

Peritonitis By Ileal Perforations of Typhic Origin in The Surgery Department of The Somine Dolo Hospital in Mopti

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Summary

Although relatively rare in developed countries, ileal perforations of typhoid origin are a public health problem in developing countries, particularly in Mali.

The aim of our study was to study ileal perforations of typhoid origin in the surgery department of the Sominé Dolo Hospital in Mopti.

This was a prospective study that took place from November 1, 2017 to October 31, November 2018, i.e. 12 months.

During this study, we observed 58 cases of ileal perforations of typhoid origin, i.e. 8.41% of emergency consultations.

It is a pathology of young people with an average age of 19.7 years.

We found a predominance of men (63.8% males) with a sex ratio of 1.76.

Emergency was the most frequent method of recruitment (91.4%).

The mean time to consultation was 13.1 days after symptoms.

Among the signs suggestive of intestinal perforation, abdominal pain (100%), abdominal defense or contracture (100%), pain on digital rectal examination (94.9%) and abolition of abdominal breathing (74.1%) were the most frequent. Radiography of the abdomen without preparation taking the diaphragmatic cupolas suspected the diagnosis of intestinal perforation through the intercosto-diaphragmatic crescent gas in 53.4% of cases.

Widal's serodiagnosis was positive in 74.1% of cases.

Excision-suture was the most used operative technique in our series (58.6%).

Early morbidity was 51.5% and overall mortality was 29.3%, i.e.

17 deaths out of 58 cases of ileal perforations of typhoid origin.

Keywords: Peritonitis; Typhoid; Perforation; Ileum; Surgery

Introduction

Peritonitis is an acute or chronic inflammation of the peritoneal serosa, which can be either generalized to the large peritoneal cavity or localized (subphrenic compartments, parietocolic splints, Douglas' cul de sac) [1]. Typhoid fever is a generalized toxi-infection of typhoid fever and is one of the etiologies with a lymphatico-mesenteric starting point due to *Salmonella typhi* (Eberth's bacillus) and paratyphi A, B, C characterized from the anatomical point of view by lesions of Peyer's plaques and closed follicles of the intestine [2].

Typhic perforation peritonitis is the pathological opening in the peritoneal cavity of a hollow organ following a *Salmonella typhi* infection [1], it is the leading cause of peritonitis in endemic areas and especially in children [3]. The diagnosis of ileal perforation peritonitis of typhoid origin is based on the clinical picture and the appearance of the lesions intraoperatively [4]. The treatment is medical-surgical. The surgical procedure should be performed as soon as possible and combined with intense resuscitation with the administration of appropriate antibiotics. Surgical techniques depend on several factors such as the patient's general condition, the degree of contamination of the cavity, the condition of the ileum, and the number of perforations [5]. Typhoid ileal perforation remains a serious pathology with a morbidity and mortality rate of up to 20 to 30% [6].

In Italy: Contini S. et al. in March 2017 through a study on typhoid intestinal perforation in developing countries, found that the most serious complication of typhoid fever is typhoid intestinal perforation. Intestinal perforation by typhoid fever in high-income countries is 0.8% and low-income is 39% [7].

IN AFRICA

In Togo: Kassegne I et al. [10]. in September 2015, studied the diagnostic, therapeutic and prognostic aspect of typhus hail perforations over 3 years. All perforations were in the ileum, which accounted for 110 cases out of 162 cases of acute generalized peritonitis.

In NIGERIA: KENNETH. A et al. [11]: in May 2014, studied over 8 years the prevalence, morbidity and mortality patterns of ileal perforation of typhoid origin in 50 patients. They found a high mortality rate of 30%, the causes of death were: tachypnea and ileal perforations (three or more).

IN MALI: KEITA I K, in 2009 in his thesis on the study of ileal perforations of typhoid origin in the surgery department of the SOMINE DOLO hospital in Mopti over a period of 4 years, found 30.7% of peritonitis by ileal perforation of typhoid origin on all acute peritonitis [12].

Few studies have been carried out on ileal perforation peritonitis of typhoid origin at the Sominé DOLO hospital in Mopti, hence the present study.

Patients and Methods

This was a prospective study conducted at the General Surgery Department of the Sominé DOLO Hospital in Mopti from November 1, 2017 to October 31, 2018.

All patients were recruited in the emergency department of the Sominé Dolo hospital. Recruitment concerned patients of both sexes and of all ages.

All patients operated for ileal perforation peritonitis of typhic origin and hospitalized in the surgical departments of the Sominé Dolo Hospital were included in our study.

The following were excluded from the study: patients who had undergone surgery for non-ileal peritonitis, non-hospitalized patients, patients who died before surgery, and patients who did not give consent.

The objectives of the study were to study ileal perforation peritonitis of typhic origin in the surgery department of the Sominé Dolo Hospital in Mopti; To determine the hospital frequency of ileal perforation peritonitis of typhic origin, to write down the clinical, par-clinical and therapeutic aspects, to analyze the postoperative follow-up and to evaluate the cost of care.

Conduct of the Study

- A phase of preparation of the questionnaire.
- A data collection phase.
- A data analysis phase.

On clinical examination, we looked for and characterized abdominal pain, abdominal defense or contracture, fever and peritoneal signs.

- An X-ray of the abdomen without preparation (ASP) was requested in some of our patients as well as an abdominal ultrasound which was essential in the diagnosis of peritonitis by perforation in emergency.
- Our therapeutic approach was first medical for all patients (preoperative resuscitation) followed by the surgical act which allowed the treatment of the perforation and the abdominal cavity.

Data Analysis

The questionnaires were filled in with medical records, operative report registers and anaesthetists' intraoperative consultation and follow-up sheets.

The data analysis was performed on SPSS version 20 software. We used the Chi2 test with a significance level $p < 0.05$.

Results

During the study period, we collected 58 cases of ileal perforations of typhoid origin which represented: 3.85% of emergency consultations, 8.41% of hospitalizations, 8.17% of surgical interventions, 36.9% of peritonitis.

The highest number of perforations was recorded during the month of September, at 20.7%. More than half (63.8%) were less than or equal to 20 years, had a mean age of 19.7 years, and a standard deviation of 14.44 years with extremes of 3 and 70 years (Table 1).

The male sex was the most represented with 64% of cases with a sex ratio of 1.76.

Out-of-school children represented 36.2% of our patients and 84.5% of the workforce came from rural areas.

General practitioners practising in the periphery had been the first contact for 87.9% of our patients.

More than half of our patients, 58.6%, consulted within 7 to 14 days after symptoms (Table 2).

The mean time to consultation was 13.1 days with extremes of 5 and 22 days.

More than half of our patients (67.2%) have a treatment time of less than 12 hours. The average time to treatment was 8.7 hours with extremes of 2 and 26 hours.

Traditional treatment was carried out before the hospital consultation in 72.4%.

Recruitment was carried out in the emergency department for 91.4% of our patients.

The majority of our patients were seen for abdominal pain-vomiting The WHO score was rated at 4 for 63.8% of our patients.

Fever was noted in 88% of cases and pulse/temperature dissociation was present in 12% of patients. Blood pressure was low in 72.4% of cases (systolic pressure < 10 cmhg). Glasgow was normal in 65.5% of cases.

The accompanying signs of pain were nausea-vomiting in 72.4% of cases. Abdominal pain was diffuse in 53.4% of our patients. Sting-type pain was in 50% of cases. The gradual onset mode was 72.4 of the cases. Pain was moderate in 44.8% of cases. The tongue was dry in 63.8% of cases. Signs of dehydration (peritoneal facies: sunken eyeball with protrusion of the facial bone) were present in 81% of cases and conjunctivae were moderately stained in 67.2% of cases. Abdominal distension was present in 10.3% of cases, abdominal contracture in 87.9%, abdominal defense 12.1% of cases. The umbilical cry was positive in 94.8% of cases. The abdomen was immobile in 93.1% of cases. Dullness of the flank was present in 70.7% of cases. Abdominal silence was present in 74.1% of cases.

Douglas' cul de sac was bulging and painful on pelvic touch 96.6% of the time.

The gaseous crescent was found in 53.4% of cases on X-ray of the abdomen without preparation, standing in front of the diaphragmatic cupolas.

Turbid fluid effusion was in 51.7% of cases on abdominal ultrasound.

The Widal and Felix serodiagnosis was positive in 74.1% of cases.

The haemoglobin level was less than 9 g/dl in 70.7% of cases.

Elevated serum creatinine was in 56.9% of cases.

Peritonitis was the preoperative diagnosis in 89.7% of cases.

A median laparotomy above and below umbilical was performed under general anesthesia with orotracheal intubation in all our patients.

The perforation lesion was unique in 72.4% of cases and in 79.3% of cases was between 0.5 and 1 cm in size and the first perforation was within 25 cm of the ileocecal angle in 48.3% of cases; it was oval in shape in 72.4% of cases.

Peritoneal fluid was stercoral in 63.8% of cases and was less than 1000 ml in 65.5% of cases.

Excision-suturing was the most commonly used surgical technique (58.6% of cases) and 21 patients (36.22%) underwent ileostomy (Table 3).

The number of drains was 3 in 79.3% of cases (both parietocolic splints and Douglas' cul de sac).

The mannheim score was >26 in 63.8% of cases.

The postoperative follow-up was simple in 87.7% of cases.

Early morbidity was 51.8%.

Morbidity was dominated by wall abscesses with 32.8%, however we recorded 6.9% of digestive fistula and 5.2% of postoperative evisceration and postoperative mortality was 29.3%.

We did not find a relationship between mortality and surgical technique (Table 4).

The duration of hospitalization ranged from 8-14 days in 34.5% of cases with a mean duration of 18.6 days and extremes 1 and 50 days.

We followed 90.3% of our patients by appointment, 2.4% seen at home for patients living in the study city and 7.3% by invitation.

The time to restoration of digestive continuity was more than 6 weeks for 84.6% of our patients.

We did not note a relationship between surgical technique and morbidity (Table 5).

The average cost of care was 95,225 CFA francs with extremes of 87,395 CFA francs and 120,400 CFA francs.

<i>Age (years)</i>	<i>Staff</i>	<i>Percentage</i>
0-10	18	31,0
11-20	19	32,8
21-30	9	15,5
31-40	7	12,1
41-50	3	5,2
61-70	2	3,4
Total	58	100,0

Table 1: Age distribution of patients.

<i>Consultation period (days)</i>	<i>Staff</i>	<i>Percentage</i>
< 7	18	31,0
7-14	34	58,6
15-20	5	8,6
21-25	1	1,7
Total	58	100,0

Table 2: Distribution of patients by time of consultation.

<i>Technique</i>	<i>Staff</i>	<i>Percentage</i>
Excision-suture	34	58,6
Termino-terminal anastomosis resection	3	5,2
Ileostomy	21	36,2
Total	58	100,0

Table 3: Allocation of patients by technique.

Excision-suture was the most used surgical technique, accounting for 58.6% of cases.

Evolution	Excisionsuture	Resection - terminoterminal anastomosis	Ileostomy	Total
Healing	27 /34 (79,41%)	1/3(33,33%)	13/21(61,91%)	41/58(70,69%)
Death	7/34 (20,59%)	2/3(66,67%)	8/21(38,09%)	17/58 (29,31%)
Total	34/34 (100%)	3/3 (100%)	21/21 (100 %)	58/58 (100%)
P	0,14	0,20	0,41	

Table 4: Comparison between the operative technique and mortality.

There is no connection between the surgical technique and death.

Postoperative effects	Excisionsuture	Ternimoternimal anastomosis resection	Ileostomy	Total
Wall abscess	12/34 (35,3%)	1/3 (33,3 %)	8/21 (38,1 %)	21/58 (36,2 %)
Fistule digestive	3/34 (8,8%)	1/3 (33,3 %)	-	4/58 (6,9 %)
Evisceration	2/34 (5,9 %)	-	1/21(4,8 %)	3/58 (5,2 %)
Hypovolemic shock	-	1/3 (33,3 %)	2/21 (9,5 %)	3/58 (5,2 %)
P	0,27	0,40	0,27	

Table 5: Relationship between surgical technique and morbidity.

Postoperative complications are unrelated to the surgical technique.

Surgical technique	Auteur		Coulibaly [6] Mali 2011		Sanogo [35] Mali 2013		Our series	
	N	%	N	%	N	%	N	%
Excision-suture	441/481	92,5	68/120	57	34/58	58,6		
	P=0,22		P= 0,87					
Ileostomy	11/481	2,3	35/120	29	21/58	36,2		
	P=0,00		P=0,39					
Anastomosis resection	19/481	3,9	14/120	14	3/58	5,9		
	P=0,72		P=0,08					

Table 6: Surgical techniques according to the authors.

Suturing excision was the most performed surgical procedure.

Discussion

We carried out a prospective study from November 1, 2017 to October 31, 2018. The limitation of the number of additional examinations carried out in emergency in second-reference hospitals (blood culture, stool culture) had an impact on our results. The population's late use of health facilities and the population's lack of financial resources affected morbidity and mortality in our series.

The mean monthly frequency of peritonitis by typhic perforation is high in our study compared to those of Coulibaly [36] and Coulibaly AT [34]. It would be due to the geographical location of our structure in the region where the majority of our patients come from

rural areas disadvantaged by poor hygiene conditions, the lack of drinking water and especially the conflict that is raging in the region.

The average age in our series is 19.7 years with extremes of 3 and 70 years. This result is similar to that of the series [6, 26, 36]. It appears from these results that typhic perforation is a pathology of young subjects. This could be explained by the poor observance of hygiene measures by children and adolescents or the youth of the population.

We found a male predominance; 37 men (63.8%) compared to 21 women (36.2%), i.e. a sex ratio of 1.76 in favour of men. This has been found in all the series [6, 36 and 12]. But we have not found an explanation in the literature for this male predominance.

Abdominal pain and fever are the most common clinical manifestations of ileal perforation, abdominal pain often localized at first and then diffuse into the abdomen [34]. It is brutal, intense or without associated factors (H Mondor). It has been found in all our patients as in many other series [6, 36]. Peritoneal contamination by the digestive contents causes irritation of the peritoneal serosa, which is rich in nerve endings. Fever was found in all series [34, 36, 6] and in ours with a rate of 87.9%. Hyperthermia is secondary to the infectious syndrome that accompanies peritonitis. In cases of ileal perforations, vomiting can be explained initially by the high intensity of the pain and secondarily by paralytic ileus. Diarrhoea was also highlighted in some authors and found in 60.3% of our patients.

Abdominal defense or abdominal contracture, the cry of the umbilicus and pain on digital rectal examination are the major signs found in our patients in 87.9 to 100% of cases. The same proportions were found in studies carried out in Mali [26, 39, 12, 36, 35] and in the world [37, 31, 38, 29]. These symptoms are due to fluid effusion in the abdominal cavity which leads to irritation of the peritoneal serosa, and involuntary contraction of the muscles of the abdominal wall.

An X-ray of the ASP was performed in all our patients. A gaseous crescent was found in 53.3%. The same radiographic appearance has been frequently reported in studies carried out in Mali [12, 26, 39] and worldwide [27, 6, 29] with $p > 0.05$. It would be due to the fact that hollow organ perforations create a gaseous crescent between the liver and the diaphragm visible on an X-ray image of the abdomen without preparation in a patient standing facing the two diaphragmatic cupolas; however, it may be missing if the patient is seen early. Other images are also found at the ASP, these are diffuse greyness and hydro-aeric levels.

They testify to the diffuse nature of peritonitis.

A cloudy intra-abdominal fluid effusion was found in 51.7% of our patients who had the ultrasound. Abdominal ultrasound, which allows the indirect diagnosis of peritonitis, could not be performed in all our patients since it is sometimes difficult to perform in emergency in our structure.

In our study, the serodiagnosis of Widal and Felix was carried out in all our patients, of whom 43 patients (74.1%) were positive. Coulibaly [36] reported an HIV positive rate of 89.6% in Sikasso, Kouamé [4] had 85% in Abidjan and Sanogo [35] had 62.5% in Bamako.

Although controversial, the serodiagnosis of Widal and Felix remains the most commonly performed laboratory examination for the diagnosis of typhoid fever in Mali [12, 26, 39], stool culture and blood culture remain the reference examinations for the confirmation of the diagnosis of typhoid fever; these examinations are difficult to perform in the context of an acute surgical abdomen but provide very useful information for the orientation of postoperative management.

The medical-surgical treatment is dominated by pre, intraoperative and postoperative resuscitation is the key to the success of the treatment, all immuno-hydro-electrolyte disorders must be corrected preoperatively. Active antibiotic therapy on salmonella and enterobacteriaceae is instituted because there is a diffusion of intestinal contents in the peritoneal cavity. This resuscitation must be as short as possible because mortality increases with the time it takes to receive surgery.

However, resuscitation must at least achieve essential objectives such as restoring good body volume hydration and adequate diuresis of 50 ml/hour in adults and 2 ml/kg/hour in children up to 25 kg, lifting shock and correcting anemia [37].

Today, all authors are unanimous that the combination of medical treatment and surgical treatment has led to a reduction in the mortality rate with values ranging from 1 to 30% in our developing countries.

This mortality is less than 1% in developed countries.

Dual antibiotic therapy or antibiotic triage has been systematic in our department. It combined either ceftriaxone with metronidazole or ceftriaxone, gentamycin and metronidazole, or ciprofloxacin and metronidazole.

Various techniques for repairing typhic perforations of the small intestine have been described, none of which is unanimous, taking into account several criteria such as the general condition of the patient (according to the WHO score), the degree of contamination of the abdominal cavity, the number of perforations and the condition of the intestinal wall (ischemia, edema, pre-perforative area) [22, 31]. In our department, three techniques are used:

- Suturing excision: this is the most used technique (57-92.5%) in the various series, including ours [6; 35]. It is indicated in the case of simple perforation, diseased in good general condition and in the absence of ischemic lesions.
- Ileostomy was the second most used surgical technique in our series (36.2%). This rate is not statistically significant with those of Sanogo [35]; but statistically higher than what Coulibaly found (2.3%); $P < 0.05$.

It can be explained by the poor general condition of our patients when they are admitted.

- Our anastomosis resection rate (3.9%) is not statistically significant difference with those of the series [6; 35] (Table 6).

Our average postoperative hospitalization was 18.6 days. It is similar to those found in the series [6, 36,26], which range from 12.9 to 20.6 days. The length of postoperative hospitalization is influenced by the patient's general condition before the operation and the complications that may occur postoperatively.

Our postoperative morbidity rate is 51.5%. This rate is similar to that found by Ouédraogo [6] in Ouagadougou, 72.2%, but higher than those found by Coulibaly [36] in Sikasso and Kouamé [4] in Abidjan, which had 28.2% and 25%, respectively. Complications during typhic perforation are multiple and represent 21.6% to 66.3% in the African series [14, 23, 40].

They are dominated by parietal suppurations in our study. These suppurations are due to contamination of the surgical wound by intestinal or peritoneal fluid intraoperatively and by the stoma postoperatively. They could be favoured by the precarious state of our patients on admission or the poor hygiene conditions in the operating theatre and in the hospital wards.

It is the main cause of increased care costs as well as the reason for a long stay of patients in hospital.

Advances in intraoperative resuscitation and the use of antibiotics have improved the prognosis of peritonitis by typhic perforation.

Our overall mortality rate is 29.3%, higher than those of Coulibaly [36] which reported 17.3% at the Sikasso hospital and Ouédraogo found 17.1% at the Ouagadougou University Hospital with $p < 0.05$.

However, our high mortality rate is due to certain factors such as the delay in care, the degree of contamination of the peritoneum and the poor general condition of our patients.

The average cost of the treatment of 95,225 FCFA is similar to those found by Keita 91,505 FCFA.

Conclusion

Peritonitis by typhic perforation in hospitals is common and serious. It mainly affects the young population with a predominance of men. The diagnosis of ileal perforation peritonitis of typhic origin is based on the clinical picture, the appearance of the lesions intraoperatively and the Widal and Felix sero-diagnosis.

The most commonly used surgical technique was suturing excision. It was based on the lesions observed intraoperatively.

The postoperative effects were complicated, especially by wall abscesses.

Improved resuscitation measures and antibiotic use have improved the prognosis of typhoid perforations.

However, morbidity and mortality are still high.

Iconography

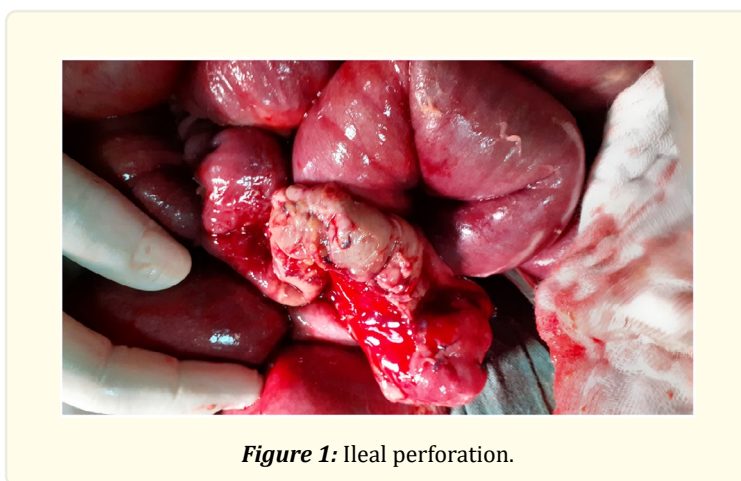


Figure 1: Ileal perforation.

References

1. Fattorusso V/O. Ritter. "Clinical Vademecum". From diagnosis to treatment. 17th Edition Masson.
2. Michel Leporrièr. The small medical encyclopedia Hamburger 19th Edition medicine -sciences Flammarion.
3. World Health Organization. "Typhoid vaccines: WHO policy brief". Weekly Epidemiological Record 93 (2018): 153-72.
4. Kouamé BD., et al. "Diagnostic and therapeutic aspects of typhus perforations of the children's small bowel in Abidjan (Côte d'Ivoire)". Bull Soc Pathol Exot 94 (2001): 379-82.
5. Mouton F, Ohuoba EI and Evans FM. "Enteric typhoid fever (part 1)". Paediatric anaesthesia 338 (2016): 1 - 7.
6. Ouedraogo S, Ouangre E and Zida M. "Epidemiological, clinical and therapeutic profiles of ileal perforations of typhoid origin in rural Burkina Faso". Med. Health Too 27 (2017): 67-70.
7. Contini S. "Typhoid intestinal perforation in developing countries". World J Gastroenterol 23.11 (2017): 1925-1931.
8. Dembélé Boubacar Mamadou. "Study of acute generalized peritonitis in the general and pediatric surgery departments of the Gabriel Touré University Hospital". Thesis Med, Bamako 215 (2005): 113.
9. Dor P., et al. "About 31 cases of typhus perforations (place of temporary ileostomy resection)". J chir 106.4 (1973): 341-352.
10. Kassegne I., et al. "The diagnostic, therapeutic and prognostic aspect of typhic perforations in hail". Tropical Medicine and Health 26 (2016): 71-74.

11. Kenneth A, Martin N and Emmanuel O. "The prevalence, morbidity and mortality patterns of ileal perforation of typhoid origin". *World J Surg* 38 (2014): 2514-2518.
12. Keita Ibrahim Kiffery. "Study of ileal perforations of typhoid origin in the surgery department of the Somine DOLO hospital in Mopti". Thesis Medicine Bamako 178 (2008): 78.
13. Barbier J., et al. "Acute peritonitis". *Encycl. Med. Surg. (Paris, France), Urgences* 24048B-10 (1988): 18.
14. Dieffaga MM. "Peritonitis by typhic perforation in the general and pediatric surgery department of the Gabriel Touré University Hospital". Thesis Medicine, Bamako 176 (2005): 74.
15. Fagniez PL., et al. "Acute peritonitis". *Encycl. Med. Chir., Stomach-Intestine*, 9045A10, 6-1982.
16. Sidibé Y. "Generalized peritonitis in Mali. About 140 cases operated in the hospitals of Bamako and Kati". Thesis Med, Bamako 1 (1996): 106.
17. Lauroy JP. "Interest of the externalized suture of the small intestine in ileal perforations of typhic origin". Thesis Med. Dakar 84 (1984): 152
18. Diarra S. "Peritonitis by ileal perforation in the "B" surgery department of the "G" Point Hospital (from 1978 to 1998)". Med Thesis, Bamako 133 (2000): 93.
19. Seck B. "Contribution to the study of non-tuberculous infectious perforations of small bowel in an African environment in Dakar". Thesis Medicine Dakar 111 24 (1977): 111.
20. Kamina P., et al. "Atlas Dictionary of Anatomy". P - Z Maloine sa. Edition (1983): 1742-1744.
21. Saxe JM. "Contribution to the study of non-tuberculous lower perforations of the small intestine in an African environment in Dakar". Thesis Med., Dakar 97 (1977).
22. Mallick S and JF Klein. "Conduct to be taken in the face of hail perforations of typhoid origin: About a series observed in western Guiana". *Med. Too* 61 (2001): 491- 494.
23. Nguyen VS. "Typhus perforation in the tropics". *A bout 83 cases J. chir* 131.2 (1994): 90-95.
24. Adjadja G. "Contribution to the study of acute generalized peritonitis in children at the University Hospital of Dakar (about 100 cases)". Thesis Medicine Dakar (1980).
25. Karmacharya B and Sharma VR. "Resultats of typhoid perforation management our experience in Bir Hospital, Nepal". *Kathman- du Univ Med, j (KUPJ)* 4.1 (2006): 22-4.
26. Samaké Daouda Seydou. "Study of peritonitis by ileal perforations of typhoid origin in the <<A>> surgery department of the Point G University Hospital". Thesis Medicine Bamako 451 (2008): 111.
27. Hosoglu S., et al. "Risk factors for enteric perforation in patients with typhoid fever". *Am J Epidemiology* 160 (2004): 46-50.
28. KOUAME BD. "Diagnostic, therapeutic and prognostic aspects of typhudic perforations of children's small bowel in Abidjan, Ivory Coast". *Black African Medicine* 47.12 (2000): 509-511.
29. Rahman GA., et al. "Typhoid in Nigeria children: An analysis of 106 operatives cases". *Pediatric Surg Int* (2001): 628-630.
30. Ahmad Hafiz., et al. "Typhoid perforation still a common problem: situation in Pakistan in comparaisn to other countries of low human development". *Journal of the Pakistan medical association Mai* 56.5 (2006): 230-2.
31. Harouna YD. "Typhus perforations: Clinical, therapeutic and prognostic aspects. Prospective studies on 56 cases treated at the national hospital of Niamey (Niger)". *Med. of Black Africa* 47 (2000): 6.
32. Ramachandran CS ., et al. "Laparoscopic surgical management of perforative peritonitis in enteric fever eliminary study". *Surg. Laparosc. Endosc Percutan Tech* (2004): 122-124.
33. Coulibaly CAT. "Study of peritonitis by typhic perforation of the small bowel in the pediatric surgery department of the Gabriel Touré University Hospital". Med thesis: University of Bamako 197 (2011): 112.
34. Sanogo ZZ., et al. "Ileal typhuc perforations: clinical and therapeutic aspects in tropical environments". *Mali Medical XXVIII.3* (2013): 5-9.
35. Coulibaly S. Peritonitis by typhic perforation: diagnostic and therapeutic aspects at the hospital of Sikasso Med Thesis Bamako 183 (2011): 98.

36. Neil KP, Sodha SV and Lukwago L. "A large outbreak of typhoid fever associated with a high rate of intestinal perforation in Kasese District, Uganda, 2008-2009". *Clin Infect Dis* 54 (2012): 1091-1099.
37. Onen A., et al. "Factors effecting morbidity in typhoid intestinal perforation in children". *Pediatr Surg Int* 18 (2002): 696-700.
38. Traoré I. "Ileal perforations of typhic origin in the surgery department A of the University Hospital of Point G". Thesis Med, Bamako 51 (2007): 103.
39. Adino ST., et al. "Typhoid enteric perforation in north western Nigeria". *Nigeria J Med* 13 (2004): 345-9.
40. Malvy D, Djossou F and LE Bras M. "Food- and water-borne infections and toxi-infections: diagnostic guidance and action". *Encyclopedia of Surgical Medicine. Infectious Diseases* 8-003A-82 (2002): 15.

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