Original Research Article

Mortality pattern of patients of typhoid perforation during the year 2001 to 2010 admitted in surgical wards of Sanjay Gandhi Memorial Hospital, Rewa, Madhya Pradesh, India

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ABSTRACT

Background: Typhoid perforation is a common surgical emergency. Despite advances in surgical techniques, antimicrobial therapy and intensive care support, management of typhoid perforation continues to be highly demanding difficult and complex. In majority of cases the presentation to the hospital is late with well-established generalized peritonitis with purulent/fecal contamination and varying degree of septicemia.

Methods: Case records were collected from central registration section of Department of Surgery, particulars of patients was recorded from case sheet. Details of patient's complaints clinical findings, investigations, treatment, operation, complications and cause of death recorded on predesigned master chart and statistical tabulation done to analyze various mortality rates. Their findings were recorded in a proforma and master chart. The information obtained was tabulated and analyzed.

Results: Total admission in surgical wards during study period was 56425, and total no. of deaths was 3676. Out of which 765 patients died of perforation peritonitis, among which 118 patients died of typhoid perforation peritonitis and it constituted 3.31% of total death, 15.42% of deaths due to perforation peritonitis.

Conclusions: In our study most common cause of death was septicaemia.

Keywords: Mortality pattern, Surgical ward, Typhoid perforation

INTRODUCTION

Wills T (1969) can be regarded as a pioneer in typhoid fever. Wills T (1659) in his description describe typically step ladder rising fever during 1st week than maintenance during second and fall during third week.

Trousseau (1826) attempted to classify typhoid from pathological angle from other gastrointestinal diseases and described classical inflammation of peyers patches.

Widal (1896), and Sicard in (1896) described Widal reaction. The traditional approach of definitive single operative procedure combined with antibacterial drug regimens and the support of functional impairment had resulted in decrease in mortality from 62% Dickson and Cole 1964 at the turn of century to 40% which remains essentially unchanged well into the 1980.⁶

A prospective study by Rajgopalan and Picklemen on adult patients with free perforation of small intestine and spreading peritonitis showed that regardless of the

etiology of small bowel perforation, the clinical syndrome mimicked the symptoms that of many other acute abdominal conditions, making preoperative diagnosis unlikely.^{13,16} Fever, leukocytosis and hyperamylasemia were inconstant and non-specific, and free air was often not demonstrated radiologically and was noted in only 8 of these 16 patients (50%).

In two large series of patients with typhoid fever, perforation occurred in 78 of 1470 patients (5.3%) and 141 of 789 patients (17.9%) Eggleston FC.⁹ Chauhan and Pande have reported increasing incidence of perforation.⁵ It continues to be a major complication of typhoid fever.

Keen W was the first surgeon who recognized intestinal perforations in 1876 as a complication of enteric fever and later published his work on the surgical complications and sequel of typhoid fever.¹⁰ Bontecou performed the first operation for enteric perforation.³

METHODS

The present study “mortality pattern of patients of typhoid perforation during the year 2001 to 2010 admitted in surgical wards of S. G. M. H. Rewa” is retrospective study which was carried out in 118 patients of typhoid perforation who were admitted and died during treatment in surgical wards in S. G. M. H. Rewa during the period of 1st January 2001 to 31st December 2010. Case records were collected from central registration section of department of surgery, particulars of patients was recorded from case sheet. Details of patient's complaints clinical findings, investigations, treatment, operation, complications and cause of death

recorded on predesigned master chart and statistical tabulation done to analyze various mortality rates.

Details of patients were recorded regarding age, sex, religion, address, rural and urban distribution and socioeconomic status. Each and every detail of patient's complaints was recorded with which patients were admitted in surgical wards.

History of past illness, with special reference to predisposing risk factors like hypertension, diabetes mellitus, chronic lung disease, h/o major operation, tuberculosis, and other coexistent medical and surgical illness, drug history, personal history and family history were also recorded. Details of patient's clinical examination, investigation, treatment and operative procedures were recorded. Details of the operation with respect to type of surgery, symptoms onset and operation interval, hospitalization operation interval, type of anesthesia given and preoperative findings were noted.

Details of patient's findings was tabulated in the master chart and studied in the full details for individual death from analysis of fact, correlating to our aims and objective. Once a permanent records is established basic statistical tabulation are prepared based on diagnosis, age groups, socioeconomic status, sex and rural and urban distribution, investigations, number of blood transfusion, duration of illness, disease onset and operation interval or conservative treatment, postoperative complications and cause of deaths and these findings discussed in view of relevant literature available.

RESULTS

Table 1: Incidence of mortality due to typhoid perforation.

Year	Total Admission	Total number of deaths	Total deaths due to perforation Peritonitis	Total deaths due to typhoid perforation		
				No.	% out of total death	% out of death due to all perforation
2001	3828	295	55	12	4.06	21.81
2002	4504	288	84	09	3.12	10.71
2003	4292	316	83	07	2.21	8.43
2004	5212	327	80	09	3.27	11.25
2005	5960	357	65	16	4.48	24.61
2006	5783	389	78	15	4.06	22.05
2007	6737	384	71	13	3.38	18.30
2008	6286	453	88	10	1.94	11.36
2009	6557	424	88	18	4.24	20.45
2010	7266	443	73	10	2.25	13.69
Total	56425	3676	765	118	3.31	15.42

Total admission in surgical wards during study period was 56425, and total number of deaths was 3676. Out of

which 765 patients died of perforation peritonitis, among which 118 patients died of typhoid perforation peritonitis

and it constituted 3.31% of total death. 15.42% of death due to perforation peritonitis.

Incidence of mortality among all admitted patients (703) due to typhoid perforation was 16.78% (118 patients).

Table 2: Year wise mortality rate in case of typhoid perforation peritonitis.

Year	Total no. of cases of typhoid perforation	Total no. of deaths due to typhoid perforation	Incidence of death %
2001	67	12	17.91
2002	61	09	14.75
2003	44	07	15.9
2004	63	09	14.28
2005	87	16	18.6
2006	82	15	18.29
2007	76	13	17.10
2008	82	10	12.19
2009	82	18	21.95
2010	59	10	16.94
Total	703	118	16.78

Table 3: Distribution according to age group.

Age group (years)	Total	
	No.	%
<10	05	4.23
11-20	37	31.35
21-30	31	26.27
31-40	29	24.57
41-50	11	9.32
>50	05	4.23
Total	118	100

Table 3: Distribution according to gender.

Gender	No.	%
Male	88	74.57
Female	30	25.42
Total	118	100

Highest mortality was recorded in age group 11-20 years (31.35%) and lowest (4.23%) in age group <10 years and >50 years. Total 82.19% patients were in age group 11-40 years.

Mortality due to enteric perforation in present study was more in male (74.57%) in comparison to females (25.42%). In present study male-female ratio (M:F) was 2.9:1.

In our study most of the mortalities due to perforation was in month of august, September and October and lower in months of November to March.

In the present study most of the mortalities due to typhoid perforation peritonitis was found in rural patients (78.2%) than urban (21.7%).

Most of the mortalities occur in lower socioeconomics group (92.4%).

Table 5: Month wise distribution.

Month	Total number of deaths due to typhoid perforation	
	No.	%
January	6	5.08
February	4	3.30
March	7	5.90
April	9	7.62
May	8	6.77
June	13	11.01
July	11	9.32
August	14	11.86
September	17	14.40
October	15	12.71
November	8	6.77
December	6	5.08
Total	118	100

Table 6: Distribution according to residence.

Residence	No.	%
Rural	109	92.40
Urban	09	07.60
Total	118	100

Diabetes mellitus (9%) and hypertension (11.3%) were the associated co-morbidities present in 20.3% of patient.

In the present study, 94.07% were anaemic, out of which 36.43% patients were moderately anaemic.

Table 7: Distribution according to religion.

Religion	No.	%
Hindu	111	94.0
Muslims	07	06.0
Total	118	100

Table 8: Distribution according to according to various factors.

Socioeconomic status	Socioeconomic status	Number	%
	Lower	107	90.67
	Middle	11	09.30
	Upper	-	-
	Total	118	100
Associated co-morbidities	Associated co-morbidities	Number	%
	DM	11	9.0
	HTN	13	11.3
	uraemia	35	29.66
	anaemia	111	94.06
Number of perforation	Number of perforation	Number	%
	Single	98	83.05
	Multiple	20	16.94
	Total	118	100
Pre hospitalization duration	Duration of illness (in days)	Number	%
	1	05	0.041
	2-7	60	50.68
	8-14	26	21.91
	>15	27	23.28
	Total	118	100
Interval between hospitalization and operation	Duration	Number	%
	Within 24 hours	20	17.10
	24-48 hours	81	68.42
	>48 hours	17	14.47
	Total	118	100
Operative procedure	Operative procedure	Number	%
	Simple closure	45	38.13
	Primary ileostomy	57	48.30
	Resection anastomosis	09	7.62
	Ileotransverse anastomosis	05	4.23
	Total	118	100
Postoperative complications	Cause	Number of cases	%
	Wound infection	69	58.47
	Renal failure	29	24.57
	Pulmonary complications	15	12.71
	Enterocutaneous fistula	9	7.62

In present study solitary perforation was found in 83.05% and multiple perforations were found in 16.94% cases.

Most of the patients in our study died within 2-7 days after admission in hospital (47.14%) and 22.85% patient died within one day of admission.

Hospitalization operation interval was >24 hours in 70% of patients.

In this study most of the patients had duration of illness for 2-7 days (58.68%), while only (4.3%) cases presented within 24 hours.

Among operative procedure simple closure was done in 38.13% cases, primary ileostomy done in 48.30% cases, resection anastomosis done in 7.62% cases and in 4.23% cases ileotransverse anastomosis done.

Most common complication was wound infection recorded in 58.47% of cases followed by renal failure in 24.57% cases, in 12.71% pulmonary complications and in 7.62% cases enter cutaneous fistula.

In our study most common cause of death was septicemia.

DISCUSSION

Incidence

In present study total admission in surgical wards during study period was 56425, and total number of deaths was 3676. Out of which 765 patients died of perforation peritonitis, among which 118 patients died of typhoid perforation peritonitis and it constituted 3.31% of total death and 15.42% of death due to perforation peritonitis.

Total cases of typhoid perforation during study period were 703, with 16.78% mortality. In present study, mortality due to typhoid perforation was 16.78% which was comparable to that observed by Eustach and kreis 21.2%, Bose 16%, Beniwal 10.5%.^{2,4,6}

Table 9: Mortality rate in typhoid perforation in different studies.

Dickson and Cole ⁶	1964	62%
Egglestone et al ⁷	1979	30%
Singh et al ¹⁵	1991	14.0%
Beniwal U ²	2002	10.5%
Malik AM ¹	2006	7.14%
Present series	-	16.78%

As per statistical data from department of surgery mortality due to typhoid perforation in 1995 was 27% and 9.52% in 2013, which indicates decline trend of mortality due to typhoid perforation.

In present study, mortality was 16.78%, which is higher than other studies was due to delay presentation and poor general condition of patients.

Mortality in relation to age

In present study highest mortality was recorded in age group 11-20 years (31.35%), followed by age group 21-30 years (26.27%) and lowest in age group <10 years (4.23%) and >50 (4.23%) years. Total 82.19% were between age of 11-40 years. The high mortality in this age group at 11-30 years is may be due to high incidence of perforation in this age group.

Typhoid perforation is commonest among 11-30 years age group because this age group is working group and they goes out of their home to earn and +exposed to unhygienic environment and suffers from typhoid fever and its complications.

As shown in above table, in present study maximum number of cases were in 2nd and 3rd decades is similar to various studies e.g. Tripathi et al and Beniwal US 32% in 2nd decade.^{2,17} However frankl, reported maximum incidence in 3rd decade.⁹ As shown in above Table.

Table 10: Age wise distribution of cases reported by various authors.

Author	Year	Age group with max. cases
Singh et al ¹⁵	1991	20-30 years
Tripathi et al ¹⁷	1994	11-20 years
Beniwal U ²	2002	20-30 years
Parashar S ¹²	2007	11-20 years
Present series	-	11-30 years

Mortality in relation to gender

In present study male-female ratio (M/F) was 2.9:1 that is consistent with the findings of Swadia NM who reported ratio of 5.25:1.¹⁶ Typhoid perforations has got male preponderance. Following table shows the findings as per study by various authors

Table 11: Sex ratio in various studies.

Authors	Year	M:F ratio
Swadia et al ¹⁶	1979	5.2:1
Egglestone et al ⁷	1979	3.55:1
Nadkarni et al ¹¹	1981	2.6:1
Singh et al ¹⁰	1991	4.2:1
Tripathi et al ¹⁷	1994	2.84:1
Beniwal U ²	2002	6.41:1
Malik AM ¹	2006	1.5:1
Parashar S ¹²	2007	2.84:1
Present series	-	2.9:1

Mortality in relation to season

In our study most of the mortalities due to perforation was in month of august, September and October mostly in rainy season. Higher incidence of typhoid has been reported in between July to October by various authors Egglestone and Santoshi, Swadia et al, Tripathi et al, and Sanjay P.^{7,12,16,17}

Mortality in relation to residence and socioeconomic status

In the present study most of the mortalities due to typhoid perforation peritonitis was found in rural patients (78.2%) than urban (21.7%) and in lower socioeconomics group

(92.4%). This can be explained on the basis that patients residing in the rural areas are of low socioeconomic status and they did not use to get opportunity for treatment of their illness either in proper time or failed to receive the full course of treatment. Apart from that this institute mainly drains rural population.

Mortality in relation to associated co-morbidities

In our study, in 20.3% of patients who died were having associated co-morbidities like diabetes mellitus (9%), hypertension (11.3%).

In case of association of medical illness in patient with typhoid perforation peritonitis, operation is sometimes delayed as patient is not fit for anaesthesia and complication rate is also high, which ultimately adversely affects the outcome.

Mortality in relation to anemia

In the present study, 36.43% patients were moderately anemic. Actual incidence may be still higher as at time of hospitalization patients are dehydrated and shows higher Hb level due to hemoconcentration. Anemia is an indirect indicator of malnutrition and majority of the patients in the study were from low socio economic class and remote rural areas with high incidence of malnutrition.

Mortality in relation to blood urea level

In present study in 29.66% cases blood urea was >40 mg%, mainly due to prolonged dehydration and septicemia, which ultimately affect the outcome.

Mortality in relation to no. of perforation

In present study solitary perforation was found in 83.05% and multiple perforations were found in 16.94% cases. Findings of Our study is consistent with Malik et al who found single perforation in 85% and Beniwal U in 81.4%.^{1,2} apart from number of perforation there are other factors like anemia, septicemia etc. plays role in outcome of patients.

Table 12: The table below showing percentage of solitary perforation in various studies.

Author	Single perforation %
Cole DE ⁶	85%
Eggleston ⁷	90.5%
Malik AM ¹	85%
Beniwal U ²	81.4%

Mortality in relation to admission and death interval

Most of the patients in our study died 2-7 days after admission in hospital (47.14%) and 22.85% patient died within one day of admission.

Most of the patients 70.33% died within one week of hospitalization.

Following factors are responsible for mortality within one week

- Poor condition of patients due to poor nutrition.
- Patients presents in hospital in state of shock and septicemia due to delayed hospitalization
- Sometimes patients who are already in dehydration do not get pre-hospitalization proper treatment
- Because of poor general condition of patients, urgent exploratory laparotomy is delayed, until patient attain stable condition by supportive measures like B. T. etc.

Mortality in relation to duration of illness

In this study most of died patients had duration of illness for 2-7 days (58.68%), while only (4.3%) cases presented within 24 hours. It shows that delay in admission deteriorates condition of the already poor condition of patients which ultimately leads to death.

Majority of cases reporting late in present study can be due to

Mortality in relation to operative procedure

In present study, in 38.13% patient's simple closure was done and in 48.3% primary ileostomy was done but that does not directly reflecting relation between operative procedure and death. Probably it simply denotes commonly performed procedure.

Mortality in relation to postoperative complications

In present study most common complication was wound infection in 58.47% of cases followed by renal failure in 24.57% cases, in 12.71% pulmonary complications and in 7.62% cases enterocutaneous fistula. Shrivastava A reported pulmonary complications was the most common general and wound infection was the most common local complication in patients operated for perforation peritonitis.¹⁴

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