Research Article

Antibiotic Use in Mild Acute Pancreatitis

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Abstract

Objective: To find out the incidence of antibiotic use in mild acute pancreatitis using BISAP (Bedside Index of Severity in Acute Pancreatitis) score and to compare the rate of antibiotic usage between an academic tertiary care institution(ATCI)and its community hospital division (CHD).

Materials and methods: Retrospective data was analyzed using electronic medical records from the ATCI and the CHD in Philadelphia, Pennsylvania. Patients aged >18 years irrespective of race and sex with documented mild acute pancreatitis (BISAP 0 to 3) admitted between June, 2011 to June, 2013 were included in the study. Patients with biliary obstruction, cholangitis or other source of comorbid infection for which antibiotics could reasonably be administered were excluded from the study.

Data analysis was done by Microsoft excel software and Z score calculator.

Results: 468 available charts were reviewed, 288 patients (179 from ATCI and 109 from CHD) met the study inclusion criteria. Mean age was 51.7 years, 43.5% were male and 56.5% were female. In total, 32.3% of patients with the diagnosis of mild acute pancreatitis irrespective of etiology received antibiotics. At ATCI, 46 out of 179 (probability =0.257) [1] patients received antibiotics while at CHD, 47 out of 109 (probability = 0.431) patients received antibiotics. There was a significant difference on antibiotic usage (z = -3.0, p <0.05) between the hospital sites.

Conclusion: About one third of patients with mild acute pancreatitis received antibiotics. There was an increasing trend towards antibiotic use with increasing BISAP score. There was a significant difference in antibiotic usage between an academic tertiary care institution and a community hospital, with patients at the community hospital being more likely to receive antibiotics for mild acute pancreatitis.

INTRODUCTION

Acute pancreatitis is one of most common gastrointestinal conditions requiring hospital admissions [1]. Most of the acute pancreatitis case is mild in severity [2]. The hospital admission rate for acute pancreatitis in the Unites States is more than 200,000 per year [3,4]. The cost of hospitalizations for acute pancreatitis exceeds $2 billion annually [5]. Acute pancreatitis [6] is diagnosed when 2 of the 3 criteria are met: (a) acute onset of severe epigastric pain which is constant and often radiates to the back [7], (b) serum lipase and/ or amylase elevated 3 times or more the upper limit of normal, and (c) characteristic imaging of acute pancreatitis on contrast-enhanced computed tomography (CECT) or less frequently on magnetic resonance imaging (MRI) or abdominal ultrasound [8]. As per the revised Atlanta classification of acute pancreatitis [9], patients with mild acute pancreatitis do not have any local complication like peripancreatic fluid collection [10], pancreatic or peripancreatic necrosis,

splenic and portal vein thrombosis, gastric outlet obstruction and colonic necrosis, or any systemic complication like exacerbation of pre-existing comorbid conditions (like chronic lung disease, coronary artery disease), sepsis or disseminated intravascular coagulation (DIC), or organ failure [11] like respiratory failure ($PO_2 \leq 60$ mm Hg), renal failure (serum creatinine (>2 mg/dl after rehydration), shock [12] (systolic blood pressure <90 mm Hg) and gastrointestinal bleeding (>500 cc in 24 hour). Interstitial pancreatitis generally present as mild acute pancreatitis but about 10% of them may develop organ failure although mostly transient. Patients with mild acute pancreatitis generally improve in 3 to 7 days. Nothing by mouth, early aggressive intravenous hydration with isotonic crystalloid fluid, preferably Lactated Ringer's solution in the first 12 to 24 hours unless there is renal or cardiovascular comorbidities and analgesics are the mainstay of therapy [13,14]. Patients with mild acute pancreatitis can be fed early if there is no nausea and vomiting and abdominal pain is resolved. One study showed that immediate oral feeding in mild

acute pancreatitis was safe and had accelerated recovery [15]. In mild acute pancreatitis, there is no role of antibiotics which is indicated in infected pancreatic necrosis and extra-pancreatic infections like pneumonia, cholangitis, urinary tract infection and catheter-related infections. Prophylactic antibiotic with ciprofloxacin and metronidazole even in necrotizing pancreatitis did not show any significant benefit in clinical outcome or mortality [16].

However, in clinical practice, we observe that as soon as the diagnosis of acute pancreatitis is established at the emergency department, the emergency room physicians, the hospitalist team or the hospital attending frequently initiate antibiotic treatment (intravenous ciprofloxacin and intravenous metronidazole) solely as part of the treatment of mild acute pancreatitis. Once started, the antibiotic is continued for several days. These antibiotics are expensive and carry the risk of different side effects as well. This practice varies from hospital to hospital. A retrospective study was conducted in this cohort of patients with mild acute pancreatitis using Bedside Index of Severity (BISAP) criteria. The study was conducted in a tertiary care hospital and its community hospital division.

MATERIALS AND METHODS

This is a retrospective cohort study. The study was approved by the Institutional Review Board of Thomas Jefferson University. No informed consent was required. Electronic medical records were searched for all patients above the age of 18 admitted with the diagnosis of acute pancreatitis at ATCI and its CHD between June 2011 to June 2013. Patients presented to the emergency department with acute abdominal pain. Acute pancreatitis was diagnosed by the Lab and imaging studies. Patients with biliary obstruction or any comorbid infections like pneumonia, cholangitis, urinary tract infection etc. were excluded from the study.

Patient stratification

The overall mortality of acute pancreatitis increases with the severity of acute pancreatitis [6]. There are different scoring systems to stratify acute pancreatitis. Ranson criteria and Glasgow score are available. But the data are not routinely collected on admission and the score cannot be completed until 48 hours after admission. The APACHE II (Acute Physiology and Chronic Health Evaluation) score [17] is widely used but it requires many parameters. CT severity index (CTSI) is good at assessing the local complications of acute pancreatitis [2] but cannot evaluate its systemic complications [18].

The BISAP (Bedside Index of Severity in Acute Pancreatitis) score is a simplified bedside scoring system which stratifies patients with acute pancreatitis [19] in the first 24 hours of admission – their risk of in-hospital mortality as well as risk of mortality prior to organ failure [20,21].

BISAP has 5 variables as mentioned in the Table 1. Each one carries one point. As a result, BISAP score is scaled from 0 to 5.

**SIRS is defined as 2 or more of the following variables [22]:

- Fever of more than 38°C (100.4°F) or less than 36°C

Table 1: BISAP: (Bedside Index of Severity in Acute Pancreatitis).
BUN >25 mg/dl
Impaired mental status: lethargy, disorientation, somnolence, stupor, coma
Systemic Inflammatory Response Syndrome (SIRS)**
Age >60 years
Pleural effusion on Imaging

(96.8°F)

- Heart rate of more than 90 beats per minute

- Respiratory rate of more than 20 breaths per minute or arterial carbon dioxide tension ($PaCO_2$) of less than 32mm Hg

Abnormal white blood cell count (>12,000/µL or < 4,000/µL or >10% immature neutrophils (bands).

As per Chen et al., the best cut off value of BISAP for predicting mortality was 3, Setting the cut off value at 3, the sensitivity and specificity of predicting mortality in acute pancreatitis were 83.3% and 67.4%% respectively (Table 2) [23].

According to the revised Atlanta classification [24], our patients with mild acute pancreatitis did not have any local or systemic complications. The BISAP score was used in our study. Patients with BISAP 0 to 3 points were considered to have mild acute pancreatitis in terms of mortality.

Analysis

The cohort of patients with mild acute pancreatitis at the ATCI and its CHD was identified. The patients' age, sex and race were documented. They were further categorized into 4 groups (BISAP 0, 1, 2, 3). Then the number and percentage of patients who received antibiotics in each group were recorded. Z test [25] was performed to find out the statistical significance.

RESULTS

288 patients with mild acute pancreatitis were studied in two institutions: 179 patients from the academic medical center (ATCI) and 109 patients from the community hospital division (CHD). The average age of patients at the ATCI was 49.7 years and at the CHD 55.1 years (overall average age of all patients 51.7 years). In ATCI, 42% were males and 58% were females. In CHD, 45% were males and 55% were females (overall average of all patients 43.5% males and 56.5% females).

The different ethnicities include: in ATCI – Whites 62%, Blacks 21%, Hispanics 3.35%, and Asians 1.11%; in CHD – Whites 53.2%, Blacks 36.69%, Hispanics 4.51%, Asians 1.83%.

When we compared the use of antibiotics in patients with mild acute pancreatitis between the two institutions, we found that in ATCI 25.7% and in CHD 43.1% (p value 0.002) received antibiotics with overall average of 32.3%. As we further analyzed the patients with different

Table 2: BISAP points and observed mortality in the validation cohort [12].

Point	Mortality
0	0.1%
1	0.5%
2	1.9%
3	5.3%
4	12.7%
5	22.5%

Table 3: Patient demographics.

ATCI charts reviewed	333		
CHD Charts reviewed	135		
Total Number of records reviewed	468		
	ATCI	**CHD**	**Total**
Total Included	179	109	288
Total Excluded Average Age of included subjects	154	26	180
(years)	49.7	55.1	51.7
# Males (included)	76	49	125
# Females (included)	103	60	163
Racial Distribution			
Asian	2	2	4
Black	39	40	79
Hispanic	6	5	11
Other	9	2	11
Unknown	11	2	13
White	112	58	170
BISAP			
0	89	45	134
1	51	33	84
2	31	23	54
3	8	8	16
Total BISAP0-3	179	109	288

BISAP scores, the antibiotic use increased with the increase in BISAP scores (Table 3 and Table 4).

DISCUSSION

Mild acute pancreatitis is a common clinical problem [2] irrespective of the etiology which usually include gallstones, heavy alcohol consumption, certain ingested medications and metabolic factors (hypertriglyceridemia, hypercalcemia). 16.5 to 25% of patients with one episode of acute pancreatitis develop recurrent attacks of pancreatitis within few years of the initial episode, particularly if the underlying cause is not removed [26]. Although the prognosis of mild acute pancreatitis is excellent [27], moderately severe acute (transient organ failure persisting less than 48 hours [10] and/or local or systemic complications) and severe acute pancreatitis (persistent organ failure >48 hours) have much higher morbidity and mortality [28]. Persistent SIRS on admission and at 48 hours is associated with organ failure and death [29]. Many physicians prescribe antibiotics when SIRS is present on admission, considering that patients may develop severe acute pancreatitis. But generally patients develop moderately severe acute and severe acute pancreatitis in the first 48 hours [5]. Patient with mild acute pancreatitis generally do not progress to moderate or severe acute pancreatitis. Antibiotics are generally given in infected pancreatic necrosis [30]. There is no role of antibiotics in the management of mild acute pancreatitis. As antibiotics have side effects and may develop resistance to infectious agents, and emergence of fungal infections if inappropriately used, physicians should not prescribe antibiotics as part of the treatment of mild acute pancreatitis. This was a retrospective study which might have some shortcomings like BISAP score could not be evaluated in each case.

In conclusion, mild acute pancreatitis is the most common form of acute pancreatitis we encounter in our clinical practice. There is no role of antibiotics in the management of this entity. Our study suggests that about one third of patients with mild acute pancreatitis receive antibiotics without any specific reason and without any evidence-based benefit. The antibiotic use was more with increasing BISAP score, and more at the community hospital than at the academic medical center. Clinicians should not start antibiotics in mild acute pancreatitis considering resistance, side effects, cost and excellent prognosis without any antibiotic use.

ACKNOWLEDGEMENT

Table 4: Data Analysis.

BISAP 0-3 who received Abx				ATC1	CHD	Total
0	15	12	27	16.9%	26.70%	20.10%
1	12	16	28	23.5%	48.50%	33.30%
2	14	14	28	45.20%	60.90%	51.90%
3	5	5	10	62.50%	62.50%	62.50%
Total BISAP 0-3 received Abx	46	47	93	25.70%	43.10%	32.30%
Z- test:				Using 0.257 & 179 for ATCI	0.431 &109 for CHD	
Two-tailed Z – Score: - 3.063. p – value: 0.00222 *significant difference at both 95% and 99%CI.						

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