Hospital readmission after 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 2 y from the date of the 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 the initial ED visit to ED readmission.

Results: Seventy-one patients were discharged from the ED with a diagnosis of symptomatic gallstones. Patients who had an elective cholecystectomy in the 2 y after the initial visit were 12.6%. In this group, the mean time from the initial ED visit to outpatient surgeon follow-up was 7.7 d, and all elective cholecystectomies occurred within 1 mo 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 a mean time of 137 d 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% required emergent and/or urgent cholecystectomy. Additional ED visits (43.5%) occurred within 1 mo and 60.9% within 3 mo of their initial ED visit. In patients with additional ED visits for symptomatic cholelithiasis, 60.9% had more than one abdominal ultrasound or computed tomography scan during the course of multiple visits.

Conclusions: 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 1–2 wk of the initial ED visit has the potential to improve outcomes for patients with symptomatic biliary colic.

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1. Introduction

The Society of American Gastrointestinal and Endoscopic Surgeons 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 h versus delayed cholecystectomy. Although 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 nonrandomized 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.

2. Methods

2.1. Data source

Patients evaluated by a surgeon and discharged from the 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 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.

2.2. Variables

Patient baseline demographic and clinical characteristics included age, gender, race and/or ethnicity, insurance status, date of visit, associated symptoms, and laboratory and/or imaging results at initial ED visit. Frequency of imaging was also recorded for patients with multiple ED visits. After the index episode, patients were followed for 2 y after 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.

2.3. 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 before discharge. We described the timing of elective cholecystectomy relative to follow-up with a surgeon.

2.4. 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 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 nonelective surgery.

3. 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 period, 960 patients were admitted for acute gallbladder disease. The mean age of all patients was 41.0 ± 14.9 y, 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% of patients (n = 18) had an outpatient follow-up with a surgeon after the index episode (Fig. 1). In the 2-y follow-up period, a total of 23.9% of patients (n = 17) underwent cholecystectomy (Fig. 2). Cholecystectomy was elective in only nine patients (12.6% of the overall cohort) and emergent in eight patients (Fig. 1). Of patients who underwent elective cholecystectomy, 88.9% (n = 8) did so within 1 mo 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 d (Fig. 3). Of the 62 patients who did not have an elective cholecystectomy, only 14.5% of patients (n = 9) in this group had outpatient surgeon follow-up with a mean time of 137 d from the initial ED visit (Fig. 3). Laboratory values and radiographic findings were similar between patients who underwent any type of cholecystectomy, including both elective and emergent procedures, and 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, laboratory 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 and/or urgent cholecystectomy. Forty-three percent (43.5%) of additional ED visits occurred within 1 mo and 60.9% occurred within 3 mo 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 two or more additional ED visits after the index episode and before cholecystectomy. Of the 40 patients who did not undergo elective cholecystectomy, 37.1% required at least one additional ED visit and 17.7% required two or more additional ED visits; 12.9% (8/62) of patients who did not undergo elective cholecystectomy required an emergent operation.

Fig. 1 – Patient trajectory after initial ED 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; 12.9% (8/62) of patients who did not undergo elective cholecystectomy required an emergent operation.

Fig. 2 – Cumulative 2-y incidence of cholecystectomy (elective and emergent). Cholecystectomy was most likely to occur within 1 mo from the initial ED visit. Over the 2-y study period, only 23.9% of patients underwent a cholecystectomy.
uninsured patients, 20.0% (n = 8) had only one additional ED visit and 10.0% (n = 4) had two or more additional visits.

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

**Table 1 – Laboratory and radiographic findings of patients who underwent cholecystectomy versus those who did not.**

<table>
<thead>
<tr>
<th>Findings</th>
<th>Cholecystectomy</th>
<th>P value</th>
</tr>
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<tbody>
<tr>
<td>Age (y)</td>
<td>Yes (n = 17)</td>
<td>44.3 ± 17.2</td>
</tr>
<tr>
<td></td>
<td>No (n = 54)</td>
<td>41.2 ± 14.4</td>
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<tr>
<td>Insurance</td>
<td>Yes (n = 17)</td>
<td>76.5</td>
</tr>
<tr>
<td></td>
<td>No (n = 54)</td>
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<tr>
<td>Laboratory values</td>
<td>Yes (n = 17)</td>
<td>8.8 ± 3.4</td>
</tr>
<tr>
<td></td>
<td>No (n = 54)</td>
<td>9.3 ± 3.0</td>
</tr>
<tr>
<td>Total bilirubin (mg/dL)</td>
<td>Yes (n = 17)</td>
<td>0.71 ± 0.46</td>
</tr>
<tr>
<td></td>
<td>No (n = 54)</td>
<td>0.52 ± 0.32</td>
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<tr>
<td>ALP (U/L)</td>
<td>Yes (n = 17)</td>
<td>110.9 ± 56.0</td>
</tr>
<tr>
<td></td>
<td>No (n = 54)</td>
<td>113.5 ± 56.6</td>
</tr>
<tr>
<td>ALT (U/L)</td>
<td>Yes (n = 17)</td>
<td>81.9 ± 73.0</td>
</tr>
<tr>
<td></td>
<td>No (n = 54)</td>
<td>75.9 ± 78.0</td>
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<tr>
<td>AST (U/L)</td>
<td>Yes (n = 17)</td>
<td>128.4 ± 153.8</td>
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<tr>
<td></td>
<td>No (n = 54)</td>
<td>85.9 ± 127.8</td>
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<td>Associated symptoms</td>
<td>Yes (n = 17)</td>
<td>94.1</td>
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<td></td>
<td>No (n = 54)</td>
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<td>Nausea</td>
<td>Yes (n = 17)</td>
<td>70.6</td>
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<td></td>
<td>No (n = 54)</td>
<td>44.4</td>
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<tr>
<td>Imaging findings</td>
<td>Yes (n = 17)</td>
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<td></td>
<td>No (n = 54)</td>
<td>5.3 ± 2.1</td>
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<td>Width common bile duct</td>
<td>Yes (n = 17)</td>
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<tr>
<td></td>
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<td>Pericholecystic fluid</td>
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<td>No (n = 54)</td>
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</table>

ALT = alanine aminotransferase; AST = aspartate aminotransferase; WBC = white blood cell.

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

4. 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 was 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. [3] randomized 71 patients with biliary colic to cholecystectomy within 24 h or delayed cholecystectomy. 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 with patients who underwent surgical intervention within 24 h [3]. Bingener et al. [11] 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 d and underwent an urgent cholecystectomy, with half presenting within 7 d. 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 a high risk for future readmissions and possible emergent operations.

Our previously published results in Medicare beneficiaries found a 2-y 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 inhospital morbidity and mortality of 56.5% and 6.5% [8]. Our present 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 the 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 present 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 underused 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 1–2 wk of the initial ED visit. Our institution is developing a system-level protocol to arrange formal outpatient follow-up for patients seen in the ED and confirming these appointments before 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.

5. 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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Disclosure

All contributing authors have nothing to disclose.

REFERENCES


