Review Article

Typhoid Cases in Surgical Emergency During Pre and Post Covid-19 Lockdown: A Review

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Abstract

Objective: To find frequency and review of causative factors of typhoid fever in patients who presented in mayo hospital surgical emergency department both during and pre-lockdown periods due to corona virus.

Method: The research was carried out at General Surgical Department (West Surgical Ward) Mayo Hospital Lahore, from Feb 2020 to May 2020. This is a retrospective descriptive study. Total numbers of patients included were 58. All patients who presented with typhoid peritonitis to surgical emergency were included in this study. Patient demographics include age, gender, type of water and food consumed socioeconomic status, symptoms, investigations and medication used for treatment of disease. Causative factors analyzed regarding their effect on typhoid using blood culture as marker of disease. SPSS version 20 was used to analyses.

Results: There were 43 males (74.1%) and 15 females (25.9%) with mean age at presentation 32.67 ± 16.22 S.D. (range =14-72 years). Thirty-three patient (n=33, 56.7%) presented before lockdown and twenty-five (n=25, 43.1%) presented after lockdown. Fever was predominant symptom (n=58,100%) and mean age of fever was 12.06 ± 5.27 S.D days. The total number of patients who were positive for antibodies performed by Typhidot test were 63.8% (n=37) while 70.7 % (n=41) patients were positive for typhoid fever by blood culture test. The factors remained associated with typhoid fever during Covid-19 lockdown were usage of tap water (p=0.022) and using street food (p=0.000).

Conclusion: Our review showed that there is decrease in frequency of patients of typhoid fever who presented in surgical emergency of mayo hospital Lahore during lock down for covid-19 pandemic. In these cases, increase number of disease was related by using tap water and unhygienic food conditions. The recognition of water and unhygienic food as main causes for typhoid disease in our country; it highlights the significance of enhancing our understanding of transmission modes, trends and origins of typhoid fever in countries such as Pakistan.

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Introduction:

Typhoid and paratyphoid fevers are affected by systemic infection with the serovar subspecies Salmonella enterica Typhi and Paratyphi A, B and C, frequently known as enteric fever.[1] Typhoid fever is a systemic contagious disease from the Typhi (S. typhi) serotype Salmonella enterica.[1] This disease remains a serious issue for public health in developing countries. Worldwide, in 1990, typhoid and paratyphoid disease was 25.9 million cases, falling to 14.3 million

cases reported in 2017, falling 44.6%[2]. In the world case, fatality in 2017 was estimated at 0.95 %, with higher estimates of fatality among kids and elderly people, particularly in those living in low-income countries.[2] Fatalities from typhoid and paratyphoid fever worldwide were approximated to be 0.135 million in 2017, a decline of 41% from 0.230 million in 1990.[3]

S. typhi has been a significant human pathogen for centuries while antibiotics in the developed world have significantly decreased the incidence of typhoid fever, it remains prevalent in developing countries. The virus is easily spread by taking unhygienic food and drinking water,[4] that is prevalent in areas where washing hands is less common. Typhoid fever spread through food, drinks, and drinking water polluted with infected fecal matter. Cleaning vegetables and fruit with contaminated water will cause it to propagate.

Few individuals are typhoid asymptomatic carriers, which mean they carry the bacteria but do not have any ill effects. Symptoms usually begin around 6 to 30 days when exposed to the bacteria. High-grade fever and skin rash are main symptoms. Some signs include fatigue, abdominal pain, constipation, headache, and occasional confusion, diarrhea, and vomiting, although this is not usually severe. In susceptible patients, the intestine may be ruptured leading to peritonitis, which in 5 to 60 percent of cases has been identified as fatal.

Increasing resistance has limited antimicrobial treatment options: in Asia since the early 1990s multidrug resistant (MDR) serotypes, defined as resistant to the three former first-line antimicrobial agents (chloramphenicol, ampicillin and trimethoprim-sulfamethoxazole), have been widespread and have been increasing in many regions of Africa. As a result of this, treatment with ciprofloxacin increased since the late 1990s, with the associated widespread fluoroquinolone resistance emerging among Typhi isolates from Asia and parts of Africa. In 2016, the first outbreak of an extensively drug-resistant (XDR) Typhi strain, with resistance to ceftriaxone, ciprofloxacin, and traditional first-line agents, was reported in Pakistan.[6] The WHO recommends typhoid fever vaccination[7] as a control strategy for both endemic and epidemic diseases in addition to remediation of environmental deficiencies, which include optimal access to clean drinking water and sanitation, and improved hygiene and food safety.

More research is required to identify better strategies to minimize its spread, since typhoid prevalence is so frequent in underdeveloped countries. This enables stamping out the disease challenging, as carriers whose clinical manifestations seem to be over may be less vigilant when cleaning food or communicating with others.

Covid-19 pandemic has caused a great impact on lifestyle issues in Pakistani population. People are bound to stay at home during lockdown however, the presentation of typhoid fever in surgical emergency continue to present with peritonitis. We conducted comparative population-based study pre lockdown and during lockdown to see the frequency and review causative factors of typhoid cases presented in surgical emergency of mayo hospital Lahore.

Methods

This comparative study was conducted at mayo hospital Lahore for the duration of lock down and equal length of time before lock down for covid-19 in 2020 (Feb 2020-May 2020). We selected all patients of typhoid peritonitis who presented in surgical emergency of mayo hospital for this period. Main objective was to check the frequency of typhoid fever and compare it with pre-lockdown time as well as also review its causative factors. Inclusions criteria were all patients presenting with history of fever of 6 to 30 days with signs of peritonitis, of both gender, operated within 24 hours after presentation to emergency. Exclusion criteria were all the patients who were below the age of thirteen; all other cases of peritonitis and redo operations for typhoid peritonitis. After permission from the concerned hospital authorities, ethical committee and fulfilling the exclusion and inclusion criteria for all the patients, detailed histories taken and Performa filled for each patient.

SPSS v20 was used to analyze data. Quantitative variables such as age executed as mean ± S.D. Qualitative variables like gender, patient symptom, causative factors presented as frequency and percentage. Stratified groups compared by using chi-square test and continuous variable were analyzed by independent T- test. P-value<_0.05 was considered

significant.

Results

We studied 58 (n=58) patients who presented in emergency department with typhoid fever during the last 4 months (2 months before Covid -19 and 2 months after) i.e. Feb 2020-May 2020. All patients met our inclusion criteria. There were 43 males (74.1%) and 15 females (25.9%) with mean age at presentation 32.67 ± 16.22 S.D. (range =14-72 years). Thirty three patient (n=33, 56.7%) presented before lockdown and twenty five (n=25, 43.1%) presented after lockdown is imposed.

Table 1: *Frequencies of Patient Variables Presenting as Typhoid Fever in Surgical Emergency*

Patient Variables	Results (n,%)	
1. Grades of Fever		
i. Low	15	25.9%
ii. Moderate	21	36.2%
iii. High	22	37.9%
2. Rigors		
i. Yes	32	55.2%
ii. No	26	44.8
3. Chills		
i. Yes	27	46.6%
ii. No	31	53.4%
4. Abdominal pain		
Yes	57	98.3%
No	1	1.7%
5. Loose Motion		
i. Yes	21	36.2%
ii. No	37	63.8%
6. Medication		
i. Tab paracetamol, tab metronidazole, tab ciprofloxacin	13	22.4%
ii. tab augmentin, tab metronidazole, tab paracetamol	5	8.6%
iii. from local clinic	19	32.8%
iv. tab metronidazole, tab ciprofloxacin	6	10.3%
v. tab paracetamol, tab metronidazole	5	8.6%
vi. tab paracetamol	3	5.2%
vii. tab paracetamol, tab ciprofloxacin	6	10.3%
viii.none	1	1.7%
6 Procedure Performed		
i. Exploratory Laparotomy and ileostomy	51	87.9%
ii. Exploratory Laparotomy and primary repair of perforation	7	12.1%
7 Antibiotics given post operatively		
i. Inj. imepenem, Inj metronidazole	10	17.2%
ii. Inj. augmentin, Inj metronidazole, Inj. Ceftriaxone	33	56.9%
iii. Inj. Moxifloxacin, Inj. Metronidazole	13	22.4%
iv. Inj. ciprofloxacin, Inj. ceftriaxone, Inj. metronidazole	2	3.4%
8 Wound dehiscence		
iii. Yes	4	6.9%
iv. No	54	93.1%

Fever was predominant symptom for typhoid disease present in all cases (n=58,100%) and mean age of fever was 12.06 ± 5.27 S.D days. Frequencies of other symptoms, medication history, antibiotics given in ward, procedure performed and wound dehiscence shown in table (Table 1). Frequencies of risk factors causing typhoid fever are shown in table (Table 2). The total number of patients who were positive for antibodies performed by Typhidot test were 63.8% (n=37) while 70.7 % (n=41) patients were positive for typhoid fever by blood culture test. The main factors associated with typhoid fever during Covid-19 lockdown were usage of tap water (p=0.022) and using street food (p=0.000).

Discussion

Our retrospective review of hospital records, spanning

Table 2: . *Frequency of Patient's Risk Factors Presenting with Typhoid Fever during and Post Lockdown.*

Patient Variables	Presentation(n)		Total (n=58)	P value ⩽0.05
	Pre lockdown (n=33)	During lockdown (n=25)		
1. Water consumption source				0.022
i. Tap water	29(87.8%)	17(68%)	46(79.3%)	
ii. Mineral water	3(9.09%)	1(4%)	4(6.9%)	
iii. Boiled Water	1(3.03%)	7(28%)	8(13.8%)	
2. Food Consumption source				0.000
i. Home-cooked	15(45.4%)	23(92%)	38(65.5%)	
ii. Street food	18(54.6%)	2(8%)	20(34.5%)	
3. Socioeconomic Status	22(66.6%)	20(80%)	42(72.4%)	0.337
i. Poor	9(27.2%)	5(20%)	14(24.1%)	
ii. Middle Class	2(6.06%)	0(0%)	2(3.4%)	
iii. Upper Class				
4. Sanitation Level				0.732
i. Poor	23(69.69%)	19(76%)	42(72.4%)	
ii. Average	8(24.24%)	4(16%)	12(20.7%)	
iii. Healthy	2(6.06%)	2(8%)	4(6.9%)	
5. Area of Residence				0.770
i. Local	25(75.75%)	18(72%)	43(74.1%)	
ii. Out of city	8(24.24%)	7(28%)	15(25.9%)	

4 months which consist of two months of pre lock down and two months of look down period for covid-19 and including data from emergency of department of surgery of mayo hospital Lahore, indicate that enteric fever is still present in healthcare settings and predominately affects male.

In our sample, as in previous research, the age distribution varies slightly.[8] Some had symptoms, including nausea/vomiting, diarrhea, and weakness/

malaise. A significantly proportion had fever and significantly higher proportions had abdominal pain and constipation. Such results were reported in a study conducted in India[9] in similar proportions of perforated enteric fever cases. The most widely used diagnostic test is blood culture, which has been shown to be just 61% responsive[10] based on pooled estimates and is used to validate in our research.

Although antimicrobial therapy is a treatment option for enteric fever, our research, which is also supported by previously conducted studies, shows a growing rate of resistance to the available antibiotics resulting in higher morbidity, mortality and treatment costs.[11,12,13]

Despite more than 100 years of research, our understanding of the epidemiology of typhoid fever is substantially different. More data on Typhoid transmission is required, particularly in low-income regions where enteric fever is especially prevalent. It is clear that Typhoid propagation habits and modes differ greatly from place to place. Possibly reflecting the surviving complexities as well as the changes in the typhoid epidemiology, professionals vary widely in their ideas about the importance of various exposure patterns for organisms causing Typhoid infection by area14. Around the same time, it understands which of the elements of water , sanitation and hygiene are best suited to combat typhoid in specific places and around the globe. Factors such as crowding, inadequate hygiene, contaminated water and unsafe practices in the processing and handling of food lead to typhoid spread. Therefore, measures to interrupt transmission, these factors should be addressed.[15]

During our study although it was conducted for short duration of period of lock down and two months before lock down main cause of disease transmission was water and food and poor relation to poor sanitary conditions. Increase incidence of disease was noted during pre-lockdown period. The polluted water as a significant cause for typhoid fever is inarguable. During the rising-endemic period of enteric fever in Santiago , Chile, industrial wastewater toxicity of the food supply proved to be the most important aspect contributing to typhoid transmission in family members more than the typhoid carrier state[16]. Previous etiological studies have demonstrated the benefits of water - borne propagation, revealing that only low inoculum is sufficient for sewage enteric spread, while food - borne spread takes a huge amount of inoculum.[16] People who consume safe water may have a lower probability of typhoid opposed to those who drink untreated water, that's one of the factors associated with typhoid and this was also seen in our study.[16] Estimates of the global healthcare costs of typhoid, however, often interpret the incidence produced by vulnerable populations to the rest of populations,[17] which is likely to be overstated. Therefore, correction of incidence rates is required when interpreting data gathered from communities taking unsafe water to communities drinking clean water.[16] However, There has been no record having data on drinkable water or contaminated water which can be used to forecast worldwide disease burden. Alternatively, there is a worldwide record available to communities on clean water supply access,[18] which can be used as a safe water use measure. Hence, there must be a correlation between the risk of unsafe water and improved water. However a literature survey previously mentioned showed that toxicological safety of optimized water is unreliable[19] but gives an idea of hygienic conditions and is the only information that can be used worldwide for water-related risk correction.

Conclusion

During this study we see that incidence of typhoid is more in adult males during pre-lockdown period for covid-19 and its relationship continue to exist with using street food and tap water consumption in both per and post lockdown intervals. Poor sanitary conditions and lower socio economic status are also seen among these cases but their relation is insignificant between pre and post lockdown periods.

We have shown that information on typhoid, not confined to blood culture, community based occurrence figures may become helpful in understanding wider geotemporal patterns in typhoid spread. There should be attempts to exploit available information on typhoid. It may enable us to understand the illness etiology, major pathogenic factors that in turn assists us making better informed strategic decisions like the implementation of Typhoid conjugate vaccine, clean water, food and hygiene practices.

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