Original Article

Management of Complicated Intra Abdominal Sepsis

Dileep Kumar, Mariyah Anwer, Shamim Qureshi and Muhammad Naeem

ABSTRACT

Objective: To describe the clinical, microbiological, and treatment profile of complicated intra abdominal infections in developing countries

Study Design: Retrospective case series study.

Place and Duration of Study: This study was conducted at the Surgical Ward 2, JPMC, Karachi from January 2013 to January 2016.

Material and Method: A total of 190 patients admitted via emergency department with the diagnosis of secondary peritonitis were included. Data was collected from previous records. Peritonitis was diagnosed on the basis of history, clinical examination, radiological assessment and intra-operatively findings.

Results: Amongst 190 cases, Tuberculosis and typhoid were the most common pathologies (n=57:30% and n=29:15%) in small intestine followed by perforated appendix (n=29:15.3%). The small bowel was the most common site of perforation (45%) followed by the appendix (15%), duodenal perforation (22.1%), and stomach perforation (10%), peritonitis due to advance malignancy (6.8%) and diverticulitis (0.52%) respectively. Pus C/S yielded E.coli in 100% of specimen followed by Enterobacter (85%) klebsilla (70%), pseudomonas (20%) and Acetobacter (8%). These organisms were 100 % sensitive to Amikacin, 95% to meroneum and imipenem, 97% to vancomycin, 75% to cefaprazone-sulbactum and Augmentin 20%. The overall mortality rate was 36.3%,(n=69), the morbidity rate was 31.05% (n=59) and 32.6 %(n=62) of patients were discharged uneventfully.

Conclusion: The current management modality for complicated intra-abdominal infections in developing countries is a surgical challenge with a high morbidity and mortality. Early recognition, prompt source control and effective use of septic care bundle are important tools of management

Key Words: Complicated intra-abdominal infections, septic care bundle, abdominal sepsis

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INTRODUCTION

Despite our better understanding of pathophysiology and advances in surgery and antimicrobial therapy, Complicated Intraabdominal infection remains a potentially fatal affliction. It requires timely surgical intervention with appropriate antimicrobial therapy[1,2.]

CIAI accounts for 20% of overall intensive care unit admission. Thus CIAI constitute the second common cause for infectious morbidity and mortality after pneumonia[3]. There is an established role of aggressive fluid therapy for patients with septic shock or organ failure. The Surviving Sepsis Campaign guidelines for managing septic shock are well practice all over the world. Key recommendations include early use of broad-spectrum antibiotics, early goal-directed resuscitation. And surgery during first 6 hours after recognition ,involvement of critical care intensivist and surgical specialist[4,5].

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Prognosis depends on early recognition, timely targeted correction of root cause, maintained ongoing organ support.[4]

The purpose of the study is to describe the clinical, microbiological, and treatment profiles of complicated intraabdominal infections (IAIs) in a surgical unit in developing country. This aim of this study is to describe the profiling of the cohort presenting with complicated intraabdominal sepsis that have undergone emergency surgical laparotomy and to determine whether based on preoperative profile does these patient have different outcomes in terms of morbidity and mortality. PICO has used to clarify the research question. Primary objectives are to know the most common etiology of intraabdominal sepsis in the developing country and its association with post-operative outcomes. Secondary objective is to evaluate the commonly involved pathogens and their drug sensitivity traits in peritoneal sepsis. To know the level of operative and critical care provide in this cohort.

To have this in mind as a goal, it would provide us better insight of optimal management of complicated intra-abdominal infection in a developing country and help the treating clinician to take appropriate step in order to improve outcome management.

MATERIALS AND METHODS

This study was done at the surgical department Ward 2 of Jinnah postgraduate medical Centre Karachi. It is a retrospective study conducted from January 2013 to January 2016.

Patients more than 14 year of age with a primary diagnosis of secondary peritonitis, admitted via emergency were included. Data was collected from previous records. Peritonitis was diagnosed on the basis of history, clinical examination and radiological assessment.

Patients were resuscitated according to Surviving Sepsis Campaign guidelines[5]. After resuscitation, passing N/G and Foley Catheter, broad spectrum antibiotics were given and all patients underwent emergency surgical intervention within 3-6 hours of admission. As per protocol, intra-abdominal samples were taken for culture and sensitivity in all cases.

Post-operatively, adequate organ support was maintained; pre-operative antibiotics were continued and changed according to culture and sensitivity reports. Patients under 14 years of age and patients with the diagnosis of acute pancreatitis, acute cholecystitis and primary peritonitis were excluded from the study. Per-operative findings were noted. Statistical analysis has been done by using Microsoft Excel worksheets for the construction of graph, data bar charts, pie chart and percentages based on frequency of data and data were presented in mean, range and frequencies..

RESULTS

In this series, 190 patients with a mean age of 60 years (14-82 years) were included. Amongst them, 64.7% were male & 35.3% were females (Table 1). Most of the cases presented with distal small bowel perforations (n=86; 45% tuberculosis n=57/190,30 % & typhoid=29/190, 15%). Amongst other cases were perforated appendix (29/190,15,3%), duodenal perforation (42/190,22.1%), peritonitis due to advance malignancy (13/190,6.8%), stomach perforation (19/190,10%), and only one case(0.5%) of diverticulitis was found. During surgical intervention, intraperitoneal specimens were collected from 92.4% of the cohort and from these samples, a variety of microorganisms were collectively identified. Most of them were E.coli, Enterobacter, Klebsilla, Pseudomonas, Actinobacter, MRSA and Candida (100%, 85%, 70%, 20%, 8%, 5% and 3% respectively). (Fig-1)

Drug sensitivities were noted and Amikacin was found 100% sensitive to all organisms followed by meroneum & imipenem (95%), vancomycin (97%), cefaprazone-sulbactum: (75%) and Ampicillin/sulbactam (20%) (Fig-2) Ceftriaxone and ciprofloxacin were found to be resistant in 92%.

With regards to the severity of CIAI, 59.9% of the patients were in severe sepsis (n=62/190, 32.6%) and septic shock (n=52/190, 27.3%) at the time of their presentation. Stoma diversions were suited in 40% of cases (n=76/190) followed by primary repair or anastomosis in 85/190,61% and appendectomy in 29/190, 15.3% of patients. However, 33/190,17.3% of the cases underwent relook laparotomy due to persistent sepsis (14 cases), anastomosis leak (6 cases), imminent perforation and ileal perforation (10 cases) and appendicular stump leak in 3 cases.

The overall mortality rate was 36.3 %(n= 69/190) and morbidity rate was 31.05% (n=59/190). Rate of wound infection was very high 159/190 (83.7%) while 38/190, 16.2% patients developed respiratory complications and residual collections were developed in 21,11.1% of patients. We noticed that most common contributing factor in high mortality were old age, late presentation, high degree of sepsis and persistent organ failure. However, 62/190,32.6 % were discharged uneventfully. Mean length of stay in hospital was 11 days (14-40 days).

Table No.1: Summary of results:

Age	Mean age = 60 years (range=14-82)
Gender	Male 123/190(64.7%) Female 67/190 (35.3%)
1. Small bowel perforation i) Tuberculosis ii) Typhoid	86 (45.2%) 57 (66.2%) 29 (33.7%)
2. Perforated appendix	29 (15.3%)
3. Duodenal perforation	42 (22.1%)
4. Stomach perforation	19(10%)
5. Peritonitis due to advance malignancy	13 (6.8%)
6. Diverticulitis	1 (0.52%)
Type of procedure(n=190)	
- Stoma	76 ,41.6%
- Primary repair	
• Duodenal perforation	42,22.1%
• Stomach perforation	19,10%
• Small bowel perforation	24, 12.6%
- Appendectomy	29,15.3%
Morbidity	
1- Relook laparotomy	59/190,31.05%
• Persistent sepsis	33,17.3%
• Anastomotic leak	14
• Imminent/ileal perforation	6
• Appendix stump leak	10
2- Postoperative complication	3
• Wound infection	159,83.7%
• Residual collection	21,11.1%
• Respiratory complication/Pulmonary embolism.	38,16.2%
Mortality	69/190,36.3%
Discharge	62/190,32.6%

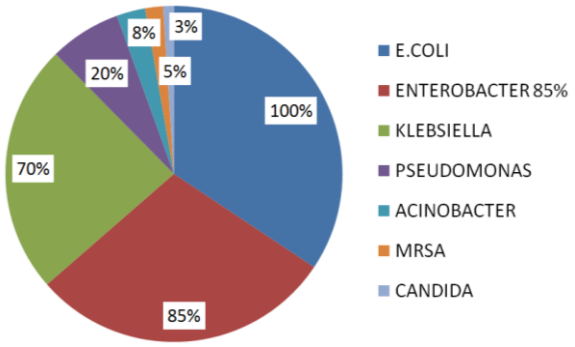

Figure No.1: Microbiology

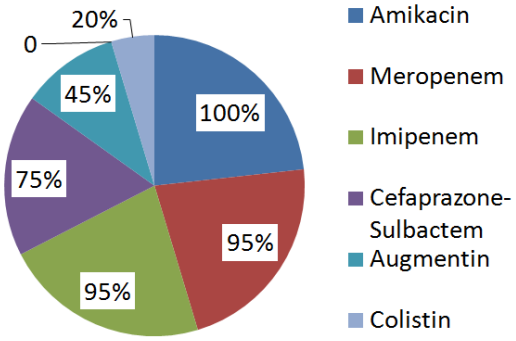

Figure No.2: Antibiotics Sensitivity

DISCUSSION

This retrospective study, performed over a period of 3 years, investigated the spectrum of findings in a group of patients with community-acquired CIAIs. We assume that this descriptive study reflects the 'real'-picture of CIAI in tertiary care hospitals in developing countries. The principal results are a high mortality rate despite adequate provision of the septic care bundle. Jhabhota at el reported that from a larger group of 504 patients, the mean age for patients having CIAI was of 36.8 years of age, while data from Sharma at el reflected an age group of 20-41 years. However, the mean age in our series was higher than the reported data (60 years) with majority of patients being male (68 45%), which is consistent with prior studies.[6,7]

Our study showed that tuberculosis and typhoid is the most common cause of secondary peritonitis in Pakistan and this finding contradicts other studies from the subcontinent where acid peptic disease and gastroduodenal perforation are the most common etiology. In 2013, Bali et al and Afridi at el in 2008, reported that perforated duodenal ulcer due to acid peptic disease was the most common cause of perforation peritonitis in 37.5% and 43.6% of the cases. However, literature published before 2000 from same demographic area is consistent with our findings[8]. Results of our study show the increasing prevalence of tuberculous and typhoid infections in the Pakistan in last one decade as compared to other developing countries in the subcontinent. At the other end of the spectrum, literature review from westernized countries documents that the causes of such perforations include : Diverticular disease, colonic malignancy, Crohn's disease, bowel ischemia, penetrating trauma and very rarely, intestinal tuberculosis[9] Noon et al reported in his series of 430 patients with gastrointestinal perforations that 210 cases were due to penetrating trauma followed by 92 cases of appendicitis.[10] Another retrospective review by Chaikof at el of 76 patients, noticed that most nontraumatic perforation in westernized world were due to malignancy and Crohns and rarely due to infectious cause.[11]

Perforations of the distal gastrointestinal tract were more common in our study which sharply contrast the other studies from developing countries from Asia(7, 8) but these results were consistent with developed countries which revealed that distal gastrointestinal tract perforations were more common[12,13]. In 2012, a large multicenter European study of 2152 patients who developed CIAI reported, 45 % cases were present with distal gastrointestinal tract perforations.[14]

In our study, E-coli was found to be more prevalent (100%) followed by Enterobacter, klebsilla, pseudomonas and candida at 85%, 70%, 20% and 3% respectively. This results matches with the CIAO Study (Complicated intra-abdominal infections

Observational study by World Society of Emergency Surgery) which underwent in 68 medical institutions worldwide during a six-month study and showed that community acquired infections are commonly caused by the non-fermenting gram-negatives E coli, Enterobacter sp, klebsilla aeruginosa and Acinetobacter and Candida sp.[15]

Most of the patients received diversions as surgical management in our study (41.6%) which is justifiable by their late presentation.[16] Sartelli et al shared his European experience in 2012 and reported that of the 100 patients with small bowel perforations, 83 underwent open small bowel resections and anastomosis (83%) the remaining 14% were treated non-surgically. This high rate of primary anastomosis were due to only 14.7% of patients were admitted in critical condition (severe sepsis/septic shock)[14] However in our study, 60% patient were in severe sepsis and septic shock.

We reported that major cause of postoperative morbidity were wound infections (83.7%), respiratory complications (16.2%) e.g., atelectasis, pneumonia, pleural effusion or ARDS, septicemia (64%) and post op collection (11.1%) which are preventable and should be detected early and aggressively treated. An unacceptably high incidence of wound infection (83.7%) and septicemia in the present series was multifactorial due to delayed presentation, gross contamination of peritoneal cavity, septicemia and nutritionally debilitation as most of them had tuberculosis. These results are higher than other

reported data. Yadav et al in his prospective review of 77 patients with CIAI showed a wound infection rate of 17.8%, followed by respiratory complications and anastomotic leaks in 7.8 and 3.9% respectively.[17] Rate of relook laparotomies in our data set were 18% in comparison to 11.7% reported in CIAOW Study[15]. A high rate in our study is attributed to late presentation and gross fecal contamination at time of intervention.

Our mortality of 36.3% is higher than the published literature from developed countries. In 2010, UK reported a 30-day hospital mortality rate of 14·9% However, USA and Denmark showed a similarly mortality rate of 14% and 19.5 % respectively. This high mortality rate could be justifiable by the large number of patients that were in septic shock at the time of their presentation. In the UK there is increasing recognition that outcomes after emergency surgery are poor and would benefit from standardization of care.[4] It is important to consider that morbidity and mortality rates have no direct association with the surgical technique, but more importantly depends on the general status of the patient, the virulence of the pathogens, and the duration and character of disease evolution preceding surgical treatment.

There is increasing resistance of community-acquired strains of gram negative organisms to selected antibiotics in many countries of the world. Specific antibiotic agent should be avoided if resistance to that agent is greater than 10% to 20% for a common intra-abdominal pathogen in the community.[18] However the rationale of empirical antibiotic therapy in CIAI is to cover the less common organism, which could be predictors of treatment of treatment failure. In order to decrease multidrug resistance, antibiotic treatment modalities need a regular update according to the hospital specific surveillance data. The use of preemptive antifungal therapy with fluconazole in high-risk patients may decrease the incidence of Candida peritonitis[19].

This paper presents the experience of clinical presentation and management of secondary peritonitis due to hollow viscous perforation in tertiary care setting, where delayed in late referral is the key factor. Which could be explained by poor primary health care referral system in our country. There are few limitations of this study as the data was collected retrospectively and based on single center. Sample size was modest. We could not provide data regarding long term complications followed by CIAI, patient's co-morbidities and it association with morbidity and mortality. None of the operative intervention was carried out by laparoscope due to lack of resources. Strength of this study include that we have discussed multiple outcomes which were lacking in other studies from subcontinent, our study findings are highlighting the increased prevalence of infectious causes in Pakistan. This data has provided strong evidence to health care authorities in our country for the establishment of developed Primary health care system and guide them to develop an accelerated pathway for early recognition of CIAI.

CONCLUSION

The study shows that management of intra-abdominal sepsis is still a surgical challenge with significant burden on the health care system. We recommend that Early recognition, prompt & proper resuscitation, adequate source control, application of septic bundle of care are important tools of management, along with an improvement of primary health care system in the developing countries may produce favorable outcomes.

Author's Contribution:

Concept & Design of Study:	Dileep Kumar
Drafting:	Mariyah Anwer,
Data Analysis:	Shamim Qureshi
Revisiting Critically:	Muhammad Naeem
Final Approval of version:	Dileep Kumar

Conflict of Interest: The study has no conflict of interest to declare by any author.

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