

# Complications of typhoid fever in digestive surgery: a descriptive study based on 295 cases in a sub Saharan environment

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## Research article

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# Abstract

**Background:** Typhoid fever is endemic in sub-Saharan Africa. Inadequate management often leads to complications, which are mainly surgical. Surgical complications are fraught with heavy mortality. **Objective:** To describe the surgical and digestive complications of typhoid fever in the Surgical Department of Tenkodogo Regional Hospital in Central-Eastern Burkina Faso. **Methods:** This was a descriptive study performed in the digestive surgery department of Tenkodogo Regional Hospital. It covered the period from January 2014 to December 2018. The records of all patients who were admitted for a surgical complication of typhoid fever were included. **Results:** Two hundred and ninety-five patients were treated for a surgical complication of typhoid fever. There were 184 male patients (62.4%) and 111 female patients. Their average age was 15.7 years. The reported complications were peritonitis by ileal perforation with 212 cases (71.2%), acute cholecystitis with 45 cases (13.8%), primary biliary peritonitis with 23 cases (6.8%) and liver abscess with 15 cases (5.1%). Patients were operated on by laparotomy and laparoscopy under general anaesthesia. The ileal perforations were treated according to 3 surgical procedures: excision-suture of the perforation, resection-anastomosis at the same time and ileostomy with restoration of the digestive continuity after 3 weeks. In cases of acute cholecystitis or biliary peritonitis, a cholecystectomy was proposed. The liver abscesses were drained by laparotomy or by puncture. Antibiotic therapy was associated with surgical treatment. The average length of stay of patients was 9 days. Twenty-eight patients died, which represents 9.5% mortality. **Conclusion:** The surgical complications of typhoid fever are responsible for heavy mortality in digestive surgery.

## Background

Typhoid fever is a systemic and contagious infection caused by *Salmonella typhi*, or more rarely, by *Salmonella paratyphi* A, B, or C [1]. It is currently considered a disease of poverty [2,3]. According to the World Health Organization (WHO), its incidence reaches 21 million cases per year worldwide, and its mortality is approximately 4% [4,5]. The majority of cases occur in South-East Asia and sub-Saharan Africa, where it is still endemic and has a large clinical presence [3,6]. The multiplicity of clinical forms leads to diagnostic errors and delays in management. This situation favours the occurrence of complications [7]. The complications of typhoid fever mainly affect the digestive, neurological, respiratory and urological system [6,8]. Most of these complications require surgical treatment [6,8]. In the tropics, digestive complications are the most frequent and the most lethal [7].

In rural Burkina Faso, the prevalence of typhoid fever is high, and it mainly affects young people [9]. The insufficiency of diagnostic and therapeutic resources in this environment has led us to expect higher morbidity and mortality of digestive complications. The present study aims to describe the clinical aspects of the surgical complications of typhoid fever in the digestive surgery department of a semi-urban hospital in Burkina Faso.

## Methods

The aim of this study was to describe the epidemiological, clinical and therapeutic aspects of the gastrointestinal surgical complications of typhoid fever in Burkina Faso.

This was a descriptive study performed in the digestive surgery department of the regional hospital of Tenkodogo, Burkina Faso. It covered the period from 1 January 2014 to 31 December 2018. This study included records of patients of all ages and sexes who were treated surgically during the study period for a digestive complication of typhoid fever.

A digestive complication of typhoid fever has been defined as pathology of an organ of the digestive system resulting from an unfavourable evolution of typhoid fever and whose main part of the treatment is surgical.

The diagnosis of typhoid fever was made on the basis of suggestive clinical signs including the presence of signs of the first and second septenary in the recent antecedents. The diagnosis was confirmed by a *Salmonella typhi*-positive blood culture and/or a positive Widal-Felix serodiagnosis.

For each patient included, the epidemiological, clinical, therapeutic and evolutionary data were collected on a survey sheet based on clinical records and operating logbooks.

## Results

# EPIDEMIOLOGICAL ASPECTS

In the digestive surgery department of Tenkodogo Regional Hospital, we counted 295 patients operated on for a digestive complication of typhoid fever. There were 184 male patients (62.4%) and 111 female patients (37.3%). The average age of these patients was 15.7 years, which ranged from 2 to 56 years. Two hundred and sixty patients (88.1%) came from rural areas compared with 35 patients (11.9%) who came from urban areas. Seventy-two patients (24.4%) were younger than 10 years. The distribution of patients by age and sex is shown in Figure 1.

# CLINICAL AND THERAPEUTIC ASPECTS

The main reported complications were ileal perforations and typhoid cholecystitis. Table 1 presents all the listed complications.

## Ileal perforations

Two hundred and twelve cases of ileal perforation related to typhoid fever were identified, which represents 71.2% of patients. These patients consulted primarily for diffuse abdominal pain (198 cases, or 93.4%), vomiting (171 cases, or 80.7%) and constipation 152 cases, or 76.7%). The physical examination found an infectious syndrome in 196 cases (92.4%), abdominal defence in 180 cases

(84.9%) and abdominal contracture in 32 cases (15.1%). X-rays of the abdomen noted pneumoperitoneum in 161 cases (76.4%) and hydroaeric levels in 122 cases (57.5%).

All patients were operated on by laparotomy. Preoperatively, ileal perforation was unique in 181 cases (85.7%); multiple perforations were noted in 31 cases (14.3%). Three surgical procedures of treatment were used: excision of the margins of the perforation with suture at the same time, ileal resection with anastomosis at the same time, and temporary ileostomy with restoration of digestive continuity at the end of three weeks. The excision-suture treatment involved 79 patients (37.3%). Resection with immediate anastomosis was performed in 84 patients (39.6%) and temporary ileostomy in 49 patients (23.1%). The surgical treatment was combined with antibiotics (ceftriaxone and metronidazole) for 10 days.

## **Acute typhic cholecystitis**

Forty-five cases of acute typhic cholecystitis were reported. These patients consulted for pain in the right hypochondrium (36 cases, 80%) or in the epigastrium (9 cases, 20%). This pain was associated with vomiting in 26 cases (57.8%). The physical examination found abdominal contracture in the right hypochondrium in all cases. The hemogram noted hyperleukocytosis in 20 cases (44.4%) and leukopenia in 12 cases (26.7%). In 13 cases (28.9%), the leukocyte count was normal. Abdominal ultrasonography showed gallbladder distension in all cases, perivesicular oedema in 27 cases (60%) and vesicular wall thickening in 42 cases (93.3%). The surgical treatment consisted of a cholecystectomy by laparoscopy. Antibiotic therapy with ciprofloxacin was administered for 10 days. The average length of stay was 7 days.

## **Primary biliary peritonitis**

Twenty-three cases of primary biliary peritonitis of typhic origin were reported. These patients consulted for diffuse abdominal pain in 20 cases (87%), vomiting in 18 cases (78.3%) and constipation in 19 cases (82.7%). At admission, the general condition was rated at WHO stage 2 in 6 patients (26.1%), stage 3 in 14 patients (60.9%) and stage 4 in 3 patients (13%). Generalized abdominal contracture was noted in 16 patients (69.6%). The haemograms showed predominantly neutrophilic hyperleukocytosis in 19 cases (82.6%). In the other 4 cases, the leukocyte count was normal. Serum creatinine was noted in 6 patients (26.1%). Radiography of the abdomen noted diffuse abdominal greyness in 23 cases and hydroaeric levels in 18 cases (78.3%). The patients were all operated on by median laparotomy. Intraoperative exploration revealed gallbladder gangrene in 4 cases and perforation of the gallbladder in 19 cases. The treatment consisted of a cholecystectomy and a toilet of the peritoneal cavity associated with drainage. Bi-antibiotic therapy consisting of ceftriaxone and gentamicin, was initiated in 17 patients. In the other 6 patients, only ceftriaxone was used.

# Salmonella liver abscess

Fifteen patients were admitted for Salmonella liver abscesses. These patients were admitted for pain in the right hypochondrium. Vomiting was present in 4 cases (26.7%). The physical examinations noted painful and febrile hepatomegaly in all cases. The blood counts revealed leucocytosis in 11 cases (73.3%). In the other 4 cases, the leukocyte count was normal. Ultrasound showed a single intrahepatic collection in 13 cases (86.7%) and multiple collections in 2 cases (13.3%). The size of the collections ranged between 6 and 12 millimetres. Surgical drainage by laparotomy under general anaesthesia was performed in 12 cases and ultrasound-guided puncture in the other 3 cases. Culture of pus revealed Salmonella typhi in all 30 cases. Surgical treatment was combined with antibiotic therapy with ciprofloxacin for 2 weeks.

## EVOLUTIONARY ASPECTS

There were 28 deaths, with an overall mortality rate of 9.5%. The lethality of primary biliary peritonitis was higher at 46.7%. The distribution of deaths by cause is reported in Table 2.

## Discussion

In 5 years, we found 295 digestive surgical complications of typhoid fever at the Tenkodogo Regional Hospital. Thus, the surgical complications of typhoid fever remain frequent in the rural areas of Burkina Faso, where typhoid fever is endemic [9]. The multiple clinical forms of typhoid fever and the similarity of some of these forms with other diseases, such as malaria, viral hepatitis and viral gastroenteritis, lead to numerous diagnostic errors [10]. It is estimated that approximately 10% of patients who have typhoid fever have a surgical complication in sub-Saharan Africa as a result of inappropriate treatment [11,12].

The patients were relatively young in our study (average age was 15.7 years). The young age of patients with a complication of typhoid fever has been reported in sub-Saharan Africa by many authors [13]. The youth of the patients is explained by their greater exposure to typhoid fever. Indeed, typhoid fever is described as a disease of dirty hands, its transmission being orofaecal (by ingestion of water or food contaminated with Salmonella) [14]. Children, who apply less food hygiene rules, are therefore more exposed than adults.

Complications of typhoid fever appear after 2 to 4 weeks of evolution without adequate treatment [6]. The most reported complications are intestinal perforations, gastrointestinal bleeding, parotitis, genitourinary infections and hepatobiliary infections [6,7,15]. Some complications respond to medical treatment. However, other complications require surgical treatment. Our study was conducted in a digestive surgery department. We did not take into account extra-digestive complications. The reported complications in our study were dominated by ileal perforations (71.2%). Ileal perforation is the most common

complication of typhoid fever in the medical literature [16]. Between 15% and 30% of cases of typhoid fever will progress to ileal perforation [17]. The preponderance of ileal complications is related to the richness of the reticuloendothelial system in the terminal intestine [16]. Indeed, during typhoid fever, *Salmonella typhi* preferentially colonizes the Peyer's patches of the terminal ileum and causes necrosis and perforation.

The hepatobiliary lesions were represented by acute typhic cholecystitis and liver abscesses. Acute typhic cholecystitis accounted for 13.8% of our cases. However, they are considered exceptional in some areas, such as Asia [5,18]. On the other hand, they are regularly reported in endemic areas [19]. Liver abscesses are less frequently reported. This situation could be explained by the fact that the bacteriological aspects of hepatic abscesses are not always established in a tropical environment. Biliary infections are ascending from the germs present in the duodenum. Hepatic abscesses would occur by the migration of digestive germs to the liver from the portal vein.

The mortality rate in our study was 9.5%. The deaths were caused by ileal perforations and biliary peritonitis. Ileal perforations are usually associated with heavy mortality in an African environment. Indeed, mortality reaches 20% in some series [10,11,20]. This mortality rate could be explained by the late consultations by patients and insufficiency in the means of resuscitation. Late consultation causes massive contamination of the peritoneal cavity by septic intestinal contents. This results in massive infection by intestinal germs [10].

Mortality in primary biliary peritonitis is related to the toxic nature of bile when it is discharged into the large peritoneal cavity [21].

## **Conclusion**

Surgical complications of typhoid fever remain frequent in Burkina Faso. They represent a large proportion of hospitalizations for surgery and mainly affect young people. These complications are largely dominated by ileal perforations. Morbidity and mortality remain high. The means of early diagnosis of typhoid fever should be strengthened in medical services, especially in paediatrics.

## **Declarations**

## **Ethics approval and consent to participate**

The study was approved by the Ethics Committee for Health Research of Burkina Faso.

## **Consent to participate**

Consent for participation in the study was not equated. The ethics committee for health research of Burkina Faso does not require consent for similar studies:

# Availability of data and material

The datasets used and/or analysed during the study are available from the corresponding author upon reasonable request.

# Competing interests

The authors declare that they have no competing interests.

# Funding

The authors state that there was no funding for this study.

# Authors' contributions

OS: design of the work, Writing the manuscript

EO: interpretation of data, substantively revised the manuscript

MZ: interpretation of data, have drafted the work

ID: have drafted the work, interpretation of data

BB: have drafted the work

All the authors have approved the submitted version.

# Acknowledgements

Not applicable.

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## Tables

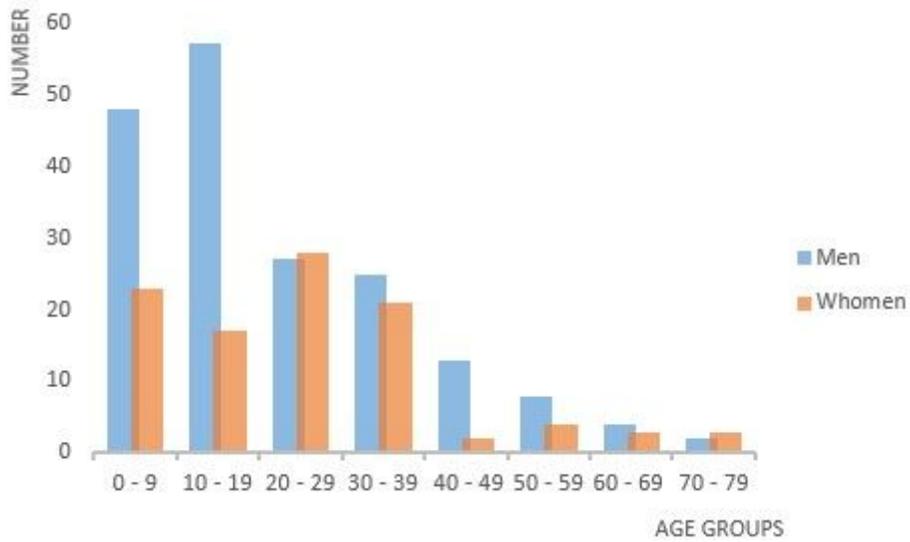
**Table 1:** Distribution of patients according to the complication

Complication	Number	Percentage
Ileal perforation	212	71.2
Acute cholecystitis	45	13.8
Primary biliary peritonitis	23	6.8
Liver abscess	15	5.1
<b>Total</b>	<b>295</b>	<b>100</b>

**Table 2:** Distribution of deceased patients by cause

Cause	Number of deaths	Percentage
Ileal perforation	21	75
Primary biliary peritonitis	07	25
Acute cholecystitis	0	0
Liver abscess	0	0
<b>Total</b>	<b>28</b>	<b>100</b>

## Figures



**Figure 1**

Distribution of patients by age group

## Supplementary Files

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