following the index episode (Figure 1). In the 2-year follow-up period, a total of 23.9% (N=17) of patients underwent cholecystectomy (Figure 2). Cholecystectomy was elective in only nine patients (12.6% of the overall cohort) and emergent in eight patients (Figure 1). Of patients who underwent elective cholecystectomy, 88.9% (N=8) did so within one month of the index episode. In patients undergoing elective cholecystectomy, the mean time from initial ED visit to an outpatient surgeon follow-up was 7.7 days (Figure 3). Of the 62 patients who did not have an elective cholecystectomy, only 14.5% (N=9) of patients in this group had outpatient surgeon follow-up with a mean time of 137 days from the initial ED visit (Figure 3). Lab values and radiographic findings were similar between patients who underwent any type of cholecystectomy, including both elective and emergent procedures, versus those who did not (Table 1). Patients who received any type of cholecystectomy were far more likely to be insured; Elective cholecystectomy was performed in 25.8% of insured patients and 2.5% of uninsured patients ($p=0.008$). Cholecystectomy, urgent or elective was performed in 41.9% of insured patients and 10.0% of uninsured patients ($p=0.004$). When comparing other characteristics in patients who underwent elective cholecystectomy or not, there were no differences in demographics, lab values, or radiographic findings (Table 2).

Of the 62 patients who did not undergo elective cholecystectomy, 37.1% had additional ED visits for gallstone-related symptoms, with 17.7% of patients having two or more additional ED visits, and 12.9% required an emergent/urgent cholecystectomy. Forty-three percent (43.5%) of additional ED visits occurred within one month and 60.9% occurred within three months of the initial ED visit. Of the 31 patients with insurance, 19.3% (N=6) had only one additional ED visit and 22.6% (N=7) had 2 or more additional ED visits following the index episode and prior to cholecystectomy (Table 3). Of the 40 uninsured patients, 20.0% (N=8) had only one additional ED visit, 10.0% (N=4) had 2 or more additional visits.

In patients with additional ED visits for symptomatic cholelithiasis, 60.9% had more than one abdominal ultrasound (US) or computed tomography (CT) scan during the course of multiple visits.

DISCUSSION

Our study demonstrates that fewer than 15% of patients seen in our ED for symptomatic gallstones undergo timely surgical follow-up and elective cholecystectomy after the initial episode. Lack of appropriate follow-up leads to multiple ED visits, high rates of emergent cholecystectomy, and redundant radiographic studies, increasing the cost of care and quality of life of these patients. Our data contribute to the literature supporting early surgical follow-up and elective cholecystectomy in preventing repeat ED visits and development of gallstone-related complications in patients presenting to the ED with symptomatic gallstones

not severe enough to require emergency admission. Our study identifies lack of surgical follow-up is a major contributor to the failure to perform cholecystectomy and highlights the importance of prompt surgical evaluation.

The low rate of surgical follow-up observed in our cohort may represent a system-level (follow-up not recommended or provided) or patient-level problem (appointments scheduled but not kept by patients). In our hospital, it is largely a system-level problem. At the time of discharge, most patients are given instructions to call a general number and surgical follow-up is recommended. However, they are not provided with a specific date and time for follow-up with a surgeon. In nearly all cases, it was not a matter of a patient not showing up for a scheduled appointment, but rather not being able to or simply not scheduling the appointment. In addition, given that 56.3% of patients are uninsured, when they do call for follow-up they cannot afford an outpatient visit, and even if they can, the cost of elective cholecystectomy is prohibitive.

Severity of gallbladder disease as measured by laboratory values and radiographic imaging were not associated with receipt of cholecystectomy, but patients who presented with nausea or emesis were more likely to undergo elective cholecystectomy. Patients with insurance were more likely to undergo an operation versus those who were not; however, if this was not done, insured and uninsured patients were equally as likely to have ongoing episodes requiring emergency care.

Two previous randomized controlled trials evaluated outcomes of patients with cholelithiasis and delayed cholecystectomy.^{3,9} Salman et al. randomized 71 patients with biliary colic to cholecystectomy within 24 hours or delayed cholecystectomy.³ Thirty-five percent of patients in the delayed group required one or more hospital admissions, and had a rate of emergency admission of 11 per 100 person-months. Furthermore, operative times and hospital stays were increased in these patients compared to patients who underwent surgical intervention within 24 hours.³ Bingener and colleagues¹¹ conducted a retrospective cohort of patients who presented to the ED with cholelithiasis and outcomes of those who underwent planned cholecystectomy versus those who did not. Patients discharged from the ED were more likely to be younger and with a lower leukocyte count; 20% returned to the ED within 30 days and underwent an urgent cholecystectomy, with half presenting within 7 days. In our study, patients who eventually underwent cholecystectomy were more likely to have presented with nausea and emesis; as such, persistent symptoms may be a driving factor in those who pursue prompt surgical evaluation. However, even if symptom severity was less in patients who did not follow-up, our results are consistent with the aforementioned studies and demonstrate that these patients remain at high risk for future readmissions and possible emergent operations.

Our previously published results in Medicare beneficiaries found a 2-year emergent gallstone-related hospitalization rate of 11.1% in older patients seen by a physician or in the ED for an initial episode of symptomatic gallstones.⁸ In the older population, the consequences of emergent gallstone-related admission were significant with a reported in-hospital morbidity and mortality of 56.5% and 6.5%.⁸ Our current study reveals that delayed

treatment in younger patients have similar consequences with respect to complications, ED visits, and even repetitive radiographic imaging.

Additional ED visits were associated with extraneous imaging in patients with an already established diagnosis of symptomatic gallstones. Moreover, less sensitive imaging studies such as abdominal computed tomography and X-ray were ordered during both initial and additional ED visits. Thus, delaying intervention affects both patient care and increases the hospital resource utilization.

Early intervention for symptomatic gallstones has been demonstrated to be cost-effective,¹² yet insurance status has been shown to play a role in care of patients with gallstone disease.^{13,14} Patients without insurance are more likely to present with complex disease and have cholecystectomy done on an emergent basis, resulting in longer hospital stays and further increasing health costs.¹⁴ Timely follow-up may help capture patients in the hospital system before they are lost to follow-up or experience complications. A system-level protocol may aid in higher follow-up rates and identify patients who are at risk for loss to follow-up. However, it is of the utmost importance to accurately identify these patients to decrease risk of future complications, admissions, and unnecessary testing.

The major limitation of the study is small sample size from a single institution with patients possibly being hospitalized and treated elsewhere. Our institution has a unique payer mix with a high percentage of uninsured patients. In addition, the protocol implemented at our hospital likely leads to higher admission rates for acute gallbladder disease than seen nationally. Given the overall national burden of gallbladder we suspect that these problems occur elsewhere and we have all seen patients in our EDs who had previously been discharged from other EDs or hospitals without definitive management. Our results may underestimate the true burden of the problem if patients required hospitalizations, radiographic imaging, or emergent operations elsewhere, making the problem potentially more significant. A multi-institutional study would be required to fully understand the burden this has on the hospital system and, most importantly, patient care. Regardless, these preliminary results provide insight to treatment patterns in patients with cholelithiasis. Our previously published results using claims data demonstrate that fewer than 25% beneficiaries with biliary colic underwent elective cholecystectomy; our current study demonstrates treatment patterns, at least at our hospital, are not much better in younger patients. Thus, lack of early surgical intervention for symptomatic gallstones is underutilized regardless of age.

Future multi-institution studies are necessary to better understand the extent of this problem nationally. System-level interventions may be appropriate to ensure outpatient surgical follow-up within one to two weeks of the initial ED visit. Our institution is developing a system-level protocol to arrange formal outpatient follow-up for patients seen in the emergency department and confirming these appointments prior to and after their discharge. We are also working to develop policies to allow timely follow-up and elective treatment in unfunded patients to prevent adverse events and increased costs in this population. Ultimately, these interventions may improve outcomes for patients with symptomatic biliary

colic and decrease the burden of extraneous ED visits such as repeat imaging for a known diagnosis of symptomatic gallstones.

CONCLUSIONS

Failure to achieve a timely surgical follow-up may result in multiple ED readmissions and emergent gallstone related hospitalizations, including emergent cholecystectomy. Patients who are initially diagnosed with symptomatic cholelithiasis should be evaluated in a short period of time to reduce such complications. With future studies a protocol or database may be most beneficial to ensure patients achieve appropriate and timely medical care.

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Figure 1.

Patient trajectory after initial Emergency Department visit with symptomatic gallstones. Patients with surgical follow-up were more likely to not undergo elective cholecystectomy. Of those who did not receive surgical follow-up and undergo elective cholecystectomy, 37.1% required at least one additional ED visit and 17.7% required two or more additional ED visits; 11.3% of patients who did not undergo elective cholecystectomy and had at least one additional ED visit required an emergent operation.

Figure 2. Cumulative 2-year incidence of cholecystectomy (elective and emergent). Cholecystectomy was most likely to occur within one month from the initial ED visit. Over the two year study period, only 23.9% of patients underwent a cholecystectomy.

Figure 3.

Cumulative 2-year incidence of outpatient surgical follow-up in the first six months after ED visit. Black dashed line represents the number of people who had elective surgery compared to those who did not, including patients who ultimately required emergent or urgent cholecystectomy. The mean time to surgical follow up was 7.7 days. In the elective group, 88.9% underwent a cholecystectomy within the first month from their initial ED visit.

Table 1

Laboratory and radiographic findings of patients who underwent cholecystectomy versus those who did not.

	Cholecystectomy		P-Value
	Yes (N=17)	No (N=54)	
Age (years)	44.3 ± 17.2	41.2 ± 14.4	0.47
Insurance (%)	76.5	33.3	0.002
Lab Values			
WBC*10 ³ (/CMM)	8.8 ± 3.4	9.3 ± 3.0	0.54
Total Bilirubin (mg/dl)	0.71 ± 0.46	0.52 ± 0.32	0.08
ALP (U/L)	110.9 ± 56.0	113.5 ± 56.6	0.88
ALT (U/L)	81.9 ± 73.0	75.9 ± 78.0	0.78
AST (U/L)	128.4 ± 153.8	85.9 ± 127.8	0.27
Associated Symptoms			
Nausea	94.1%	68.5%	0.05
Vomiting	70.6%	44.4%	0.08
Imaging findings			
Width Common Bile Duct (mm)	6.1 ± 2.2	5.3 ± 2.1	0.21
Pericholecystic Fluid	29.4%	20.4%	0.44
Gallbladder Wall Thickening	52.9%	29.6%	0.08

No p-values < 0.05. Continuous variables presented as mean ± standard deviation with 95% confidence interval. Categorical variables presented as percentiles.

Table 2

Laboratory and radiographic findings of patients who underwent elective cholecystectomy versus those who did not.

	Elective Cholecystectomy		P – Value
	Yes (N=9)	No (N=62)	
Age (years)	50.4 ± 18.5	40.7 ± 14.2	0.07
Insurance (%)	88.9	37.0	0.003
Lab Values			
WBC*10 ³ (/CMM)	7.7 ± 2.9	9.4 ± 3.1	0.13
Total Bilirubin (mg/dl)	0.77 ± 0.46	0.54 ± 0.34	0.075
ALP (U/L)	113.6 ± 67.0	112.8 ± 54.9	0.97
ALT (U/L)	107.6 ± 86.7	72.8 ± 74.5	0.20
AST (U/L)	186.1 ± 182.3	82.2 ± 122.0	0.29
Associated Symptoms			
Nausea	100.0%	71.0%	0.08
Vomiting	77.8%	46.8%	0.10
Imaging findings			
Width Common Bile Duct (mm)	5.8 ± 1.8	5.4 ± 2.2	0.62
Pericholecystic Fluid	22.2%	22.6%	0.98
Gallbladder Wall Thickening	55.6%	32.3%	0.17

No p-values < 0.05. Continuous variables presented as mean ± standard deviation with 95% confidence interval. Categorical variables presented as percentiles.