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RESEARCH ARTICLE

GASTROINTESTINAL PERFORATION: A CLINICAL STUDY

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Abstract

Introduction:-

Gastrointestinal perforation is the most common surgical emergency presenting as an acute abdomen. It refers to the clinical condition in which an acute change in the condition of intra-abdominal organ which is usually associated with inflammation and infection, demands immediate and accurate diagnosis and management.

Pathogenesis of acute perforation begins from its etiology progressing to perforative peritonitis, multiple organ dysfunction syndrome (MODS) and death being the endpoint without timely management.

Diagnosing a gastrointestinal perforation is not a herculean task except cases complicated with a small sealed perforation and overlapped with a picture of ileus or obstruction.

Recent advances show endoscopic, laparoscopic and laparoscopic-assisted procedures are now being increasingly performed instead of conventional laparotomy.

The clinical diagnosis of perforation, its cause with timely diagnosis and management pay an important role in patient outcome.

The current dissertation states the changes with time with regards to its etiology and changes in their management over time.

In retrospect there has been a decline in mortality over the years which may be attributed to early admission to the hospital, improved modalities of investigations, better pre-operative resuscitation, early intervention and improved surgical instruments and techniques with minute critical care monitoring.

We present a case study of 60 patients to know most common cause of gastrointestinal perforation, their symptomatology and recent techniques of management with management of their complications studied from May 2014 onwards.

Aims And Objectives:-

A clinical study on 60 cases of gastrointestinal perforation was done to -

1. Identify various etiological factors in gastrointestinal perforations

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2. To study common sites of perforations.
3. To analyse various modes o clinical presentations.
4. To study intra and postoperative findings in these patients.

Materials And Methods:-

A clinical study of 60 cases of gastrointestinal perforation was done - A Retrospective & Prospective study of 60 cases of gastrointestinal perforation in 3 years (2014-2017) period in department surgery will be conducted

The various data was collected from MGM hospital attached to MGM medical college between May 2014 And August 2016. The clinical details will be obtained from the medical records department and from incoming cases in the emergency services in the hospital.

Study Design:
Prospective study

Place Of Study:
Department of Surgery,
MGM Medical College and Hospital.
Kamothe, Navi Mumbai.

Sample Size:
60 Cases from IPD and Accident and Emergency

Inclusion Criteria
Patients of all age groups and both sexes included
All traumatic and non -traumatic perforations.

Exclusion Criteria
Neonates
• Esophageal perforation.

Results:-

Table 1:- Age Related Incidence.

Age (Group in Years)	No Of cases	Percentage
1-20	6	10.00%
21-40	35	58.33%
41-60	14	23.33%
>60	5	8.33%
Total	60	100.00%

The above table shows distribution according to the age in years. The majority of cases were in the age group 21-40 years followed by 41-60 years age group. The least number of cases were in the age group > 60 years followed by the age group 1-20 years old.

The incidence was significantly higher in the age group 21-40 years ($p < .001$)

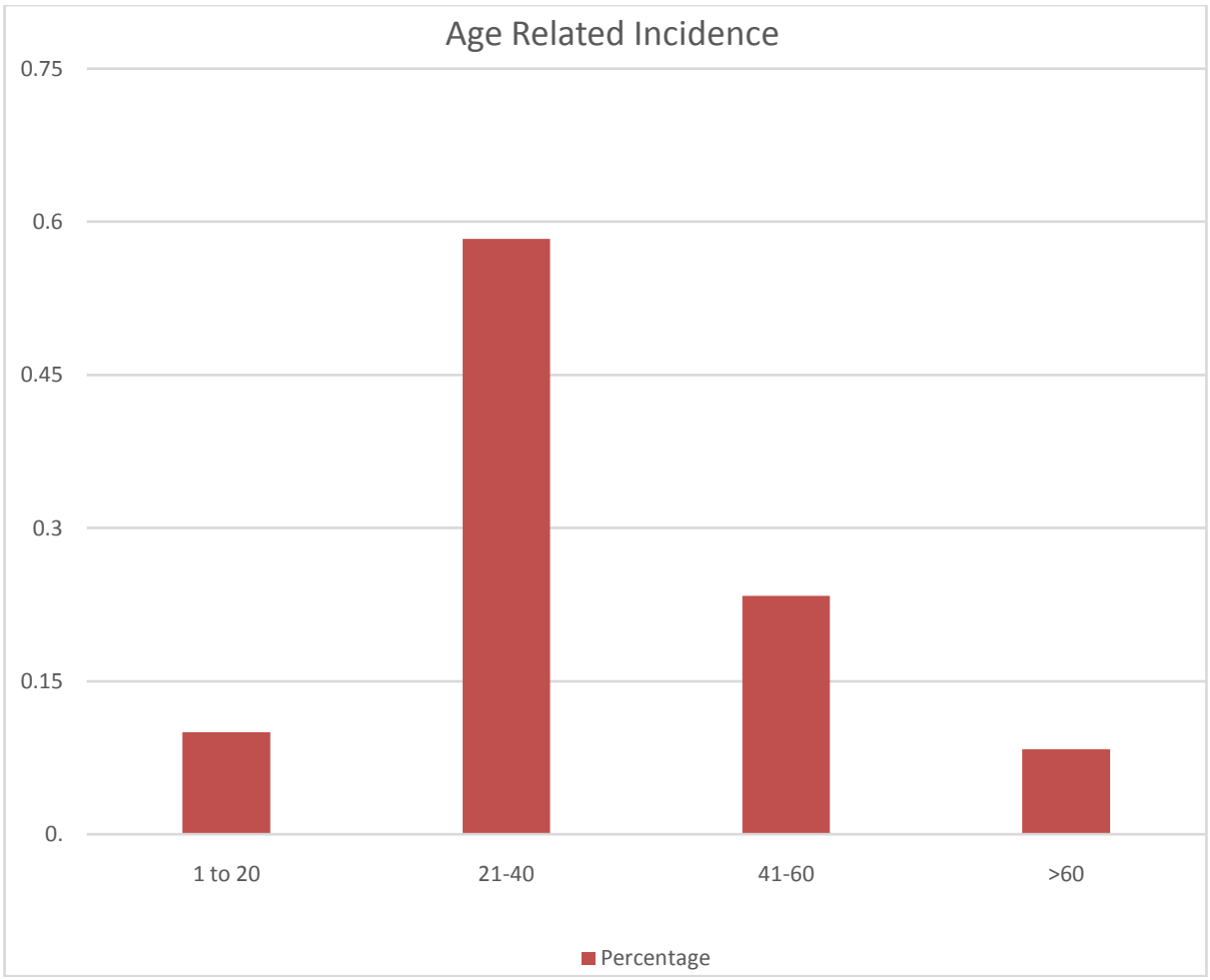


Fig1:- Age Related Incidence.

Table 2:- Sex Related Incidence.

Sex	No of cases	Percentage
Male	55	91.67%
Female	5	8.33%
Total	60	100.0%

The above table shows distribution according to the sex. The majority (91.67%) of cases were male. The incidence was significantly higher in the males ($p < .001$)

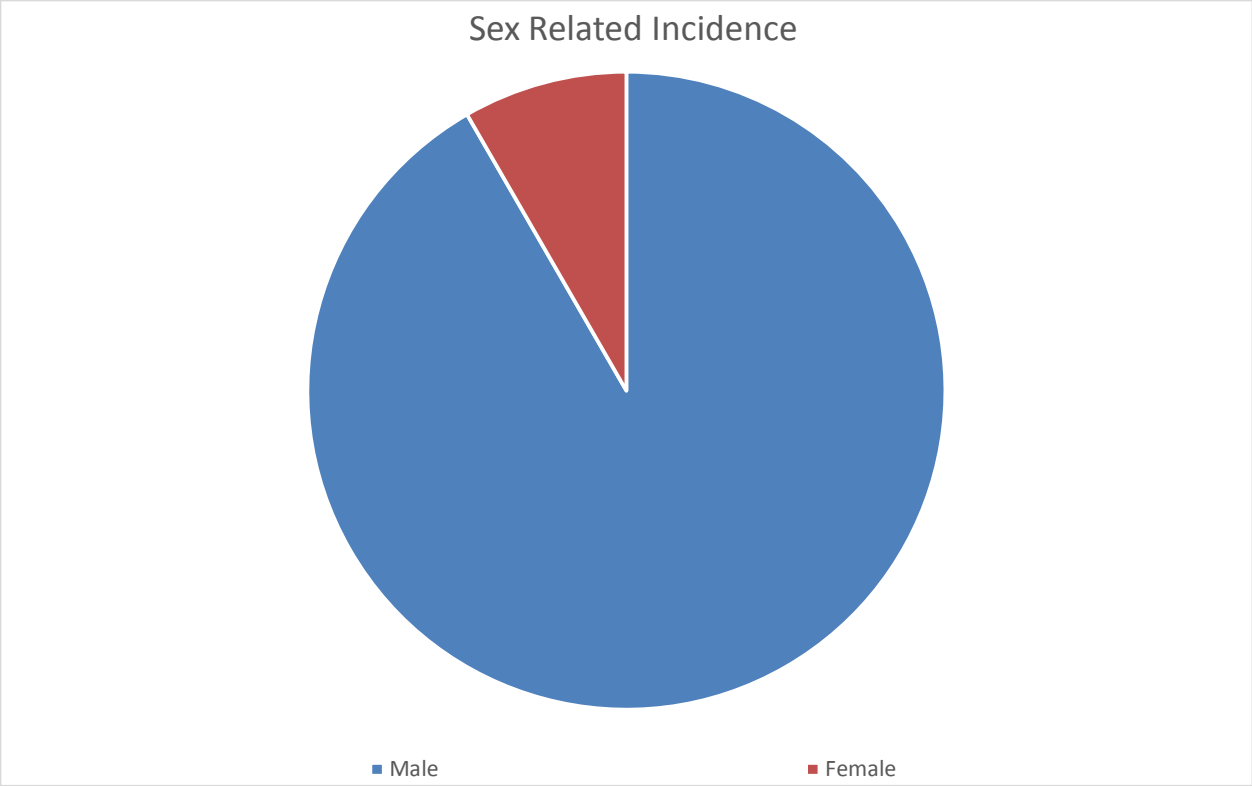


Fig 2:- Sex Related Incidence.

Table 3:- Incidence of the Symptoms.

Chief Complaints	Present		Absent		p- Value
	n	%	n	%	
Pain P/A	60	100	0	0	<0.001
Vomiting	34	56.67	26	43.33	<0.05
Fever	23	38.33	37	61.67	<0.05
Obstipation	14	23.33	46	76.67	<0.05
Distention	11	18.33	49	81.67	<0.05
Loose Stools	1	1.67	59	98.33	>0.05
Malena	1	1.67	59	98.33	>0.05
Hematemesis	0	0	60	100	>0.05

The above table shows distribution according to the symptoms. The majority of cases shown the symptoms of pain P/A, vomiting, and fever followed by obstipation and distension. The pain P/A, vomiting, fever, obstipation and distension was significantly higher in the cases ($p < .05$) whereas loose motion, malena and hematemesis were not significant ($p > .05$)

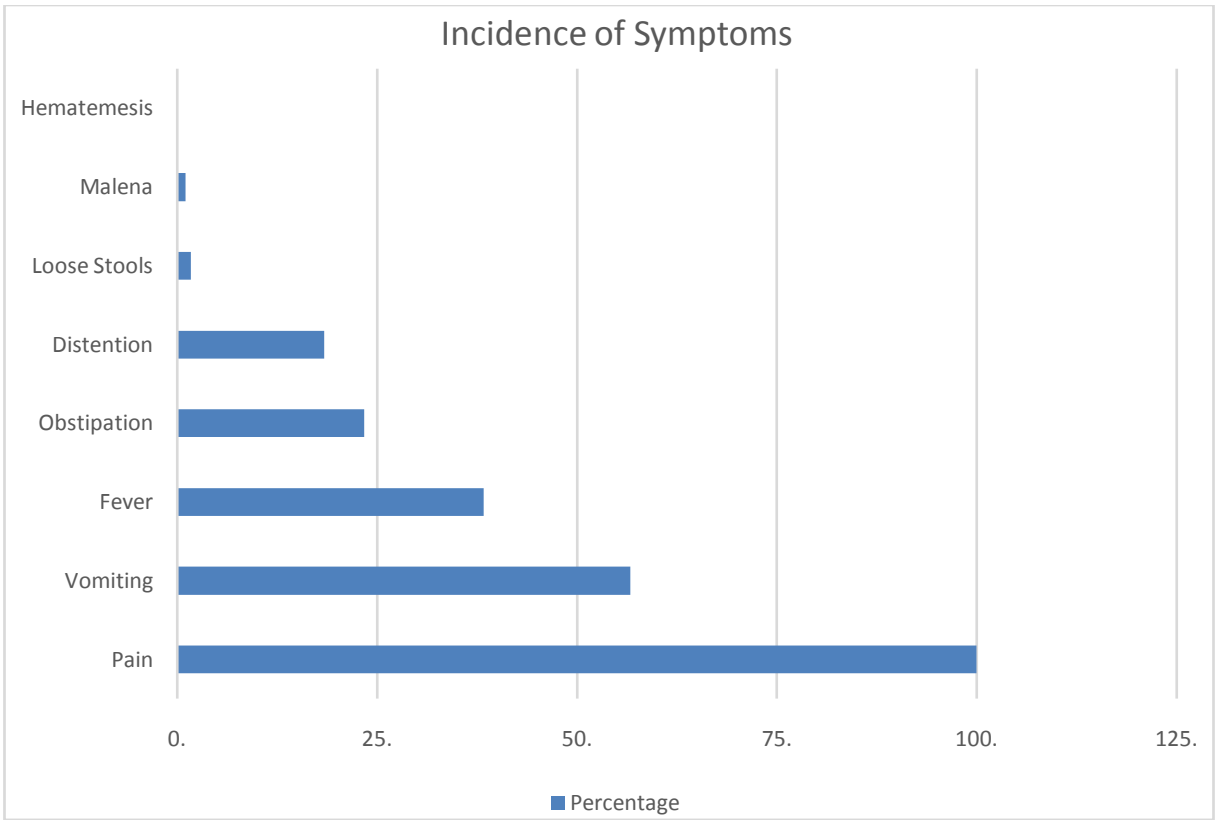


Fig 3:- Incidence of the Symptoms.

Table 4:- Incidence of the Signs.

Chief Complaints	Present		Absent		p- Value
	n	%	n	%	
Guarding	55	91.67	5	8.33	<0.001
Tenderness	58	96.67	2	3.33	<0.001
Rigidity	47	78.33	13	21.67	<0.001
Rebound Tenderness	45	75	15	25	<0.001
Dullness on Percussion	40	66.67	20	33.33	<0.001
Bowel Sounds	28	46.67	32	53.33	<0.05

In all 60 cases, the signs such as guarding, tenderness, rigidity, rebound tenderness, dullness on percussion were significant (p < 001) presence of bowel sound showed a value significant at 5% level.

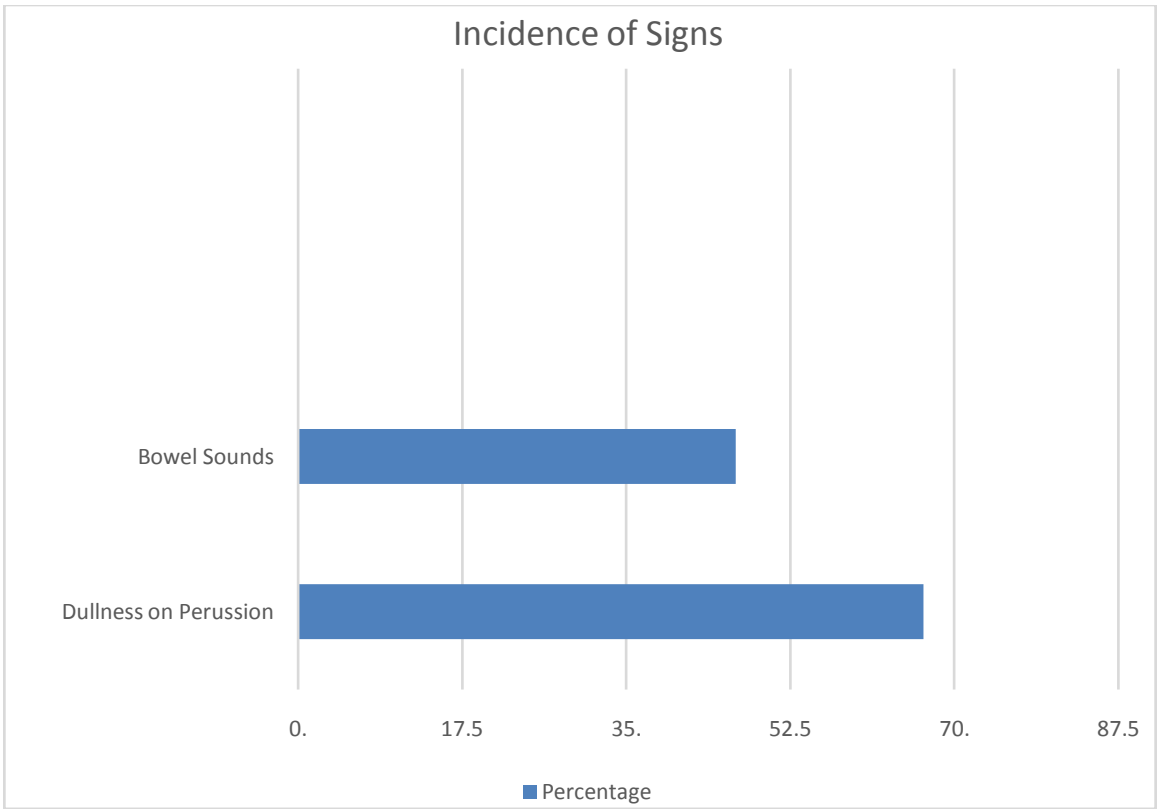


Fig 4:- Incidence of the Signs.

For the maximum number of cases the time lag between signs and treatment was between 6 hours to 24 hours and for few cases it was more than 24. The difference was significant (p<.001)

Table 5:- Time Lag between Signs and Treatment.

TIME LAG	NO OF CASES	PERCENTAGE
<6 HOURS	19	31.67
6-12 HOURS	19	31.67
12-24 HOURS	18	30.00%
24-48 HOURS	2	3.33%
>48 HOURS	2	3.33%
TOTAL	60	100%

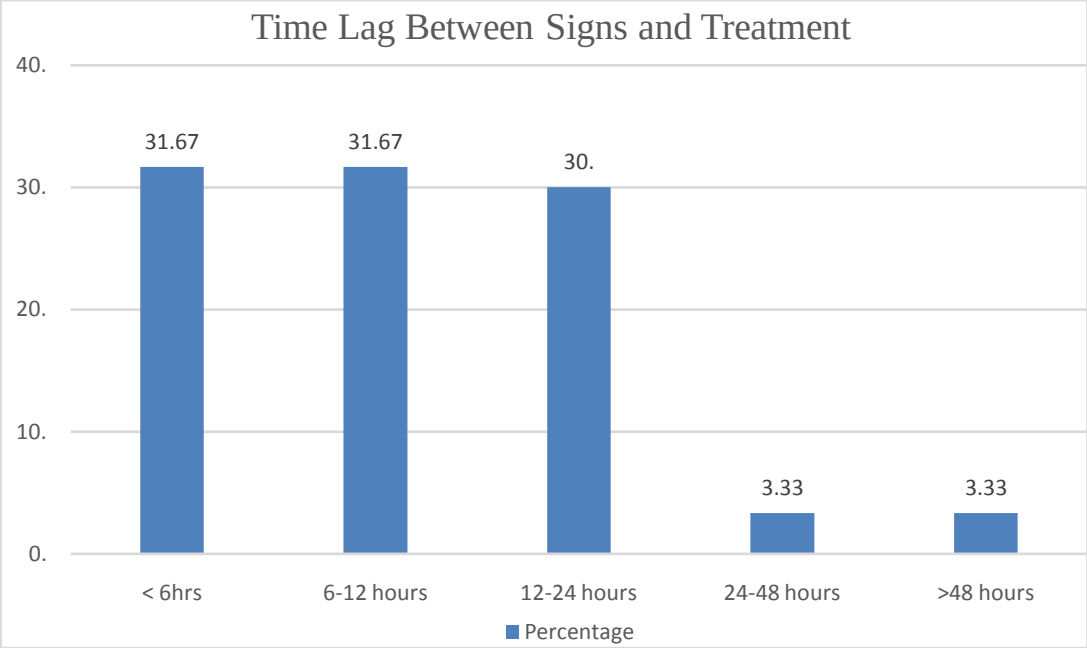


Fig 5:- Showing Bar Graph showing time lag between signs and treatment.

In majority of cases, the WBC count was between 10000 to 20000 (n=57) and for 3 cases the WBC count was more than 20000. The difference was significant (P < 001)

Table 6 Investigations

WBC COUNT	CASES	PERCENTAGE
<10000	38	63.33%
10000-20000	19	31.67%
>20000	3	5.00%
TOTAL	60	100%

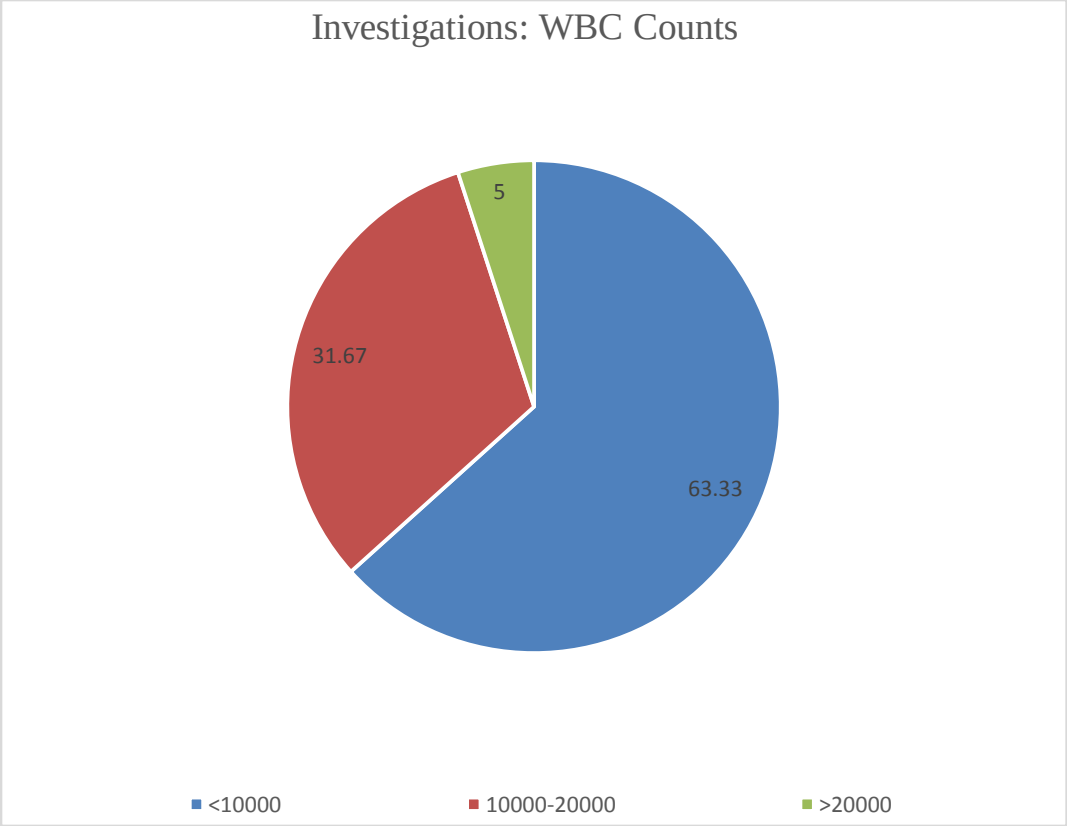


Fig 6:- Pie Chart showing Investigations.

In 48 cases (80%) , gas under diaphragm on × ray film was positive which is significant at 1% level (p <.001) whereas widal test and HIV was positive in 5 cases each which was not significant (p >.05)

INVESTIGATION	POSITIVE		NEGETIVE		P-VALUE
	N	%	N	%	
WIDAL*	5	13.16%	33	86.84%	>0.05, Ns
HIV	5	8.33%	55	91.67%	>0.05%,Ns
GAS Under diaphragm	48	80.00%	12	20.00%	<0.001**

Table 7:- Investigations- HIV, WIDAL, X-RAY (gas under diaphragm).
NS-not significant
**-significant at 1% level
*- Widal test done on those patients who had fever and who were suspected to have typhoidal contacts

Fig 7:- Bar graph showing Investigations (Widal test, HIV, gas Under Diaphragm on xray abdomen).

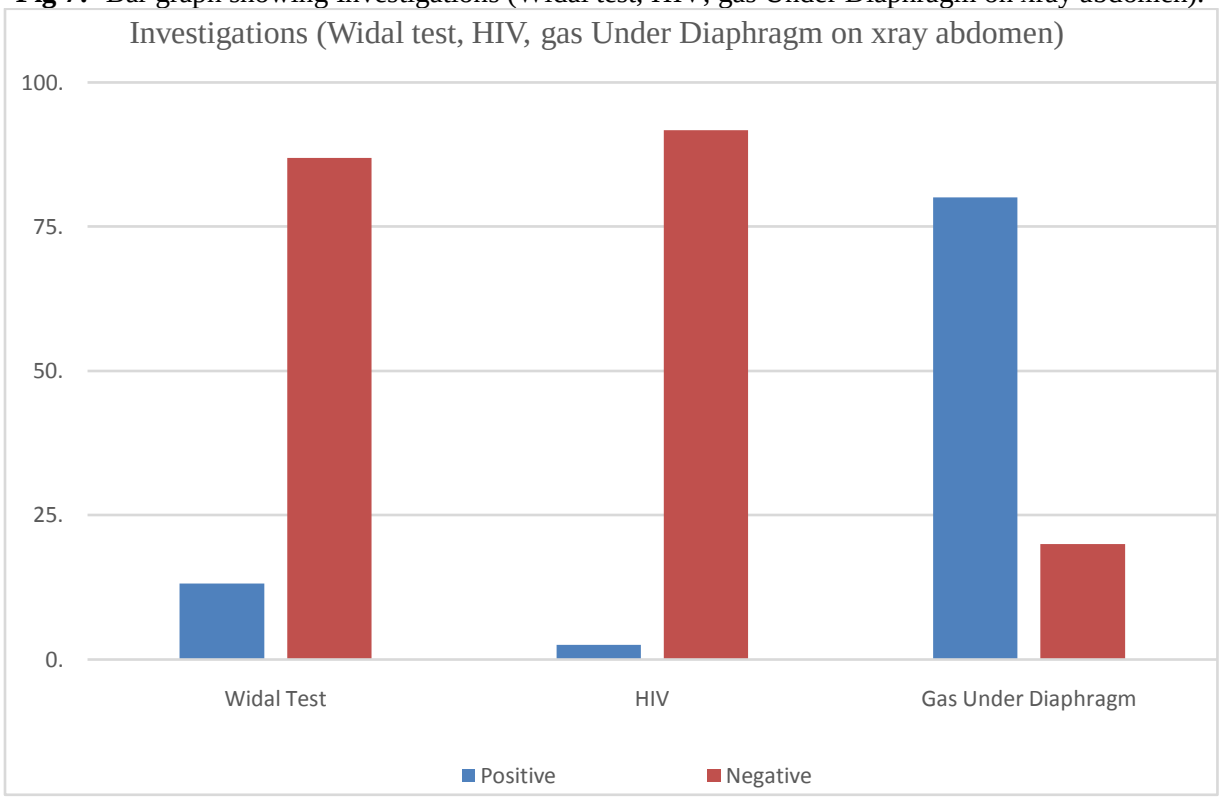


Table 8:- Incidence of perforation according to site.

Site of perforation	No of cases	Percentage
Ileal	17	28.33
Jejunal	13	21.60
Gastric	10	16.67
Appendicular	9	15.00
Duodenal	7	11.67
Rectal	1	1.67
G and D	1	1.67
I and J	1	1.67
Colonic	1	1.67

CHI-square=35.75, df, p <0.001

The incidence of perforation according to site was also found to be significant , p<0.001

Fig 8:- Bar graph showing Incidence of Site of Perforation.

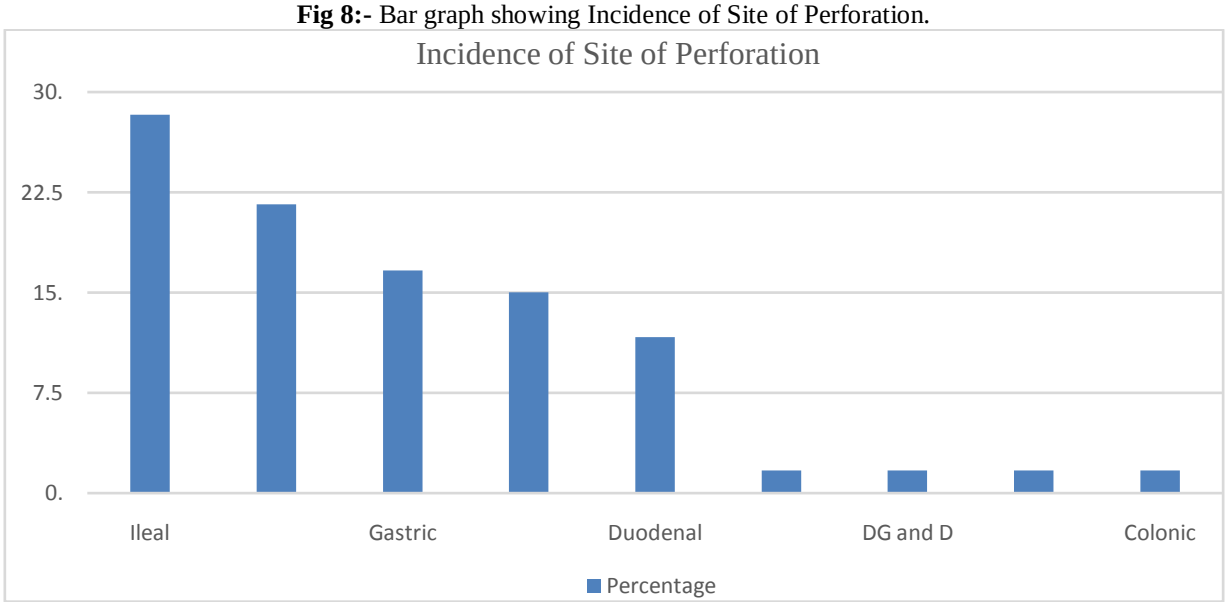


Table 9:- Incidence Of Etiology Of Perforation.

CAUSE OF PERFORATION	NO OF CASES	PERCENTAGE
PEPTIC	17	28.33%
TRAUMATIC	17	28.33%
APPENDICULAR	9	15.00
TUBERCULOSIS	6	10.00
TYPHOID	6	10.00
MECKEL'S DIVERTICULITIS	1	1.67
COLONIC DIVERTICULITIS	1	1.67
CACINOAM STOMACH	1	1.67
OBSTRUCTED HERNIA	1	1.67
IATROGENIC	1	1.67
TOTAL	60	100

Chi-square= 62.67 , DF= 9, p-value < .001

The incidence of the Etiology of perforation was significant as shown in table above ($p < .001$)

Fig 9:- Bar graph showing Incidence of Etiology of Perforation.

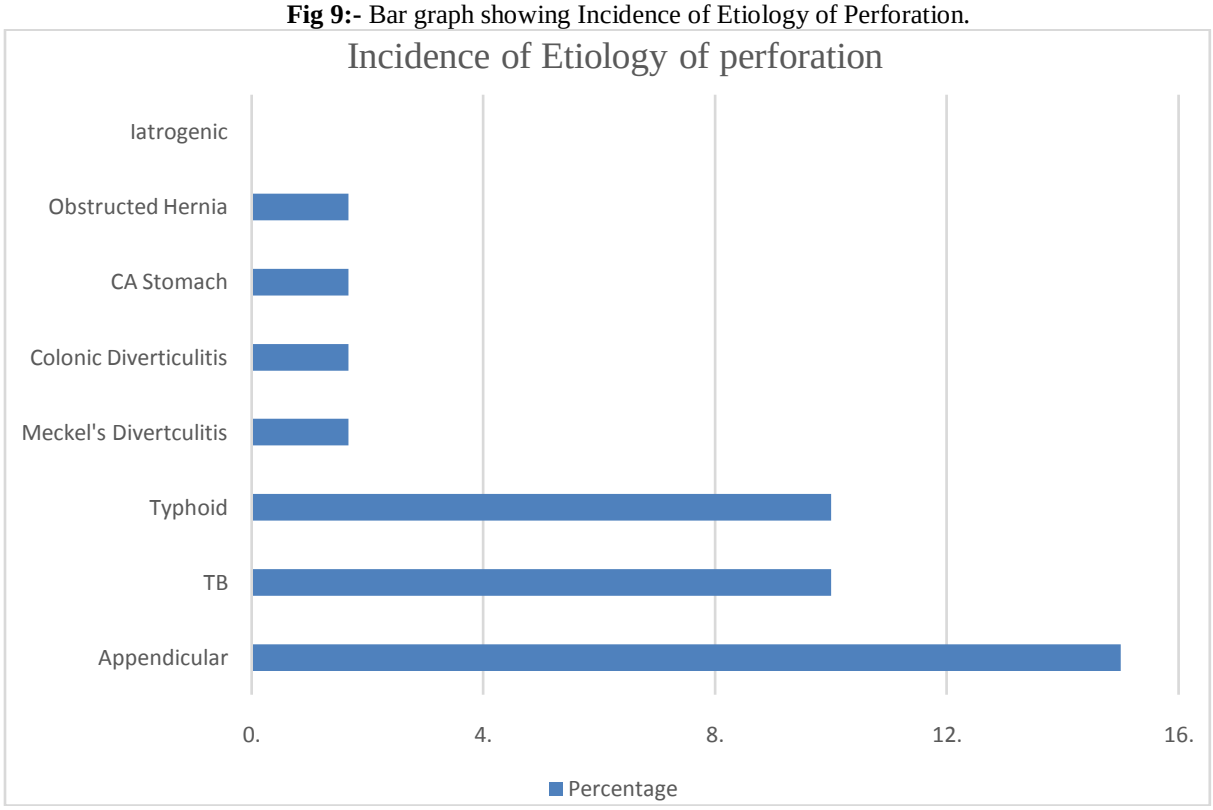


Table 10:- Day Of Drain Removal.

DAY OF DRAIN REMOVAL	FREQUENCY	PERCENTAGE
3	10	16.67
4	19	31.67
5	16	26.67
6	8	13.33
7	3	5.00
8	3	5.00
DIED OF DAY 3	1	1.67
TOTAL	60	100

In majority of cases the day of drain removal was between 3 to 5 days (n-45) in case of 15 cases, the day of drain removal was more than 6. The difference was found to be significant ($p < .001$)

Fig 10:- Bar graph showing frequency of day of drain removal.

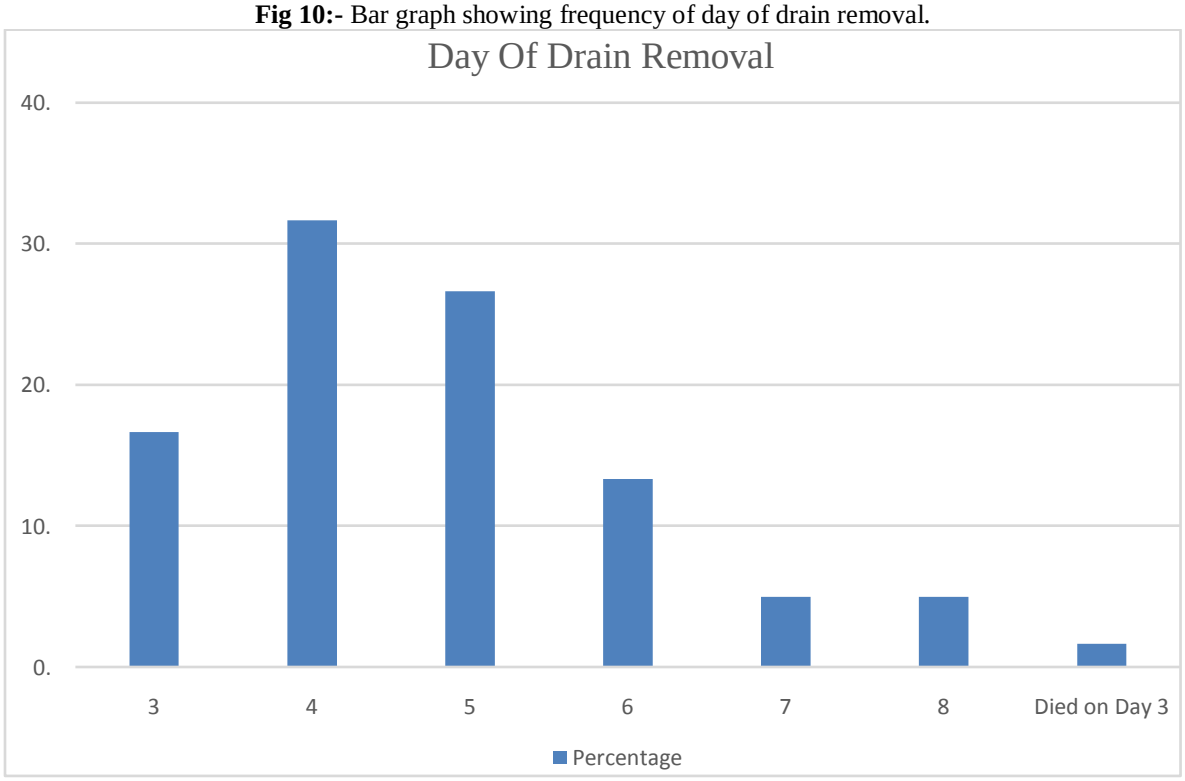
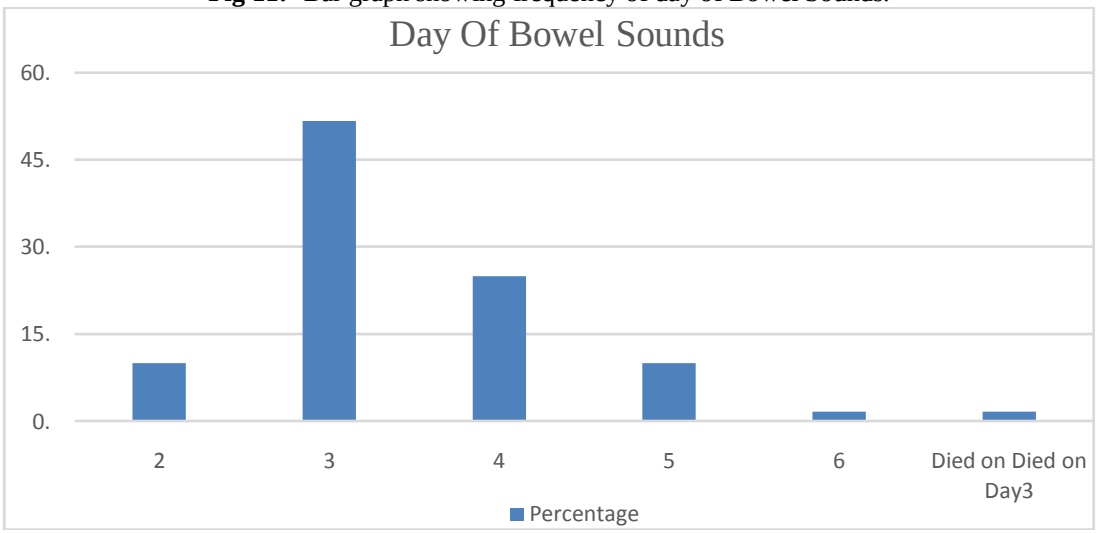


Table 11:- Day Of Bowel Sounds.

DAY OF BOWEL SOUNDS	FREQUENCY	PERCENTAGE
2	6	10.00
3	31	51.67
4	15	25.00
5	6	10.00
6	1	1.67
DIED ON DAY 3	1	1.67
TOTAL	60	100

In majority of cases the day of bowel sound was between 2 to 4 days (n 51) in case of 9 cases, the day of bowel sound was more than 6. The difference was found to be significant ($p < .001$)

Fig 11:- Bar graph showing frequency of day of Bowel Sounds.



Discussion:-

Table:- Showing Etiology Related Incidence.

Etiology	Bhansali 96 cases N%	Dandapat et al 340 cases N %	Present study 60 Cases N %
Peptic	48 (50)	276 (81.15)	17 (28.33)
Typhoid	29 (30.2)	25 (7.3)	6 (10)
TB	07 (7.3)	24 (7.1)	6 (10)
Traumatic	06 (6.25)	07 (2.2)	17 (28.33)
Others	06 (6.25)	08 (2.25)	14 (24)

The results obtained in the present study were compared with previously conducted similar studies.

A clinical study by Bhansali, on gastrointestinal perforation in Nair Hospital shows that the commonest cause of the perforation was acid peptic disease (50%) and second one is the typhoid (30.2 %) . In the study of Dandapat et al, the incidence of etiology sustains its order with significant rise (50% to 81.15%) in peptic ulcer perforation. It might be due to raised stressful life and addictions like alcoholism, smoking etc. in the present study the order of incidence is same but incidence of APD perforation is 56 % The decline may be due to availability and judicial use of better antacids.

Etiological factors also show a wide geographical variation. According to a study from India, infections formed the most common cause of perforation peritonitis, around 50% cases in this study were due to typhoid. In the study 22% of the cases were due to typhoid and tuberculosis. in contrast to this, Noon et al from texas in their study reported only 2.7% cases due to infections. also studies from the west have shown that around 15-20% cases are due to malignancy, this being in stark contrast to our study , where malignancy was ascertained to be the cause of perforation in only 3% of cases.

Perforation peritonitis in India has a different spectrum compared to the western countries. peptic ulcer perforation, perforating appendicitis, typhoid and tubercular perforations are the major caiuses pf gastrointestinal perforations. early surgical intervention under get cover of broad spectrum antibiotics preceded by adequately aggressive resuscitation and correction of electrolyte imbalances is imperative fro good outcomes minimising morbidity and mortality as evident in the above table, the commonest age group of patients of hollow viscus perforation is 20-40 years. incidence was 61.15% in the study by Dandapat et al in 340 cases and in the present study it is 58.33%.

Sex related incidence:
Peptic ulcers are more common in men than in women. Prior to 1900, perforated ulcer was common in both of he sexes. between 1850 and 1900, there was essentially equal incidence among the sexes, affecting particularly young women . by 1920, it was only 2% in women . however three is a gradual decrease in male to female ratio and in India

Table:- Showing Sex Related Incidence.

Author	Year	Males	Females	Ratio
Dandapat et al	1991	304	36	8.4:1
Present Study	2014-2016	55	5	11:1

Age Group	Dandapat et al 340 cases N %	Present study 60 Cases N %
	50 (14.71)	6 (10)
20-40	208 (61.15)	35 (58.33)
	82 (24.12)	19 (31.33)

From this, it can be seen that while the number of the perforations in the males has decreased and the number of the female shows an increased incidence progressively . Mackey has up-to-date previous report on the perforated peptic ulcer in the western Scotland, and had observed that the male:female ratio had been declining steadily. it was 4.4:1. in India , Mohan Rao has observes that the perforations were three times more likely if subjected to consequent alteration in the intra-abdominal pressure the male:female ratio has fallen from 19:1 to the present study , documented as 11:1, this may be possible due to the increased literacy and health awareness and tendency of women to take on the responsibilities and occupations traditionally associate with men , in addition , in recent years a higher incidence of women have adopted smoking (significant rise in peptic ulceration in women).

Table:- Showing Incidence of the site of perforation.

Site	CDM Rao et all 46 cases N%	Dandapat et al 340 cases N %	Present study 60 Cases N %
Gastric	6 (13.3)	28 (8.2)	10(16.67)
Duodenum	20(43)	248(72.9)	7(11.67)
Ileum	18 (39)	25(7.3)	17(28.33)
Others	2(4.35)	39 (11.47)	26(43.3)

In perforations of duodenum , incidence (11.67) is decreased this study as compared to that of CDM Rao et al (43%) and Dandapat et al (72.9%). On the contrary , incidence of perforation at stomach is more or less similar. (16.67% in the present study as compared to that of raw and dandapat - 13.3% and 8.2% respectively).

Table:- Showing Incidence of Symptoms.

Symptoms	Dickson and Cole 38 Cases N %	Present Study 60 cases N%
Abdominal Pain	38 (100)	60(100)
Vomiting	24 (63.16)	34(56)
Obstipation	20 (52.63)	14(23.33)
Distention	20 (52.63)	11(18.33)
Diarrhoea	14 (36.84)	1 (1.67)
Fever	24 (63.16)	23 (38.33)

From the above comparison it is evident that acute abdominal pain is the only constant complaint by the patients with incidence of 100%. Other symptoms depend upon various factors like aetiology, site of the perforation , the time lag between onset and presentation and general condition of the patient .

Table:- Showing Incidence of Signs.1

Signs	Archampong et al121 CasesN %	Present Study60 cases N%
Guarding	96 (79)	55 (91.67)
Tenderness	121 (100)	58 (96.67)
Rigidity	30 (24)	47 (78.33)
Rebound Tenderness	94(70)	45 (75)
Free Fluid	14 (11.60)	40 (65)
Absent Bowel Sounds	101 (83.5)	32 (53.33)

The incidence of the rigidity in the study of Archampong was 24% and in the present study it is 78.33%. The incidence of presence of intraperitioneal free fluid on cinical examination was 11.6% and in the present study it is 65% the increased incidence in the present study might be due to the presentation of majority of the patients in the late stages of the disease process in the secondary and tertiary phases of peritonitis. It may be due to poverty and lack of health awareness.

Mortality related to cause:

Lee in a study said, factors linked with increased complications and mortality were age, co-morbidities, multiple perforations and length of time between onset of abdominal symptoms and perforation. Four patients (66.7%) had long histories of abdominal symptoms before perforation. Three patients were receiving or had completed anti-tuberculous therapy before developing perforation. Five patients were managed surgically, two underwent laparotomy as both primary closure and end-to-end anastomosis were deemed too risky. Mortality following perforation was 17 %.

Conclusion:-

From our study of 60 cases of gastrointestinal perforations following can be concluded

1.The commonest cause of Gl perforation in our setting was traumatic perforation due to our centre being a trauma centre while acid peptic disease was most common cause in atraumatic cases, 17% and 28.33% each.

2.The peak age incidence of perforation is between 20-40 years of age Group (58.33%). Age had a significant p value for correlation to incidence (-0.001).
3.Males are more vulnerable for perforation with male: female ratio of 11:1.Sex had a significant correlation to incidence (p<0.001).
4.Ileum was the most common site of perforation in our centre (28.33%).
5.All patients (100%) present with symptom of acute abdominal pain and vomiting as the second common complaint (56.67%) Pain in abdomen showed significant p value of <0.001(significant at 1% while vomiting, fever, obstipation and distension showed a p value <0.005.
6.The signs such as guarding, tenderness, rigidity, rebound tenderness, dullness on percussion were significant (p < .001) and presence of bowel sound showed a p value significant at 5% level.
7.X ray abdomen standing showed a significant p value <0.001 for diagnosis .In cases where X ray abdomen was uncertain, USG also can be used in hands of an experienced sonologist. CECT abdomen is the most specific and sensitive investigative modality today.
8.The patients who presented late have slower recovery.
9.Recovery depended upon various factors; age, time of presentation with type of procedure undertaken were considered significant along with postoperative findings like day of drain removal and movement of bowel.

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