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CAUSES, CLINICAL PRESENTATION AND OUTCOME OF SECONDARY GENERALIZED PERITONITIS IN ADULT SURGICAL PATIENTS

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**CAUSES, CLINICAL PRESENTATION AND OUTCOME OF SECONDARY
GENERALIZED PERITONITIS IN ADULT SURGICAL PATIENTS IN
SPHMMC, ADDIS ABABA, ETHIOPIA, 2018**

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ABSTRACT

INTRODUCTION: Peritonitis is a life-threatening condition with a multitude of etiologies that can vary with geographic location. Despite a better understanding of pathophysiology, advances in diagnosis, surgery, antimicrobial therapy and intensive care support, peritonitis remains a potentially fatal affliction.

OBJECTIVE: To determine the causes, clinical presentation and outcome of secondary Generalized peritonitis in adult surgical patients at SPHMMC, Addis Ababa, Ethiopia, from September 2015 – August 2016 G.C.

Methodology: -The study employed a retrospective design. Study subjects were identified from the hospital admission/discharge records, patient cards and operation log books which were collected by pretested data collection format by trained final year medical students. Data analyzed using SPSS software. The analyzed data presented using tables and described using texts.

RESULTS A total of 186 patients were studied. Most of the patients were males; with male to Female ratio of 2.3:1. Majority of the patients presented with pain (100%) associated with bowel symptoms. The most common etiologies were appendicular perforation 57(30.6%), Gastro duodenal perforation 43(23.1%), Gangrenous SBO 17(9.14%), Traumatic perforation of small bowel 14(7.5%), Gangrenous Sigmoid volvulus 15(8%), Stomach perforation 8(4.3%), Ileosigmoid knotting 6(3.2%), Tumor perforation 6(3.2%) and others 19(10.2%). Ex lap + Appendectomy + Lavage was the most commonly performed procedure. Overall morbidity was 36% and mortality was 11%.

CONCLUSION & RECOMMENDATION Generalized peritonitis is a common and significant surgical problem in Ethiopia. The most affected group was the young individuals who are most involved in social productivity and thus has an impact on the economy of the society. Parameters such as aggressive fluid and electrolyte resuscitation with vital sign monitoring, type of surgical procedures and use of appropriate antibiotics use should be emphasized in order to improve survival.

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ACRONYMS AND ABBREVIATIONS

AD	Advisors
CI	Confidence Interval
EGS/ES	Emergency General surgery/Emergency Surgery
GI	Gastro Intestinal
HICs	High Income Countries
LMICs	Low Middle Income Countries
PI	Principal Investigator
POM	Perioperative Mortality
SPHMMC	Saint Paul Hospital Millennium Medical College
WHO	World Health Organization

1. INTRODUCTION

1.1 BACKGROUND

Peritonitis is defined as inflammation of the serosal membrane that lines the abdominal cavity and the organs contained therein.¹

It may be local or have a systemic consequence generating multiple organic dysfunctions. Most of the studies report a mortality of 30% in severe intraabdominal infections.¹

In general, the term peritonitis refers to a constellation of signs and symptoms, which includes abdominal pain and tenderness on palpation, abdominal wall muscle rigidity, and systemic signs of inflammation.²

Patients may present with an acute or insidious onset of symptoms, limited and mild disease or systemic and severe disease with septic shock.

Peritoneal infections are classified as primary (i.e. spontaneous), secondary (i.e. related to a pathologic process in a visceral organ), or tertiary (i.e. persistent or recurrent infection after adequate initial therapy). The intraabdominal infection may be localized or generalized, with or without abscess formation.²

Secondary peritonitis is caused by the loss of integrity of the gastrointestinal apparatus, which contaminates the peritoneal cavity with pathogens. Invariably they are polymicrobial infections, mostly due to facultative aerobic and anaerobic gram-negative bacilli.¹

The prognosis of peritonitis depends on the struggle between two forces, local and systemic immunity of the host and the volume, nature and level of the contamination. Microorganisms and their products stimulate cellular defenses in the host and activate inflammatory mediators responsible for sepsis.¹

The surgical treatment of peritonitis started with the first laparotomy for an infected ovarian cyst by McDowell in the beginning of the 19th century. Thereafter the surgical approach developed parallel to the advances in abdominal surgery.⁴

In the last decade of the 19th century Mikulicz felt that laparotomy was indicated in all patients with purulent peritonitis.⁴

In the beginning of the 20th century Korte and Kirschner defined the principles of surgery for peritonitis that are valid up to this day; Early surgical intervention, elimination of the source of infection, and peritoneal toilet.⁴

Untreated cases of acute peritonitis may be fatal. In 1926, the fundamental role of operative therapy in the treatment of peritonitis was documented. Kirschner reported that the mortality rate from intraabdominal infections decreased from more than 90% to less than 40% during the period from 1890-1924 with the introduction of operative management as an effective therapeutic modality.⁴

The peritoneum reacts to a variety of pathologic stimuli with a fairly uniform inflammatory response. Depending on the underlying pathology, the resultant peritonitis may be infectious or sterile (i.e. chemical or mechanical).⁶

1.2 STATEMENT OF THE PROBLEM

Generalized secondary peritonitis is one of the most common surgical emergencies. Despite the great progress in intensive care support, antimicrobial therapy and surgical techniques, the management of peritonitis is still highly complex and represents a challenge for clinicians. With a mortality of up to 20% peritonitis is a dominant cause of death due to surgical infections.³

Severe abdominal infections are accompanied with a high level of endotoxin production, resulting in the so called systemic inflammatory response syndrome (SIRS), which is often complicated by multiple organ failure. The surgical eradication of the infectious focus is the most important prerequisite for a surgical treatment.¹⁰

Severe morbidity and high mortality is especially experienced in developing countries.⁸ Some of the risk factors are attributed to low socio-economic status.^{7,8} Poor health facilities, disorganized social infrastructure and unavailable health insurance programs.

There are a variety of factors influencing the reduction in mortality from peritonitis over the last century. Safer anesthetic techniques, improved understanding of perioperative fluid management, the advent of blood banking, improvements in critical care, more rapid and accurate diagnostic studies, and more effective antibiotics are some of the factors that have led to a reduction in mortality from peritonitis.⁵

On the other hand, a variety of challenges have arisen that threaten to offset these advances. Patients with intraabdominal infection are older, more commonly have comorbid diseases, often have associated immune suppression due to chronic diseases or their treatment, and more frequently have decreased physiologic reserve with either sub-clinical or evident organ failure. Although the bacterial flora of the gastrointestinal tract has remained relatively consistent over time, the widespread presence of antimicrobial resistance among patients with nosocomial as well as community-acquired infections has presented another challenge. This is particularly true for patients who have received previous antimicrobial treatment, inappropriate therapy, or have developed tertiary peritonitis where the pathogens are commonly resistant to front-line agents.⁵

1.3 Rationale of the study

Up to one third of patients still die of generalized peritonitis,¹¹ despite improved diagnostic modalities, potent antibiotics, modern intensive care, and aggressive surgical treatment.

Peritonitis in African communities is mainly in the young age group ^{8,9}this is a group that is actively involved in social productivity. Also, this condition afflicts communities who live in slums where sanitary conditions and housing infrastructures are poor.

The pattern, causes and outcome of generalized peritonitis are not well documented in our region. Therefore, this study provides a database on the profile of this fatal condition. The knowledge acquired will aid setting up strategies necessary for prevention and early intervention.

2. LITERATURE REVIEW

According to a review on peritonitis on – the Eastern experience Sanjay Gupta* and Robin Kaushik perforations of the gastro duodenum are the most common cause of peritonitis. These commonly arise consequent to perforation of peptic ulcers, more specifically; ulcers of the first part of the duodenum. The mortality in this subset of perforations is up to 11 %, with a higher mortality seen in patients over the age of 50 years, those with concomitant disease, preoperative shock, larger size of the perforation, delay in presentation and delay in operation¹²

The next commonly encountered perforations arise from the small bowel (6–42 %), but there seems to be a wide geographical variation in the incidence and frequency of small bowel perforations. A few authors have reported this to be the most common cause of peritonitis in their series, whereas it accounted for only around 6 % of the cases of peritonitis that were encountered in China. A very low incidence of small bowel perforations has also been reported from Thailand .¹²

Generalized peritonitis due to perforation of the small bowel is seen more commonly in the developing countries, where it is usually secondary to perforation of typhoid ulcers that are seen in enteric fever. Nonspecific or idiopathic ulcer perforation and tubercular ulcer perforations are the next common cause in most of the series. The overall mortality in this group of peritonitis is higher than that seen in gastro duodenal ulcer perforations, and ranges from 0 – 38 % .¹²

Appendicular perforations are also frequently implicated, Colorectal perforations are rare but a higher incidence has been reported from Japan and China. The other causes that have been reported are perforation of colonic diverticula, inflammatory conditions of the colon, volvulus, mesenteric ischemia, trauma, iatrogenic complications, idiopathic and stercoral perforation. In the Asian communities' diverticular disease is more common in a younger age group, and the right colon is more commonly involved. One-third of these patients present with perforation of the large bowel and fecal peritonitis that requires surgical intervention. Amoebic colitis is another condition that is common in the tropical countries, with an incidence of perforation around 2 %, but with a high mortality rate (up to 50%) regardless of the treatment .¹²

Rare sites of perforation leading to secondary peritonitis that have also been reported in the literature arise from the biliary tree, uterus, splenic and liver abscesses. Of these, ruptured amoebic liver abscesses are frequently encountered in tropical countries. These are seen in 3–7% of cases of intestinal amoebiasis, and up to 22% can rupture to give peritonitis, which

carries a high mortality. The management is by laparotomy and drainage or nonoperatively, by means of metronidazole and/or radiologically guided drainage. Rupture of pyogenic liver abscess is rarer by comparison.¹²

Kruger et al reviewed 956 patients with generalized peritonitis who underwent surgery. The causes of peritonitis were :perforating gastro duodenal ulcers (454),acute ruptured appendicitis(190),acute perforated cholecystitis(82),perforation of small intestine and colon(96),postoperative peritonitis(80),other causes(54).In the postoperative period ,out of 691 patients with low degree of bacterial contamination ,wound infection was seen in 7.9%,intra-abdominal infection in 2.5%,multiple organ insufficiency in 1%.Mortality was 5.9%.In the postoperative period of 256 patients with high degree of bacterial contamination wound infection decreased to 6% ,intraabdominal infection increased to 4.2% ,multiple organ insufficiency in 42.6%;mortality was 18.1%.¹³

In a retrospective analysis done in India, 98 cases were managed surgically. Duodenal ulcer perforations, necrotizing enteritis, acute cholecystitis with perforation and small bowel perforations were the common causes. Most of them presented late; many had associated conditions. While there was significant decrease in the number of typhoid and tubercular peritonitis, there appeared to be an increase in the incidence of necrotizing enteritis & acute cholecystitis.¹⁴

A Study conducted on 190 cases at Kamuzu Central Hospital (KCH) in Lilongwe, Malawi, during the calendar year 2008 Sixty-nine percent were male. The average age was 35 (median 32, range10-84). The youngest subject was 10, and 10 subjects were under the age of 18. The most common etiologies were appendicitis (22%), intestinal volvulus (17%), perforated peptic ulcer (11%) and small bowel perforation (11%). The overall mortality rate associated with peritonitis was 15%, with the highest mortality rates observed in solid organ rupture (35%), perforated peptic ulcer (33%), primary/idiopathic peritonitis (27%), tubo-ovarian abscess (20%) and small bowel perforation (15%). Factors associated with increased mortality include age, gender, symptoms (constipation, vomiting) and symptom duration.¹⁵

According to a study done on Epidemiology of Secondary Peritonitis at International Journal of Scientific Study, march 2016: Analysis of 545 Cases ;A clear male predominance was found ($n = 461$; 84.58%); Gastro duodenal (GD) perforation due to acid peptic disorder remained the most common cause of peritonitis ($n= 264$; 48.44%). Among 264 cases of GD perforation, 251 (95.07%) were males and only 13 were females; clearly showing significant male preponderance ($P < 0.0000001$). Similarly, peritonitis from appendicular perforation, gangrenous intestinal obstruction, abdominal trauma, and typhoid ulcer perforation was also found to be much more common in males. The majority of the trauma patients were also males

(89.18%) . The age range of our patients was 16-87 years with the mean age being 31.9 years. Analysis of month wise incidence of cases failed to reveal any notable seasonal variation.¹⁶

In a study conducted by Konkena JR et al at north coastal Andhra Pradesh, India about spectrum of secondary peritonitis A total of 603 patients were studied. Among them, 493 (81.7%) were males and 110 (18.3%) were females. Most common cause of secondary peritonitis in our study was acid peptic disease (52.40%) followed by Appendicular pathology (11.2%), gastrointestinal perforation due to injury of abdomen (9.62%), small bowel perforation due to typhoid etiology (7.63%), gangrenous bowel (6.30%), ruptured liver abscess (2.98%), biliary peritonitis (1.99%) and some miscellaneous rare causes. Overall, mortality in this study was found to be 8.95%.¹⁷

In A retrospective analysis of 305 cases from the South-West Region of Cameroon the diagnosis of diffuse peritonitis was suggested on clinical ground only in more than 93 % of cases. The most common causes of diffuse peritonitis included peptic ulcer perforation (n = 69), complications of acute appendicitis (n = 53) and spontaneous perforations of the terminal ileum (n = 43). A total of 142 complications were recorded in 96 patients (31.5 % complication rate). The most common complications included wound dehiscence, sepsis, prolonged paralytic ileus and multi-organ failure. Patients with typhoid perforation of the terminal ileum carried a significantly higher risk of developing a complication (p = 0.002). The overall mortality rate was 15.1 %. The most common cause of death was septic shock. Differential analysis of mortality of various causes of peritonitis indicated that the highest contributors to death toll were typhoid perforation of terminal ileum (34.7 % of deaths), post-operative peritonitis (19.5 %) and peptic ulcer perforation (15.2 %).¹⁸

In a study conducted by Mabewa et al on Etiology, treatment outcome and prognostic factors among patients with secondary peritonitis at Bugando Medical Centre, Mwanza, Tanzania The study enrolled 97 patients with the female to male ratio of 1:1.8 and approximately 41.2 % (40/97) were in their third and fourth decades of life. Only 3 (3.09 %) patients arrived to the hospital within 24 hours of onset of illness, 26 (26.80 %) patients presented with shock and HIV seropositivity among all patients was 13.40 % (13/97). The common etiologies of secondary peritonitis were perforated appendicitis 23 (23.71 %), peptic ulcer disease 18 (18.56 %), ischemia 18 (18.56 %) and typhoidal perforation 15 (15.46 %). Of the 97 patients, 35 (36.08 %) had complications and 15 (15.46 %) died. Presence of premorbid illness and post-operative complication were found to be associated with death (p values = 0.004 and <0.001 respectively).¹⁹

According to a research done by Zinabu Ayenew et al at Nekemte Referral Hospital Southwest Ethiopia: There were 107 cases that developed peritonitis at the time of operation from different sources. Forty-eight (44.8%) of cases were from gangrenous bowel obstructions,

22(20.5%) perforated appendicitis, 14(13.0%) perforated PUD and 11(10.2%) from typhoid perforation while 11(10.2%) were primary peritonitis. Majority of cases of peritonitis were those who came late before operation.²⁰

The main presenting features of peritonitis were abdominal pain (100%), vomiting (97.65%) constipation (78%), and nausea (69.87%). Among perforated PUD, 11 were from rural and 3 urbans and all were males. Majority of cases were in the age group of 40-60 years. All managed by Omental patch and there was one death by the complication of sepsis.²⁰

Most cases of typhoid perforation were from rural and in the age group of 1st and 2nd decades. Male to female ratio was 1:2 and repair done for eight (72.7%) cases where as REEA done for three (27.2%). There was 1death from repair due to sepsis secondary to leak. Ten of 11 cases of primary peritonitis were from rural and the male to female ratio was 1:2. Six (54.5%) managed by lavage plus appendectomy and for five (45.4%) lavage only done. The total deaths among patients who had peritonitis at time of operation were six (5.6%).²⁰

3. OBJECTIVES

3.1 GENERAL OBJECTIVE

To describe the pattern, causes and outcome of secondary generalized peritonitis in Adult surgical patients at SPHMMC

3.2 SPECIFIC OBJECTIVES

1. To describe the causes of secondary generalized peritonitis
2. To describe the clinical presentation of secondary generalized peritonitis in Adults
3. To describe the morbidity& mortality of secondary generalized peritonitis in Adults

4. METHODOLOGY

4.1 STUDY AREA

This study was conducted at St. Paul's Hospital Millennium Medical College, department of surgery, Addis Ababa, Ethiopia. The hospital is founded in 1967 G.C. In 2008 the hospital transformed itself into a medical college. It is one of the referral hospital in the country and has more than 380 inpatient beds of which 121 beds are in surgical wards. St. Paul's Hospital Millennium Medical College located in the northwestern part of Addis Ababa and serves as a referral center for patients from Addis Ababa and all over the country. The hospital has more than of 1500 professionals and supporting staffs. The hospital currently provides undergraduate and postgraduate studies. On average it provides health service for more than 2000 inpatient and 200,000 outpatients and more than 5000 surgeries annually.

4.2 STUDY DESIGN AND PERIOD

One year, an institutional based retrospective record review design was employed to assess the pattern, causes and outcome of Adult patients operated for secondary Generalized Peritonitis from September 2015 – August 2016 G.C

4.3 POPULATIONS

4.3.1 SOURCE POPULATION

All adult General Surgical patients operated at SPHMMC during the study period

4.3.2 STUDY SUBJECTS

All Adult Patients who were admitted in the surgical wards with clinical features of secondary generalized peritonitis.

4.4 ELIGIBILITY CRITERIA

4.4.1 INCLUSION CRITERIA

All Adult general surgery patients with an intraoperative diagnosis of secondary generalized peritonitis

4.4.2 EXCLUSION CRITERIA

1. Cases of primary peritonitis/spontaneous bacterial peritonitis/
2. Laparotomy performed for blunt trauma and subsequently found to have hemoperitoneum from solid organ injury;
3. Pediatric patients age less than 14 years
4. Localized form of peritonitis

4.5 MEASUREMENT VARIABLE

4.5.1 Dependent variables

- ❖ Morbidity
- ❖ Mortality

4.5.2 INDEPENDENT VARIABLES

- ✓ Gender
- ✓ Age
- ✓ Address
- ✓ Causes
 - ❖ operative diagnosis Date of onset and type of symptoms
 - ❖ Presence of guarding, tenderness, or rigidity and abdominal quadrant(s) affected
 - ❖ Vital signs on presentation including temperature, heart rate, blood pressure, and respiratory rate
 - ❖ Date and results of initial complete blood count if performed, and results of abdominal ultrasound and erect abdominal x-ray if performed

4.6 sample size and sampling procedure

All Adult Patients who will be admitted in the surgical wards with clinical features of secondary generalized peritonitis in the study period.

4.7 OPERATIONAL DEFINITIONS

Peritonitis is the acute inflammatory response of the visceral and parietal peritoneum to bacterial, chemical, radiation or foreign body injury.

Primary peritonitis is an infection of the peritoneum occurring de novo without obvious intra-abdominal pathology; usually from hematogeneous dissemination

Secondary bacterial peritonitis is a purulent inflammation of the peritoneum due to contamination following a complication of a preexisting primary intra-abdominal process such as perforated peptic ulcer, ruptured appendix, a disrupted anastomotic suture line or as consequence of bacterial contamination from external sources (e.g. penetrating injury).

Tertiary peritonitis represents the persistence or recurrence of peritoneal infection following apparently adequate therapy for SBP or SP, often without the original visceral organ pathology. Patients with tertiary peritonitis usually present with an abscess, or phlegmon, with or without fistulization.

Localized Peritonitis A type of peritonitis that is confined to a demarcation region of the peritoneal cavity.

Generalized Peritonitis A type of peritonitis in the presence of contamination in two or more quadrants of the abdomen

4.8 DATA COLLECTION

Data was collected from patients' medical record cards and operation registry by using pre tested data collection sheet and included: gender, age, date of admission, date of surgery, date of discharge or death, surgical procedure and operative diagnosis, date of onset and type of symptoms, presence of guarding, rebound, or rigidity and abdominal quadrant(s) affected, vital signs on presentation including temperature, heart rate, blood pressure, and respiratory rate, date and results of initial complete blood count if performed, and results of abdominal ultrasound and erect abdominal x-ray if performed.

Five medical interns were involved during the data collection processes who were trained on how to collect the relevant data using the data collection sheet. The Principal Investigator was continuously supervising the data collectors and the records were cross checked with hospital medical records.

4.9 DATA ENTRY AND ANALYSIS

The collected data was cleaned, coded and entered to SPSS version 20 for analysis. Descriptive statistics like frequency, mean/median, standard deviation and percentage were used. The result was summarized using explanations, charts and tables. Variable logistic regression was used to identify factors of cause, clinical presentation and outcome. Explanatory variables with level of significance less than 0.01 was used to select independent variables appeared on bivariate analysis for fit for the final multiple logistic regression model. Variables appeared on multiple logistic regressions with p-value less than 0.05 was declared as statistically significant.

4.10 QUALITY CONTROL

The data collecting sheet were standardized by testing it in 5% of the sample size before the study to make sure that the data collecting sheet is capable of yielding the required data for the study and some modifications were done according to the results found. The collected data were checked for completeness consistency and clarity.

4.11 ETHICAL CONSIDERATION

Ethical clearance was obtained from IRB. All the collected data was kept confidential and no one except the members of the research team had access to the collected information. All paper and computer records of the study were kept in a secured place under lock and the name and/or other personal information was not notified in any report.

4.12 DISSEMINATION OF THE RESULT

The finding of the study will be presented to the department of Surgery / SPHMMC. It will also be disseminated through presentations in different professional association meetings and annual conferences. The paper will also be submitted to national or international peer reviewed scientific journals for possible publication

5. RESULTS

I identified a total of 186 subjects meeting the definition of Generalized peritonitis who underwent Laparotomy during the study period of one year from September 2015 upto august 2016 G.C.

5.1. ADMISSION DISTRIBUTION BY AGE AND GENDER

Among a total of 186 patients 129(69.4%) were males; 57(30.6%) were females; with male to female ratio of 2.3:1 .The average age was 34 (median 28.5, range 15-80). The commonest age group affected was those between 15-30 years. About 109(58.6%) of patients were admitted from urban area and 77(41.4%) of them from rural area. The distribution of admission according to age, address and gender is given in the following table

Table 1 Distribution of Admission by age, address and Gender for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

Count		Sex		Total
		Male	Female	
Age	15-30	68	37	105
	31-45	31	10	41
	46-60	15	4	19
	>60	15	6	21
Total		129	57	186

Count		Sex		Total
		Male	Female	
Adress	Urban	72	37	109
	Rural	57	20	77
Total		129	57	186

5.2 ETIOLOGY

The most common etiologies were appendicular perforation 57(30.6%), GD perforation 43(23.1%), Gangrenous SBO 17(9.14%), Traumatic perforation of small bowel 14(7.5%), Gangrenous SV 15(8%), Stomach perforation 8(4.3%),Ileosigmoid knotting 6(3.2%),Tumor perforation 6(3.2%) and others 19(10.2%).

Majority of the patients 105 were in 15-30 years age group (56.5%) followed by 41 in 31-45 years age group (22%) , 21 (11.3%) were in age group >60 years and 19(10.2%) were in 46-60 years of age.

Table 1 Etiology of peritonitis in relation to gender & age

Diagnosis	Male	%	Female	%	Total	%
Appendicular perforation	32	24.8	25	43.9	57	30.6
Perforated Peptic Ulcer	37	28.7	6	10.5	43	23.1
Gangreneous SBO	10	7.7	7	12.3	17	9.1
Small Bowel Perforation	11	8.5	3	5.2	14	7.5
Gangreneous SV	13	10	2	3.5	15	8.1
Stomach perforation	8	6.2	0	0	8	4.3
Ileosigmoid knotting	5	3.9	1	1.8	6	3.2
Tumor perforation	5	3.9	1	1.8	6	3.2
Bladder perforation	1	0.7	0	0	1	0.5
Others	7	5.4	12	21	19	10.2
Total	129	100	57	100	186	100

Table 2 Etiology of peritonitis in relation to age & gender for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

The majority of appendicular perforations occur in the age group of 15-30 which is 49/57 but Perforated PUD occur in the age group 15-30 in 19/43 cases and in the age group of 31-45 in 12/43 cases, in the age group 46-60 in 5/43 cases and those >60 ,7/43cases .(table2 illustrates these results)

Table 3 Intraop finding and age distribution for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

Count		Age				Total
		15-30	31-45	46-60	>60	
INtraop DX	GD Perforation	19	12	5	7	43
	Ileosigmoid knotting	3	2	0	1	6
	Stomach Perforation	6	1	0	1	8
	Appendicular perforation	49	2	2	4	57
	Bladder Perforation	0	1	0	0	1
	Tumor Perforation	1	2	3	0	6
	Traumatic Perforation Of SB	8	6	0	0	14
	Gangreneous SBO	6	7	1	3	17
	Gangreneous SV	6	1	6	2	15
	Others	7	7	2	3	19
Total		105	41	19	21	186

5.3 CLINICAL PRESENTATION

Majority of patients present to hospital within 25 hours upto 7 days; 40 % of them presented between 25-72 hours and 34 % of them between 3-7 days. Mean of 2.4 days and median of 2 days.

Table 4 Duration of symptoms for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August 2016

Duration of symptoms					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	<24 hrs	29	15.6	15.6	15.6
	25-72 hrs	74	39.8	39.8	55.4
	3 days-7 days	63	33.9	33.9	89.2
	>7 days	20	10.8	10.8	100.0
	Total	186	100.0	100.0	

All of the 186 study subjects presented with abdominal pain, while 28(15 %) of them presented with trauma. Around two third of patients 124(66.7%) presented with positive sign of fluid collection. 27(14.5 %) of patients presented with signs of localized peritonitis. 161(86.6 %) of patients were having systolic BP >90 and 121(65.1%) of them had HR >100. Majority of patients 177(95.2) had hemoglobin value of >10.

Table 5 Presenting symptoms and signs for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

Presenting Factor		Frequency	%
Pain	Yes	186	100
Obstipation	Yes	44	23.7
Vomiting	Yes	116	62.4
Trauma	Yes	28	15.1
Fever	Yes	52	28
+ve sign of colln	Yes	124	66.7
Peritonitis	Localized	27	14.5
	Generalized	159	85.5
Blood pressure	>90	161	86.6
	<90	25	13.4
Respiratory Rate	>30	16	8.6
	<30	70	91.4
Heart Rate	>100	121	65.1
	<100	65	34.9
WBC	<4,000	6	3.2
	(4-11) 1000	73	39.2
	>11,000	107	57.5
Hemoglobin	<10	9	4.8
	>10	177	95.2

5.3 INVESTIGATIONS

Preoperative ultrasound was performed in 100 of cases and x-ray done in 76 of cases. The commonest ultrasound finding was generalized fluid collection in 71/100 cases and the commonest x-ray finding was air under diaphragm in 30/76 cases, features of SBO in 26/76 cases followed by LBO in 14/76 cases

The following table illustrates these results

Table 6 Comparision between Ultrasound & X-ray results for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

Table 3 Comparison between ultrasound & X-ray results

Imaging	Finding	Number
Ultrasound finding	Peritoneal Fluid collection	71
	Dilated bowel	8
	Localized collection	20
	Normal	1
	Total	100
X-ray finding	SBO	26
	LBO	14
	Air under Diaphragm	30
	Normal	6
	Total	76

5.4 SURGICAL PROCEDURES

Among the surgical procedures Ex lap + Appendectomy + Lavage account the majority 60(32.2 %),Graham's omental patch done in 38(20.4 %) of cases.the following table illustrates these

Table 4 Surgical procedure performed

Surgical Procedures	Number	%
Graham's omental patch	38	20.4
EX lap+appendectomy+lavage	60	32.2
Ex lap + Lavage	20	10.6
Repair	14	7.5
Resection & anastomosis	27	14.5
Stoma	18	9.7
Resection + anastomosis + stoma	9	4.8
Total	186	100

Table 7 Types of Surgical Procedures performed for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

5.5 COMPLICATIONS

Among all the study subjects 67 of them develop complications which account 36 %.the majority was intra abdominal collection in 16 cases followed by sepsis in 10 cases and SSI,Pneumonia & ECF each account 9 cases.The following table illustrates these

Table 5 Post-operative complications

Complications	Number	% complications	% total
Intra-abdominal collection	16	23.9	8.6
SSI	9	13.4	4.8
Pneumonia	9	13.4	4.8
Leak	0	0	0
ECF	9	13.4	4.8
Wound dehiscence	6	9	3.2

Electrolyte disturbance	2	2.9	1.1
PTE	1	1.5	0.5
DVT	3	4.5	1.6
Sepsis	10	14.9	5.4
AKI	2	2.9	1.1
Total	67	100	36

Table 8 types of postoperative complications for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

5.6 OUTCOME

The overall mortality rate associated with peritonitis was 11 %,with the highest mortality rates observed in gangrenous SBO 6,GD perforation 6,gangrenous SV 3,Small bowel perforation 2,Ileosigmoid knotting 1.The commonest possible cause of Death being septic shock followed by MOF.

The following table illustrates these results

Table 6 Possible cause of Death

Outcome	Number	%	Possible cause of Death	Frequency	%
Discharged	166	89%	MOF	7	35
Died	20	11%	Septic shock	10	50
Total	186	100%	Cardiac arrest	1	5
			Respiratory Failure	2	10
			Total	20	100

Table 9 Possible cause of Death for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

		Outcome		Total
		Discharged	Died	
INtraop DX	GD Perforation	37	6	43
	Ileosigmoid knotting	5	1	6
	Stomach Perforation	8	0	8
	Appendicular perforation	56	1	57
	Bladder Perforation	1	0	1
	Tumor Perforation	6	0	6
	Traumatic Perforation Of SB	12	2	14
	Gangreneous SBO	11	6	17
	Gangreneous SV	12	3	15
	Others	18	1	19
Total		166	20	186

Table 10 Etiology based outcomes for secondary generalized peritonitis patients at St.Paul's hospital millennium medical college, Addis Ababa Ethiopia from Sep 2015- August2016

6. DISCUSSION

This study outlines the etiology, associated presenting signs and symptoms, and outcomes of surgically managed peritonitis in a tertiary care center in central Addis Ababa, Ethiopia.

Generalized peritonitis is a frequently encountered emergency and remains a significant cause of morbidity and mortality which usually requires emergency surgery.²⁵ Worldwide there is a predominance of males presenting with this life-threatening disease^{26, 27}; our series also shows a similar trend, with a male to female ratio of 2.3:1. The commonest age group affected was those between 15-30 years which is the youngest and productive age group. IN a Malawi study, during the calendar year 2008; 69% were male. The average age was 35 (median 32, range 10-84). In Indian study, 493 (81.7%) were males and 110 (18.3%) were females. In Tanzanian study enrolled 97 patients with the female to male ratio of 1:1.8 and approximately 41.2 % (40/97) were in their third and fourth decades of life.^{15, 17, 19}

The etiological factors vary depending on geographic variation.. Appendicular perforation was the most common cause of peritonitis in our study (30.6%) and in studies on acute abdomen from Ghana (43.1%), Nigeria (40.3%) , Malawi (21%) and Ethiopia(24.5%)^{15, 21, 22, 23}. According to a review on peritonitis on – the Eastern experience Sanjay Gupta* and Robin Kaushik perforations of the gastro duodenum are the most common cause of peritonitis. The next commonly encountered perforations arise from the small bowel (6–42 %) ¹².

Kruger et al reviewed 956 patients with generalized peritonitis who underwent surgery. The causes of peritonitis were :perforating gastro duodenal ulcers (454), acute ruptured appendicitis(190), acute perforated cholecystitis(82), perforation of small intestine and colon(96), postoperative peritonitis(80), other causes(54).¹³

A Study conducted on 190 cases at Kamuzu Central Hospital (KCH) in Lilongwe, Malawi, The most common etiologies were appendicitis (22%), intestinal volvulus (17%), perforated peptic ulcer (11%) and small bowel perforation (11%).¹⁵

According to a research done by Zinabu Ayenew et al at Nekemte Referral Hospital Southwest Ethiopia: There were 107 cases that developed peritonitis at the time of operation from different sources. Forty-eight (44.8%) of cases were from gangrenous bowel obstructions, 22(20.5%) perforated appendicitis, 14(13.0%) perforated PUD and 11(10.2%) from typhoid perforation while 11(10.2%) were primary peritonitis.²⁰

In our study all of the 186 study subjects presented with abdominal pain, while 28(15 %) of them presented with trauma. Around two third of patients 124(66.7%) presented with positive sign of fluid collection.²⁷ (14.5 %) of patients presented with signs of localized peritonitis. 161 (86.6 %) of patients were having systolic BP >90 and 121(65.1%) of them had HR >100. Majority of patients 177(95.2) had hemoglobin value of >10.

The main presenting features of peritonitis were abdominal pain (100%), vomiting (97.65) constipation (78%), and nausea (69.87%); according to a study done at Nekemite.²⁰ According to Pakistan study

Presenting symptoms included abdominal pain (97%), abdominal distension (91%) absolute constipation (80%) and vomiting (58%). All patients (100%) presented with dehydration and shock. Abdominal tenderness and rigidity were present 85 and 83% of the patient's respectively.²⁸

In Cameroon study the most common clinical findings were diffuse abdominal pain (100 %), abnormal temperature (83 %) and signs of peritoneal irritation (tenderness, rebound tenderness, guarding, rigidity: 91 %). A total of 138 patients (45 %) presented with signs of sepsis on admission. The delay between onset of symptoms and admission ranged from 16 h to 9 days with a mean of 3.62 days. Most patients (80 %) for whom a leucocyte count was requested and had a leucocytosis above 12.000/ml.¹⁸

In our study Majority of patients present to hospital within 25 hours upto 7 days; 40 % of them presented between 25-72 hours and 34 % of them between 3-7 days. Majority of patients in Indian study presented late with the time interval between the onset of symptoms and admission varying from 12 hours to up to 6 days with an average of 3.5 days.²⁸

Investigations in patients with peritonitis have dubious reliability. In our study Preoperative ultrasound was performed in 100 of cases and x-ray done in 76 of cases. The commonest ultrasound finding was generalized fluid collection in 71/100 cases and the commonest x-ray finding was air under diaphragm in 30/76 cases, features of SBO in 26/76 cases followed by LBO in 14/76 cases

Only 164 (52.7%) patients in Indian study had evidence of pneumoperitoneum on chest x-ray. This corresponds well with another study, which reports pneumoperitoneum in 50% of cases with peritonitis . Similarly, only 28.9% cases showed air fluid levels on x-ray abdomen.²⁹

In our study among all the study subjects 67 of them develop complications which account 36 %.the majority was intra abdominal collection in 16 cases followed by sepsis in 10 cases and SSI,Pneumonia & ECF each account 9 cases.

IN Pakistan study postoperative complications included wound infection (28%), septicemia (20%) and electrolyte imbalance. ²⁸. However, postoperative complication in secondary peritonitis reported by Jhobta RS are respiratory tract infections (28%), wound infection (25%), septicemia (18%) and dyselectrolaemia .²⁵

A total of 142 complications were recorded in 96 patients (31.5 % complication rate). The most common complications recorded included wound dehiscence, sepsis, prolonged paralytic ileus and multi-organ failure. The most common combination was the association of signs of septic shock with paralytic ileus.¹⁸

The mortality rate 11% was similar to reports from Malawi(15%),Ethiopia(4.9-15.3%),India(8.95) &England (20%).^{15,22,24,17}In Malawi study The overall mortality rate associated with peritonitis was 15%, with the highest mortality rates observed in solid organ rupture (35%), perforated peptic ulcer (33%), primary/idiopathic peritonitis (27%), tubo-ovarian abscess (20%) and small bowel perforation (15%). Factors associated with increased mortality include age, gender, symptoms (constipation, vomiting) and symptom duration. ¹⁵

A total of 46 patients were reported death during the course of management, giving an overall mortality rate of 15.1 %.The most common cause of death was septic shock.¹⁸

7. CONCLUSION

Generalized Peritonitis is a commonly encountered condition of surgical emergency. The presentation of in Ethiopia is different from its western counterpart.. It is more common in productive age groups with male predominance. The In majority of cases the presentation to the hospital was late with well established generalized peritonitis with purulent/fecal contamination and varying degree of septicemia. Good pre-operation assessment and early management will decrease the morbidity, mortality and complications of secondary peritonitis

RECOMMENDATION

Generalized peritonitis one of the commonest cause of any acute abdomen. High index of suspicion needed by clinicians especially in African countries where human power and hospitals are somehow underdeveloped. It is a potential life-threatening disease with a high mortality and morbidity when compared to western studies. Parameters such as aggressive fluid and electrolyte resuscitation with vital sign monitoring, type of surgical procedures and use of appropriate antibiotics use should be emphasized in order to improve survival

8. LIMITATION OF THE STUDY

Retrospective record review has its own limitation while individual patient chart was reviewed for study variable. Some of the study variables not found on the chart and some charts of patients lost from card room. There was incomplete documentation

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ANNEX DATA COLLECTION SHEET

I. Socio-demographic data

1. Serial Number _____
2. Age _____
 1. 15-30 2. 31-45 3. 46-60 4. >60
3. Sex A. Male B. Female
4. Date of admission _____
5. Date of surgery _____
6. Date of Discharge/Death _____
7. Address A. Urban B. Rural
8. Educational status
 1. Not read and write
 2. Primary
 3. Secondary
 4. College
 5. University

II. Clinical Data

9. Duration of symptoms -----
 1. <24hours 2. 25-72 hours 3. 4days-1week 4. >1week
10. Types of symptoms
 1. Pain in the abdomen
 2. Vomiting
 3. Fever
 4. Constipation
 5. Trauma
 6. 1-4
 7. 1,2,4
11. Signs
 1. Distension of the Abdomen
 2. Guarding, Rigidity & Tenderness all over
 3. Localized Tenderness
 4. Positive sign of Fluid collection
 5. Tympanic on Percussion
 6. Empty Rectum
 7. 1,5,6
 8. 2 & 4
12. Vital sign on presentation
 - A. BP 1.>90 2.<90
 - B. RR 1. >30 2.<30
 - C. HR 1.>100 2.<100
 - D. Temperature 1. <36.5
 2. 36.5-37.5
 3. >37.5
13. Initial CBC before surgery
 - A. WBC
 - a) $<4 \times 10^3$
 - b) $4-11 \times 10^3$
 - c) $>11 \times 10^3$
 - B. Hg/Hct
 - a) <10/30
 - b) >10/30
 - C. Platelets
 - a) <100,000
 - b) 100,000-400,000
 - c) >400,000

14. Ultrasound 1. Done 2. Not Done

15. If Ultrasound Done Finding 1. Peritoneal fluid collection 2. Dilated bowel loops 3. Localized collection

16. Erect abdominal X-ray 1. Done 2. Not done

17. If erect AXR done Finding 1. SBO 2. LBO 3. Air under diaphragm

18. Preoperative Diagnosis

- | | |
|-----------------------------|------------------------------------|
| 1. GD perforation | 5. Peritonitis with Gangrenous SBO |
| 2. Appendicular perforation | 6. Peritonitis with Gangrenous SV |
| 3. Traumatic perforation | 7. others |
| 4. Appendiceal abscess | |

19. Postoperative Diagnosis

1. GD Perforation
2. Ileosigmoid Knotting
3. Stomach perforation
4. Appendicular Perforation
5. Bladder perforation
6. Tumor perforation
7. Traumatic Perforation of SB
8. Appendiceal Abscess
9. Gangrenous SBO
10. Gangrenous SV
11. Others

20. Surgical Procedure

- | | |
|------------------------------------|-----------------------------------|
| 1. Omental patch closure | 5. Repair |
| 2. Appendectomy & Abscess Drainage | 6. Resection & anastomosis |
| 3. Ex lap + Appendectomy + Lavage | 7. Stoma |
| 4. Ex lap + Lavage | 8. Resection, Anastomosis + Stoma |

21. Complication

- | | |
|---------------------------------------|----------------------------|
| 1. Intra-abdominal abscess collection | 6. Wound dehiscence |
| 2. SSI | 7. Electrolyte disturbance |
| 3. Pneumonia | 8. PTE |
| 4. Anastomotic leak | 9. DVT |
| 5. ECF | 10. Sepsis |
| | 11. AKI |

22. Outcome.....1. Discharged 2. Died

23. Possible cause of death _____

- | | | | |
|--------|-----------------|-------------------|------------------------|
| 1. MOF | 2. Septic shock | 3. cardiac arrest | 4. respiratory failure |
|--------|-----------------|-------------------|------------------------|

DECLARATION

I undersigned declare that this research paper is my original work and all the materials used for this study have been duly acknowledged.

Name of student: **Dr. Birhanu Ayana** (MD, General Surgery Resident).

Signature_____ Date _____

This student research paper has been submitted for examination with our approval

Advisor 1:Dr. Gulilat Tigye (M.D, Assistant professor of surgery)

Signature_____ Date _____

Advisor 2: Dr. Gelan G/Michael(M.D, Assistant professor of Surgery)

Signature_____ Date _____