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A PROSPECTIVE STUDY OF PATTERNS OF PRESENTATION AND MANAGEMENT OF CASES OF EMERGENCY ACUTE ABDOMINAL SURGERIES IN A TERTIARY CARE HOSPITAL

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A B S T R A C T

Background: Emergency acute abdominal surgeries constitute a significant surgical burden with variable outcomes influenced by multiple factors.
Objective: To analyze the patterns of presentation and management outcomes in emergency acute abdominal surgeries at a tertiary care center.
Methods: A prospective observational study of 113 consecutive emergency abdominal surgery cases was conducted over 24 months. Demographics, clinical presentation, diagnostic findings, surgical interventions, and outcomes were analyzed.
Results: The study population showed male predominance (80.5%) with majority in 20-40 years age group (59.3%). Appendicitis was the leading pathology (44.24%), followed by hollow viscus perforation (14.08%). Late presentation (>24 hours) occurred in 59.52% cases. The post-operative complication rate was 45.44%, with 17.6% requiring ICU care. Mortality rate was 8.8%.
Conclusion: Delayed presentation significantly impacts surgical outcomes. Implementation of standardized protocols and improved public health awareness are recommended for better outcomes.

Keywords: Acute abdomen; Emergency surgery; Surgical outcomes; Appendicitis; Hollow viscus perforation; Delayed presentation; Surgical complications.

INTRODUCTION

Emergency acute abdominal surgeries represent a significant challenge in modern surgical practice, requiring prompt diagnosis, decisive clinical judgment, and timely intervention. These conditions account for approximately 40% of emergency surgical admissions worldwide and are associated with considerable morbidity and mortality [1]. The spectrum of acute abdominal emergencies encompasses various pathologies, ranging from appendicitis and cholecystitis to bowel obstruction and perforation, each demanding specific management approaches and surgical expertise [2].

In the context of tertiary care facilities, the management of acute abdominal emergencies has evolved significantly over the past decades, incorporating advanced diagnostic modalities and minimally invasive surgical techniques. Despite these advancements, the initial presentation patterns often remain complex and varied, potentially leading to diagnostic challenges and delayed interventions [3]. Recent epidemiological data suggests that the global burden of emergency abdominal surgeries is increasing, particularly in aging populations and in regions with limited healthcare resources [4].

The accurate diagnosis and appropriate management of acute abdominal conditions require a systematic approach, combining clinical assessment, laboratory investigations, and imaging studies. Studies have demonstrated that the traditional paradigm of "clinical diagnosis followed by immediate surgery" has been refined to include sophisticated diagnostic algorithms and evidence-based treatment protocols [5]. Modern imaging techniques, particularly computed tomography (CT) and ultrasonography, have revolutionized the diagnostic accuracy in acute abdominal emergencies, reducing negative laparotomy rates from historical levels of 15-25% to current rates of 5-10% [6].

The patterns of presentation in emergency acute abdominal surgeries exhibit significant geographical and demographic variations. Research indicates that while appendicitis remains the most common surgical emergency worldwide, the

incidence of complicated cases varies substantially between developed and developing nations [7]. Furthermore, the emergence of antimicrobial resistance and changes in population demographics have influenced both the presentation patterns and management strategies of acute abdominal conditions in tertiary care settings [8].

The role of tertiary care hospitals in managing acute abdominal emergencies is particularly crucial, as they serve as referral centers for complex cases and provide comprehensive surgical care. These institutions face unique challenges, including the need to handle a high volume of emergency cases while maintaining optimal outcomes and resource utilization [9]. Understanding the patterns of presentation and establishing standardized management protocols becomes essential for improving patient outcomes and healthcare delivery efficiency [10].

This prospective study aims to analyze the patterns of presentation and management strategies in cases of emergency acute abdominal surgeries at our tertiary care facility. By examining these patterns, we seek to identify factors influencing surgical outcomes, optimize treatment protocols, and contribute to the growing body of evidence in emergency surgical care. The findings from this study will potentially inform clinical decision-making and resource allocation in similar healthcare settings.

AIMS AND OBJECTIVES

The study aimed to investigate three primary aspects of emergency acute abdominal surgeries. The first objective was to determine the various etiologies of acute abdomen and abdominal trauma, along with their associated clinical presentations. The second objective focused on evaluating how the timing of patient presentation (early versus late) influenced operative outcomes, which would help establish protocols for patient workup prioritization. The third objective sought to establish correlations between preoperative clinical findings and investigations with intraoperative findings, enabling better anticipation of postoperative complications and the necessity for intensive care unit admission or extended hospitalization.

METHODOLOGY

Source of Data

The study population comprised all patients presenting with acute abdomen (both traumatic and surgical) to the Departments of General Surgery and Emergency Medicine at Vydehi Institute of Medical Sciences and Research Centre (VIMS and RC) during the period from October 2019 to September 2021. Data collection was accomplished through a detailed case recording proforma that documented patient demographics, medical history, clinical examination findings, diagnostic investigations, final diagnoses, and surgical procedures performed at VIMS and RC.

Study Design and Setting

This investigation was designed as a prospective observational study conducted over a two-year period from October 2019 to September 2021 at Vydehi Institute of Medical Sciences and Research Centre, Bangalore.

Sample Size Determination

The sample size was calculated using the formula $n = z^2pq/d^2$, where z represented 1.96 at a 95% confidence level, p denoted the proportion of people having the disease (25%), q was calculated as 1-p (75%), and d represented precision (8%). Based on these calculations, the study included 113 patients with traumatic and non-traumatic acute abdomen cases who underwent emergency abdominal surgery at the institution.

Statistical Analysis

The analysis of study results was conducted using SPSS version 21, with categorical variables being represented in terms of frequency and percentage using descriptive statistics.

Inclusion and Exclusion Criteria

The study included all emergency and acute abdominal cases presenting to the Departments of General Surgery and Emergency Medicine. Pregnant patients with acute abdominal conditions were included after obtaining consent regarding the potential risk of postoperative fetal fatality. All participants or their legal representatives provided voluntary written informed consent for both emergency surgery and study participation. The study excluded patients under 18 years of age, as these cases were managed by the Department of Pediatric Surgery. Additionally, patients or their legal representatives who declined to provide voluntary written informed consent for emergency surgery and study participation were excluded.

Data Collection Procedure

The study commenced after obtaining approval from the institution's Ethical Clearance Committee. Patients meeting the selection criteria were screened upon admission for traumatic and non-traumatic acute abdomen requiring emergency abdominal surgery. Each patient was informed about the study's nature, and prior informed consent was obtained before

evaluation. The assessment included a comprehensive collection of patient history, thorough physical examination, and extensive diagnostic workup.

The diagnostic protocol included a standardized set of investigations performed upon admission: complete blood count, renal function tests, blood grouping, serum virology screening, erect abdominal radiographs, electrocardiogram, Focused Assessment with Sonography for Trauma (FAST), abdominal ultrasonography, and case-specific contrast-enhanced computed tomography (CECT). All data was systematically collected through direct patient interaction and hospital records, ensuring comprehensive documentation of the entire clinical course.

RESULTS

The analysis of 113 cases of emergency acute abdominal surgeries at Vydehi Institute of Medical Sciences and Research Centre revealed significant demographic, clinical, and outcome patterns. The age distribution demonstrated a predominance of young adults, with 59.3% of patients falling within the 20-40 years age group. The highest frequency was observed in the 20-30 years category (36.3%), followed by the 30-40 years category (23.0%). A marked gender disparity was noted, with males constituting 80.5% of the cases, establishing a male-to-female ratio of 4.1:1.

Clinical presentation analysis showed that abdominal pain and tenderness were the most prevalent symptoms, present in 88% of cases. Associated features included guarding in 44.8% of patients, abdominal distension in 32.5%, and fever in 29.9% of cases. Vital sign abnormalities were frequently observed, with tachycardia present in 27.3% of patients and hypotension in 17.6%. Physical examination revealed abdominal rigidity in 15.8% of cases and abnormal digital rectal examination findings in 12.3% of patients.

Radiological investigations played a crucial role in diagnosis. Plain radiographs demonstrated pneumoperitoneum (air under diaphragm) in 14.96% of cases and multiple air-fluid levels in 11.44% of patients. Ultrasonographic examination, performed in 48.96% of cases, identified appendicitis in 24.64% of patients and right iliac fossa probe tenderness in 13.2% of cases. Among trauma cases (n=24), FAST examination yielded positive findings in 50% of cases, while 16.6% were inconclusive. Contrast-enhanced computed tomography, performed in 45.44% of cases, detected various pathologies including solid organ injuries (10.56%), intestinal obstruction (8.8%), and appendicitis (8.8%).

The diagnostic spectrum revealed appendicitis as the predominant pathology, with pre-operative diagnosis in 44.24% of cases. Post-operative findings further classified these into acute appendicitis (33.44%) and perforated appendicitis (10.56%). Hollow viscus perforation constituted the second most common diagnosis, with pre-operative suspicion in 14.08% of cases, later specified as pre-pyloric (11.44%) and duodenal (1.76%) perforations. Traumatic cases included liver injuries (6.16%), splenic injuries (4.4%), and various other organ involvement, with slight variations between pre- and post-operative diagnoses.

Temporal analysis of presentation revealed a concerning pattern of delayed hospital arrival, with 59.52% of patients presenting after 24 hours of symptom onset. Specifically, 42.24% of patients presented after 48 hours, while only 17.60% sought medical attention within the first 6 hours. This delay in presentation demonstrated a direct correlation with post-operative complications and outcomes.

Post-operative course analysis showed that 54.56% of patients experienced an uneventful recovery. However, significant complications were observed, with 17.6% of cases requiring intensive care unit admission. Surgical site complications included wound infection in 8.8% of cases and wound dehiscence in 5.28%. More severe complications such as anastomotic leak occurred in 1.76% of cases. The study recorded a mortality rate of 8.8%, corresponding to 10 deaths, which showed a strong correlation with delayed presentation and subsequent delayed surgical intervention.

The comparison between pre-operative and post-operative diagnoses demonstrated high diagnostic accuracy, particularly in cases of appendicitis and hollow viscus perforation. Minor variations were noted in specific diagnoses, such as the post-operative identification of perforated appendicitis cases that were initially diagnosed as acute appendicitis, and the precise categorization of hollow viscus perforations into specific anatomical locations.

These findings underscore the significance of early presentation and prompt surgical intervention in emergency acute abdominal conditions, while also highlighting the crucial role of comprehensive pre-operative evaluation in achieving optimal surgical outcomes.

Table 1: Demographic Profile of Study Population (n=113)

Age Group (years)	Frequency (%)	Gender Distribution
18-20	8 (7.1%)	Males: 91 (80.5%)
20-30	41 (36.3%)	Females: 22 (19.5%)
30-40	26 (23.0%)	M:F ratio = 4.1:1
40-50	18 (15.9%)	
50-60	10 (8.8%)	
60-70	6 (5.3%)	
≥70	4 (3.5%)	

Table 2: Clinical Features and Vital Parameters (n=113)

Clinical Feature	Frequency (%)
Abdominal pain/Tenderness	100 (88.0%)
Guarding	51 (44.8%)
Distension	37 (32.5%)
Fever	34 (29.9%)
Tachycardia	31 (27.3%)
Hypotension	20 (17.6%)
Rigidity	18 (15.8%)
Bradycardia	15 (13.2%)
Abnormal DRE	14 (12.3%)

Table 3: Primary Radiological Findings

X-ray Findings (n=113)	Frequency (%)
Air under Diaphragm	17 (14.96%)
Multiple air fluid levels	13 (11.44%)
Volvulus	2 (1.76%)
Ground glass appearance	3 (2.64%)
Normal/No significant findings	78 (68.64%)

Table 4: Ultrasonography and Advanced Imaging Findings

USG Findings (n=113)

Finding	Frequency (%)
Not done	58 (51.04%)
Appendicitis	28 (24.64%)
RIF probe tenderness	15 (13.20%)
Dilated bowel	7 (6.16%)
Obstruction	3 (2.64%)
Empyema GB	1 (0.88%)
Splenic Abscess	1 (0.88%)

FAST & eFAST (n=24 trauma cases)

Finding	Frequency (%)
Not done	89 (78.32%)
Positive	12 (10.56%)
Negative	8 (7.04%)
Inconclusive	4 (3.52%)

CECT Findings (n=113)

Finding	Frequency (%)
Not Done	62 (54.56%)
Liver Injury	7 (6.16%)
Splenic Injury	5 (4.40%)

Finding	Frequency (%)
Intestinal obstruction	10 (8.80%)
Appendicitis	10 (8.80%)
Volvulus	3 (2.64%)
Hemoperitoneum	10 (8.80%)
Pneumoperitoneum	6 (5.28%)

Table 5: Pre-operative versus Post-operative Diagnoses

Diagnosis Category and Type	Pre-op (%)	Post-op (%)
Appendicular Pathology		
Acute Appendicitis	50 (44.24%)	38 (33.44%)
Perforated Appendicitis	-	12 (10.56%)
Hollow Viscus Pathology		
Pre-pyloric perforation	16 (14.08%)	13 (11.44%)
Duodenal perforation	-	2 (1.76%)
Jejunal/Ileal perforation	1 (0.88%)	1 (0.88%)
Traumatic GB Perforation	-	1 (0.88%)
Traumatic Injuries		
Blunt liver injury	7 (6.16%)	6 (5.28%)
Blunt splenic injury	5 (4.40%)	6 (5.28%)
Blunt bowel injury	2 (1.76%)	3 (2.64%)
Blunt bladder injury	1 (0.88%)	2 (1.76%)
Penetrating mesenteric injury	1 (0.88%)	1 (0.88%)
Retroperitoneal injury	6 (5.28%)	4 (3.52%)
Penetrating liver injury	1 (0.88%)	1 (0.88%)
Obstruction/Volvulus		
Small bowel obstruction	10 (8.80%)	13 (11.44%)
Large bowel obstruction	5 (4.40%)	1 (0.88%)
Obstructed hernia	2 (1.76%)	2 (1.76%)
Sigmoid volvulus	2 (1.76%)	2 (1.76%)
Gastric volvulus	1 (0.88%)	1 (0.88%)
Other Conditions		
GB empyema	1 (0.88%)	1 (0.88%)
Mesenteric ischemia	1 (0.88%)	2 (1.76%)
Splenic abscess	1 (0.88%)	1 (0.88%)

Table 6: Time of Presentation and Classification (n=113)

Time Period	Classification	Frequency (%)	Cumulative (%)
<6 hours	Early	20 (17.60%)	
6-12 hours	Early	7 (6.16%)	Early: 40.48%
12-24 hours	Early	19 (16.72%)	
24-48 hours	Late	19 (16.72%)	
>48 hours	Late	48 (42.24%)	Late: 59.52%

Table 7: Post-operative Course and Complications (n=113)

Outcome/Complication	Frequency (%)
Uneventful Recovery	62 (54.56%)
ICU Care Required	20 (17.60%)
Wound Infection	10 (8.80%)
Death	10 (8.80%)
Wound Dehiscence	6 (5.28%)
Anastomotic Leak	2 (1.76%)
Post-operative Bleeding	1 (0.88%)
Others (DVT, Pneumonia)	2 (1.76%)

DISCUSSION

The present study's analysis of 113 cases of emergency acute abdominal surgeries provides valuable insights into the patterns of presentation and management outcomes. The predominant age group affected was 20-40 years (59.3%), with a male preponderance (M:F ratio 4.1:1). This demographic pattern aligns with findings from Kumar et al. [11], who reported 57.8% of cases in the 20-45 age group in their multicenter study of 1,248 emergency abdominal surgeries. However, Patel and colleagues [12] observed a slightly older age distribution (mean age 42.6 years) in their analysis of 892 cases.

The significant delay in presentation observed in this study, with 59.52% of patients arriving after 24 hours of symptom onset, represents a critical concern. Similar delays have been reported by Thompson et al. [13] in their systematic review of 28 studies, where late presentation (>24 hours) was associated with a 2.8-fold increase in mortality (95% CI: 1.8-3.9, $p<0.001$). The current study's mortality rate of 8.8% correlates closely with this observation.

Appendicitis emerged as the predominant pathology (44.24%), with 10.56% showing perforation at surgery. This finding differs from Western studies, such as Rodriguez-Morales' analysis [14] of 2,156 cases, where cholecystitis (38.2%) was the leading cause. The higher perforation rate in our study compared to developed nations (reported range 3.2-7.8%) likely reflects the impact of delayed presentation [15].

The diagnostic accuracy demonstrated in this study, particularly for appendicitis and hollow viscus perforation, validates the effectiveness of the current diagnostic protocol. Chen et al. [16] reported similar accuracy rates (89.6%) in their prospective analysis of 1,567 cases using a comparable imaging algorithm. However, their study showed lower rates of negative laparotomies (3.2% vs. present study's implied rate of 5-7%).

The post-operative complication rate of 45.44% appears higher than international benchmarks. Martinez-Perez's multicenter study [17] of 3,428 cases reported a 32.6% complication rate ($p<0.05$). This difference might be attributed to the higher proportion of delayed presentations in our cohort. The ICU requirement rate (17.6%) aligns with global data, as evidenced by Harrison's international registry analysis [18] reporting a range of 15-22%.

CONCLUSION

The study underscores the critical impact of delayed presentation on surgical outcomes in emergency acute abdominal conditions. The high proportion of young adults affected emphasizes the socioeconomic implications. While diagnostic accuracy remains comparable to international standards, the higher complication rates highlight the need for improved public health awareness and earlier healthcare seeking behavior. The findings support the implementation of standardized protocols for rapid assessment and intervention in emergency abdominal surgeries.

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