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Management Outcome of non Traumatic Small Intestinal Perforation: A Prospective Study

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Abstract
Background: *Small intestinal perforation peritonitis is a surgical emergency which remained a challenge to the surgeons since time immemorial. Independent of its aetiology all the cases of small intestinal perforation have similar clinical features leading to peritonitis with fulminating secondary bacterial infection for which the condition is studied as one entity.*
Material and Methods: *A prospective study of 40 patients presenting to VSSIMAR, Burla with a diagnosis of Small bowel perforation between November 2017 and October 2019 was done. The history, clinical features, the investigations done, the surgical procedure performed, the post-operative ICU care, the complications, the secondary procedures undertaken and mortality rate were recorded.*
Results: *The maximum number of cases were in the age group of 21-30yrs (32.5 %) followed by 31-40yrs (25 %) with a male to female ratio 7:3 . Pain abdomen was the most common symptom. Majority of patients (42.5%) were presented between 24-48 hrs. The most common abdominal findings were guarding / rigidity, abdominal distension each 95%, Free gas under diaphragm found in 90% of cases. Widal test was positive in 35% cases. 8 cases (20%) didn't respond to fluid therapy alone and required vasopressors. 85% were ileal perforation,15% were jejunal perforation. Simple closure with drainage was the most performed procedure (65% of cases). Typhoid & non specific inflammation tops the aetiology (35% each) followed by Tuberculosis (22.5%). The most common complication was wound infection in 14 cases (35%). Seven patients who required critical care and later on also secondary procedure were stayed longest with mean 26.28 days and range 19-36 days. The overall mortality rate was 10%. Elderly (p <0.001), delayed presentation (p 0.001) and need of preoperative vassopressor (p <0.001) were associated with high mortality.*
Conclusions: *Combined resuscitation and surgical management are the key for better out come. Age >50yr, delay in initiation of treatment and pre-op shock requiring vasopressor support are associated with high mortality.*
Keywords: *Non traumatic; Small intestine; Perforation; Management; Mortality; Morbidity.*

Introduction

Small intestinal perforation peritonitis from a wide variety of causes comprises the majority of emergency surgical admissions in tropical countries; also has remained a challenge to the surgeons since time immemorial. Several

aetiologies have been recorded from different geographical zones of the world. Typhoid, Tuberculosis, Amoebiasis and round worms constitute the most frequent causes, And Crohn's disease, diverticulum, volvulus and malignancy are encountered as rare causes of non traumatic small gut perforation in third world countries[1,2]. Independent of its aetiology all the cases of small intestinal perforation have similar clinical features leading to peritonitis with fulminating secondary bacterial infection for which the condition is studied as one entity. For the diagnosis of this condition many investigations have been formulated like straight X-ray abdomen, peritoneal tapping, haematological investigations, culture and sensitivity, widal test etc, even CT scan . But laparotomy is the ultimate diagnostic tool which gives the aetiological diagnoses with biopsy, definite site of perforation and the final treatment clue .Taking all these factors into consideration, the present work was taken up for study in department of General Surgery, Veer Surendra Sai Institute of Medical Sciences And Research (VSSIMSAR), Burla, Odisha from November 2017 to October 2019.

Aims and Objective

General Objective

- To study the management outcome of non-traumatic small Intestinal perforation.

Specific Objective

- To study the aetiology, symptoms & signs, surgical procedures performed, and complications associated with non traumatic small intestinal perforation.
- To study the mortality rate & probable cause of mortality associated with non traumatic small intestinal perforation.

Secondary Objective

- To study about the post op ICU care and secondary procedures performed in case of non traumatic small intestinal perforation.

Material and Methods

This observational prospective study was carried out at department of General surgery, Veer Surendra Sai Institute of Medical Sciences And Research (VIMSAR), Burla from Nov 2017 to Oct 2019 by purposive sampling.

Inclusion Criteria: Age >12yrs

C/F consistent with non-traumatic small intestine perforation

Exclusion Criteria: Age <12yrs

Traumatic small intestine perforation

Duodenal perforation

Cases managed conservatively

Results

Chart No-1: Age & Sex Distribution

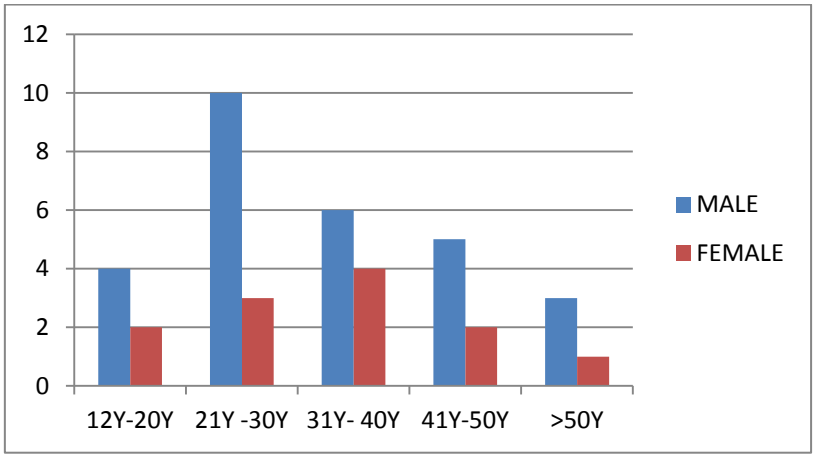

Table No 1: Symptoms and Signs

PRESENTING SYMPTOMS	CASES	%	ABDOMINAL SIGNS	CASES	%
Pain Abdomen	40	100	Guarding & Rigidity	38	95.0
Abdominal Distention	36	90.0	Distention	38	95.0
Vomiting	31	77.5	Rebound Tenderness	36	90.0
Constipation	22	55.0	Obliteration Of Liver Dullness	36	90.0
Fever	19	47.5	Absent Bowel Sound	36	90.0
Loose Motion	4	10.0	Ascites	30	75.0
			Rectal Tenderness	4	10.0

Chart No 2: Duration of Delay from Appearance of 1st Symptom to Admission in Hrs

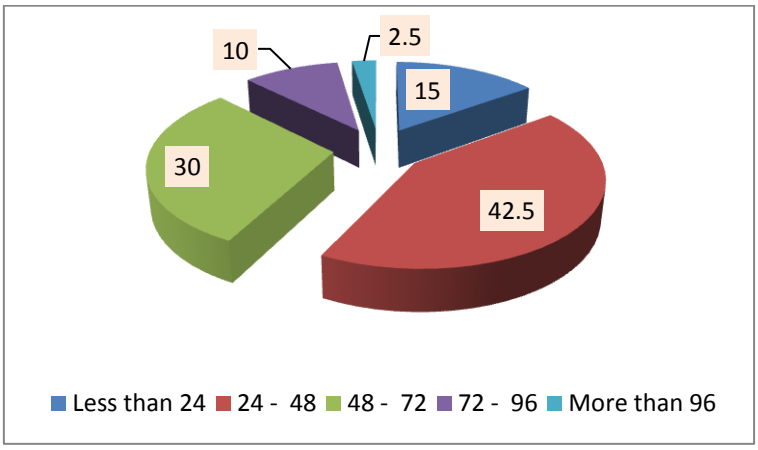

Table No. 2: Primary Surgical Procedure

PROCEDURE	CASES	%
SIMPLE CLOSURE WITH DRAINAGE	26	65.0
RESECTION & ANASTOMOSIS WITH BYPASS AND DRAINAGE	10	25.0
RESECTION & ANASTOMOSIS AND DRAINAGE WITHOUT BYPASS	3	7.5
RESECTION & END ILEOSTOMY WITH DRAINAGE	1	2.5

Table No. 3: Postoperative ICU Care

		CASES	%
ICU ADMISSION (n=40)	YES	11	27.5
	NO	29	72.5
MECHANICAL VENTILATION (n=11)	YES	9	81.8
	NO	2	18.2
VASOPRESSORS (n=11)	YES	10	90.9
	NO	1	9.1
OUTCOME (n=11)	SURVIVED	7	76.0
	DEAD	4	24.0
DURATION OF ICU STAY IN DAYS	MEAN- 6.72days		RANGE- 2-11days

Table No 4: Histopathology of Perforation Margins and Lymph Nodes

HISTOPATHOLOGY	CASES	%
Typhoid	14	35.0
Tuberculosis	9	22.5
Jejunal Diverticulosis With Necrosis	2	5.0
Meckel's Diverticulum	1	2.5
Nonspecific Inflammation	14	35.0

Table No. 5: Post Operative Complications and secondary procedures performed

COMPLICTIONS	SECONDARY PROCEDURE	CASES	%
Wound Infection	Dressing & Sec. Suturing	14	35.0
Burst Abdomen*	En-Mass Closure	2	5.0
Anastomotic Leak	Re-Exploration & Ileostomy	1	2.5
Enterocutaneous Fistula	Re-Exploration+ Resection & Anastomosis	2	5.0
ARDS	-	2	5.0
Mortality	-	4	10.0
No Complication	-	17	42.5

*2 cases of burst abdomen were part of wound infection, but mentioned separately due to their severity.
All the ileostomy who were fit for surgery after 6 weeks (9 cases), had undergone closure.

Table No. 6: Duration of Hospital Stay

PATIENT TYPE	CASES	MEAN in days	RANGE in days
Pts neither required ICU nor 2nd procedure	17	7.53	7-11
Pts required ICU but 2nd procedure not done*	4	2.75	2-5
Pts required ICU and 2nd procedure both	7	26.28	19-36
Pts not required ICU but 2nd procedure was done	12	15.83	11-26

*patients succumbed during ICU care

Table No. 7: Mortality rates in different variables

VARIABLES		DEATH	TOTAL	%	P Value
SEX	Male	2	28	7.14	0.818
	Female	2	12	16.67	
AGE	12-20	0	6	0	<0.001
	21-30	0	13	0	
	31-40	0	10	0	
	41-50	1	7	14.28	
	>50	3	4	75.0	
DUARATION OF DELAY	<24	0	6	0	0.001
	24-48	0	17	0	
	48-72	1	12	16.67	
	72-96	2	4	50.0	
	>96	1	1	100	
HEMOGLOBIN	<8	2	10	20.0	0.224
	>8	2	30	6.67	
PRE-OP VASOPRESSOR	Yes	4	8	50.0	<0.001
	No	0	32	0	
SITE OF PERFORATION	Ileum	4	34	11.76	0.376
	Jejunum	0	6	0	
PATHOLOGY	Typhoid	1	14	7.14	0.113
	Tuberculosis	2	9	22.22	
	Non Specific	1	14	7.14	
	Jejunal Diverticulosis	0	2	0	
	Meckel's Diverticulosis	0	1	0	
PROCEDURE	Simple Closure	1	26	3.85	0.069
	R & A With Bypass	3	10	30.0	
	R & A Without Bypass	0	3	0	
	R & End Ileostomy	0	1	0	
OVER ALL	10%				

Discussion

This study was carried out at VSSIMSAR, Burla from Nov 2017 to Oct 2019. 467 cases of acute abdomen were admitted during this period out of which 180 cases were due to perforations of various part of gastrointestinal tract. Out of these 180 cases of various perforations small intestinal perforations were screened out and it was found in 40 cases (22.22%) and out of total acute abdomen case it was 8.5%. Because of high propensity, the Surgeon should bear in mind the possibility of non traumatic small intestinal perforation while examining a case of acute abdomen.

In this series we observed 47.5% of the cases in young adults 12 to 30 years of age and maximum cases were in 2nd decade (32.5%) followed by 3rd decade (25%).The male to female ratio was 7:3. Nair et al[3] (1981) in their observation have observed that male suffer 3-4 times more frequently then female and most of the patients were in 2 and 3 decade of life.

The common presenting symptoms of our series were pain abdomen (100%), abdominal distension (90%) and vomiting (77.5%) . 80% of patients had tachycardia, 70% of patients had shock at the time of presentation . Guarding and rigidity, abdominal distension found in all cases ; rebound tenderness, obliterated liver dullness and absent bowel sound were present in 90% of cases. Free peritoneal fluid was seen in 75% cases and per rectal tenderness observed in10% cases The low incidence of fever (45%) as compared Nair et al[3] (100%)may be attributed to prior treatment and different etiologies . Dickson and Cole[1] observed diarrhoea in 42% of their series. The low incidence of diarrhoea (10%) is because of the absence of amoebiasis in this series.

Leucocytosis in 50% of cases and leucopenia in 15% (may be due to Enteric fever) were observed. Severe anaemia found in 25% cases. All patients were subjected for 'X' ray abdomen in erect posture and 90 % of cases had free gas under the dome of diaphragm and 50 % had distended coils of intestine with multiple fluid levels. Serum creatinine was raised in 34 cases, out of which 8 cases had values above 3 mg/dl. Hyponatremia found in 92.5 % of cases, where as hypernatremia found in 2.5% cases. Hypokalemia found in 60% of cases & hyperkalemia was seen in 5% of cases. Widal test was positive in 14 cases.

All the cases were subjected to preoperative resucitation. Nasogastric aspiration, intravenous fluids, and antibiotics were routinely given to all patient and blood transfusion (25%), vasopressors (22.5%) and oxygen (10%) were given where ever required. Ahmed et al[4] (1962) had the opinion to resuscitate all cases pre-operatively and then to proceed for the laparotomy.

On laparotomy purulent and faeculent fluid came in all 40 cases and adjacent mesenteric lymphadenopathy in 22.5% cases . Karmakar et al[6] (1972) found typhoid in 17 cases out of 30, where as we got 14 out of 40 cases. The low incidence may be due to early diagnosis of the disease by modern method of investigation and treatment by newer antibiotics. Out of 40 cases, Tuberculosis was found in 9 cases. Perforated Meckel's diverticulum was found in 1 case only, may be due to exclusion of under 12yr children in our study. In rest 14 cases no specific cause could be ascertained, so they were grouped under non-specific perforation. Nandkarni et al[7] (1987) attributed the perforation of small intestine to be maximum due to typhoid in tropical countries and round worm is an associated finding.

At first the site of perforation was identified and management was done according to cause, site, number of perforation; bowel condition and general condition of patients. Through peritoneal toileting was done in all cases. Simple Closure with drainage was done in 26 cases with single perforation with a healthy bowel. In 10 cases with either multiple ileal perforations or tuberculosis, resection & anastomosis with proximal loop ileostomy was done. Three cases of diverticulosis undergone resection & anastomosis without bypass and only one case of gangrenous ileum undergone resection & end ileostomy as the bowel was unhealthy. In all the 40 cases bilateral flank drains were given. The drainage tube was kept for

3- 6 days to drain the residual infected materials. In all the 40 cases, we used empirically ceftriaxone (Igm/12hrly) and metronidazole (500mg/8hrly).The antibiotics later on changed according to culture & sensitivity report. In Typhoid the ceftriaxone dose would be doubled. In case of Tuberculous perforation, in addition to above antibiotics, anti tubercular drugs according to RNTCP guideline are given on post op day 4 onwards.

In this study 11 cases out of 40 required ICU care post operatively. The indications for ICU care were lack of effort during anaesthesia recovery, persistent severe shock , acute renal failure and ARDS not responding to non invasive ventilation. Nine cases (81.8%) required mechanical ventilation and 10 cases (90.9%) required vasopressor support . During ICU care 4 patients succumbed to death. The cause of death was septic shock in 3 patients and acute or chronic kidney disease with progressive renal failure in one case. 7 patients survived and transferred to ward .

All possible measures for peri-operative care were rendered, in spite of that 19 cases developed complications and 4 cases died; uneventful recovery noted in 17 cases. The most common complication encountered was wound infection in 14 cases, out of these 14 cases 2 landed in burst abdomen. Two patients developed ARDS on post op period, one patient had anastomotic leak. 2 cases of enterocutaneous fistula observed. 12 cases of wound infections undergone regular dressing followed by secondary suturing. Two cases of burst abdomen were resuscitated and emergency basis en-mass closure was done. One case of anastomotic leak was identified on post op day 4;as the patient had stable hemodynamics, re-exploration was done and an end ileostomy was performed. Two cases of enterocutaneous fistula and all ileostomies from primary and secondary procedures were built up nutritionally for 6 weeks at least. After that re-exploration and resection & anastomoses was done for enterocutaneous fistula; and ileostomy closure was done for cases of ileostomy.

In our series we have noted 10% overall mortality. Mortality is high in patients with age >50yrs (p <0.001), delayed presentation (p0.001), patient requiring preoperative vassopressors (p<0.001). Olurin et al[5] (1972) reported 31% mortality, Nadkarni et al[7] (1987) have observed 12.5% mortality, Khorwal B et al[8] (2015) reported 11% mortality in their series of non-traumatic small bowel perforation. The mortality in our study is comparable to Khorwal B & Nandakarni and much less than other studies above mentioned.

Conclusion

From our study we can conclude that non traumatic small intestinal perforation is more common in 2nd & 3rd decade with a male preponderance and most commonly presented as pain abdomen. Erect abdomen X-ray showing both dome of diaphragm is very useful investigation. Typhoid & non specific inflammation tops the aetiology followed by Tuberculosis. Combined resuscitation and surgical management are the key for better out come. Wound infection is the most common complication. The age >50yr, delay in initiation of treatment and pre-op shock requiring vasopressor support are associated with high mortality.

Conflicts of interest – None

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