

Epidemiological, diagnostic, therapeutic, and evolutionary profile of digestive tuberculosis at the CNHU-HKM of Cotonou in 2011–2021

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Introduction: Tuberculosis (TB) remains a public health problem in Africa. This study aimed to describe the epidemiological, diagnostic, and clinical progression profile of digestive tuberculosis (DTB) in adults in Cotonou.

Methods: This retrospective, descriptive, and analytical study included 37 cases of DTB over 11 years (January 2011 to December 2021).

Results: A total of 37 cases of DTB were included, with a female predominance (sex ratio of 0.8) and a mean age of 44 years. The diagnosis was confirmed bacteriologically in five cases (13.5%) and based on presumptive criteria in 32 cases (86.5%). All patients received anti-TB treatment. Over a six-month follow-up, the outcome was favourable without complications in 19 cases (51%). However, there were five cases of hepatotoxicity and three deaths. Factors such as HIV ($p = 0.037$) and undernutrition ($p = 0.005$) were statistically significantly associated with death in univariate analysis.

Conclusion: DTB is uncommon but seems to be a potentially severe condition. Improving the socio-economic status of the population and combating human immunodeficiency virus (HIV) infection could help reduce the incidence of this condition.

Keywords: digestive tuberculosis, immunodeficiency, ascites, treatment, Cotonou

Introduction

TB remains one of the world's most deadly infectious diseases. It is the ninth leading cause of death worldwide and the leading cause of death due to a single infectious agent, ahead of the HIV/acquired immunodeficiency syndrome (AIDS). Every day, almost 4 000 people lose their lives to TB, and almost 28 000 contract this preventable and curable disease.¹ Approximately 10 million people are affected by TB worldwide each year, according to the World Health Organization (WHO), including 5.6 million men, 3.2 million women, and 1.2 million children.^{1,2} A total of 1.4 million people died from the disease, including around 208 000 HIV-positive individuals. The highest number of new cases was recorded in the South-East Asian region, with 44% of new cases, followed by the African region with 25%, and the Western Pacific region with 18%.¹ Two-thirds of cases are concentrated in eight countries, led by India, followed by Indonesia, China, the Philippines, Pakistan, Nigeria, Bangladesh, and South Africa.¹

In Africa, the incidence in 2015 was 2.7 million.² In Benin, 4 092 cases were diagnosed, with a 3% increase from 2014 and a prevalence of 40/100 000 inhabitants.³ Extrapulmonary TB represents a growing percentage of all TB forms, reaching 20–40%, depending on the series. DTB is one of the most common localisations of extrapulmonary TB, ranking third after pleural and lymph node TB and dominated by peritoneal TB. It is characterised by its clinical and radiological polymorphism and its diagnostic difficulties, especially with Crohn's disease and digestive tumours, exposing patients to diagnostic erraticism, particularly in our setting with weak technical platforms.⁴

Ending the TB epidemic by 2030 is one of the health targets set out in the Sustainable Development Goals adopted by the United Nations.¹ This study aimed to investigate the epidemiological, diagnostic, and evolutionary profile of DTB in adults at the Centre National Hospitalier Universitaire-Hubert Koutoukou Maga (CNHU-HKM) of Cotonou from 2011 to 2021.

Patients and methods

This retrospective cohort study included 37 cases of DTB in the hepato-gastroenterology and internal medicine departments over 11 years from 1 January 2011 to 31 December 2021. The patients were hospitalised in these departments for DTB during the study period. Subjects who died on admission before any diagnostic confirmation, subjects discharged against medical advice, and those with incomplete records were excluded from the study. Using hospitalisation registers, patient records were consulted using a data collection form designed and validated for this study.

Diagnostic criteria

The diagnosis was certain if tissue culture was positive for *Mycobacterium tuberculosis*, there was histological evidence of typical acid-fast bacilli, or a polymerase chain reaction (PCR) of TB GeneXpert tested positive. The diagnosis was probable in the presence of parenchymal abnormalities and hilar adenopathies on chest X-ray, peritoneal or mesenteric adenopathies with thickening of the walls on ultrasound, or positive intradermal tuberculin reaction.

Data analysis

Information was entered using the KoboCollect application and organised using Excel 19 and R (The R Foundation for Statistical Computing, Vienna, Austria). Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 25 statistical software. For the analysis of factors associated with death, a univariate analysis was carried out using Fischer's exact test because the number of subjects was less than 5 for some variables. The strength of the association was assessed using odds ratios and their 95% confidence intervals. The chosen threshold of significance was 5%. A multivariate analysis could not be performed because the size of the study population was small (< 50).

The work was carried out in strict compliance with ethical and hierarchical rules. Before starting work, we obtained administrative authorisations from the University Clinics for Hepato-Gastroenterology and Internal Medicine of the CNHU-HKM. Patients' anonymity was preserved.

Results

Socio-demographic characteristics

Females were predominant in the 37 DTB cases ($n = 21$, 56.8%), with a sex ratio of 0.8. The mean age was 44 ± 15.81 years, with extremes of 18 and 78. The modal age range was 34–48 years, representing 48.6% of the study population. Patients were predominantly urban ($n = 25$, 67.6%) versus rural ($n = 12$, 32.4%). Most of these patients were at a very low socio-economic level ($n = 18$, 48.6%) (Table I).

Clinical data

The mean time to diagnosis in our series was 88 ± 49.34 days, with extremes ranging from 16 to 212. Most patients in our series had no personal history of TB ($n = 34$, 91.9%). Only three patients had a personal history of TB (8.1%), including two cases of pulmonary TB and one lymph node TB. Six patients (16.2%) had been infected with TB. Nearly half of the patients were immunocompromised ($n = 18$, 48.6%), dominated by HIV infection (35.1%) (Table II). The clinical features were dominated by asthenia (97.3%), abdominal pain (97.3%), abdominal distension (97.3%), anorexia (94.6%), fever (83.1%), and weight loss (83.1%) (Table III). Extra-digestive clinical manifestations included cough (62.2%), headache (18.9%), dyspnoea (16.2%), and sputum (8%) (Figure 1).

Physical examinations mainly revealed ascites (91.8%) with abdominal tenderness (83.7%) (Table IV). Peritoneal localisation was noted in 89% of cases. The diagnosis was confirmed bacteriologically in five cases (13.5%) and based on presumptive criteria in 32 cases (86.5%).

Paraclinical data

The tuberculin skin test (TST) was used in 18 patients (48.6%), of whom two tested positive (11.1%). GeneXpert testing was used in 26 patients (70.27%), of whom five tested positive (19.23%). Gastric tubing was performed in six patients (16.21%), among

Table I: Socio-demographic characteristics of patients with digestive tuberculosis at the university clinics for hepato-gastroenterology and internal medicine, 2011–2021 ($n = 37$)

	<i>n</i>	%
Sex		
Male	16	43.2
Female	21	56.8
Age (years)		
18	2	5.4
19–33	6	16.2
34–48	18	48.7
49–63	4	10.8
≥ 64	7	18.9
Origin		
Urban	25	67.6
Rural	12	32.4
Income level		
Low income	18	48.7
High income	10	27
Average income	9	24.3
Total	37	100

Table II: Distribution of the different causes of immunosuppression in patients monitored for digestive tuberculosis at the university clinics for hepato-gastroenterology and internal medicine, 2011–2021 ($n = 37$)

	<i>n</i>	%
HIV infection	13	35.1
Malnutrition	2	5.4
Corticosteroid therapy	2	5.4
Diabetes	2	5.4
Chronic renal failure	1	2.7
Cirrhosis	1	2.7
No cause of immunosuppression	19	51.4

HIV – human immunodeficiency virus

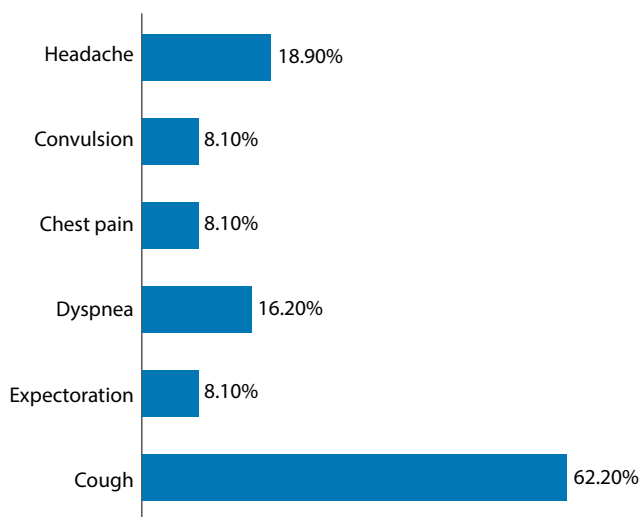


Figure 1: Extra-digestive signs observed in patients with digestive tuberculosis at the university clinics for hepato-gastroenterology and internal medicine, 2011–2021 ($n = 37$)

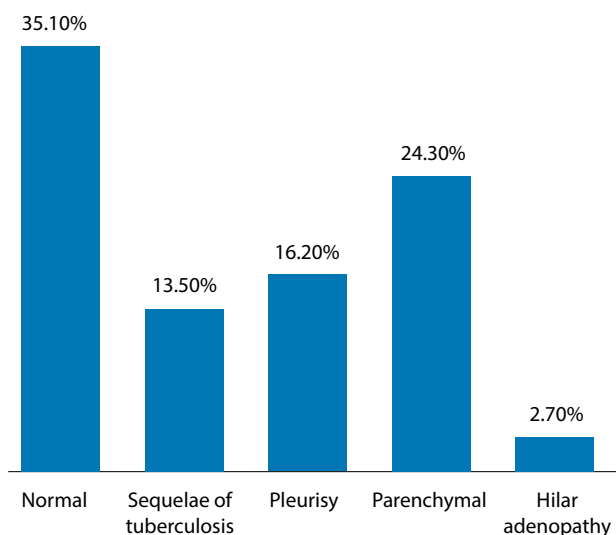


Figure 2: Results of chest X-rays performed ($n = 31$)

whom only one case was positive. Also, the search for acid-fast bacillus in the sputum was carried out in 16 patients (43.24%), with a positive result in three patients. Anaemia was found in most patients (89.2%). Bacteriological analysis was performed in 18 patients (48.64%), and the result was positive for PCR (33.33%), direct examination (6.25%), and culture (5.56%).

On medical imaging, notably chest radiography, parenchymal abnormalities were found in nine patients (24.3%), TB sequelae in five patients (13.5%), pleurisy in six patients (16.2%), and hilar adenopathies in one patient (2.7%) (Figure 2). Abdominal ultrasonography was performed in 30 patients (81%) and revealed free ascites (62.16%), hepatomegaly (54.05%), splenomegaly (43.24%), parietal thickening (10.81%), and mesenteric adenopathy (8.11%) (Figure 3).

Treatment and clinical progression

Anti-TB treatment was started in all our patients per the recommendations of the National TB Programme of Benin. Undesirable effects were observed in 49% of patients. These included digestive disorders (19%), hepatic cytolysis (13.5%),

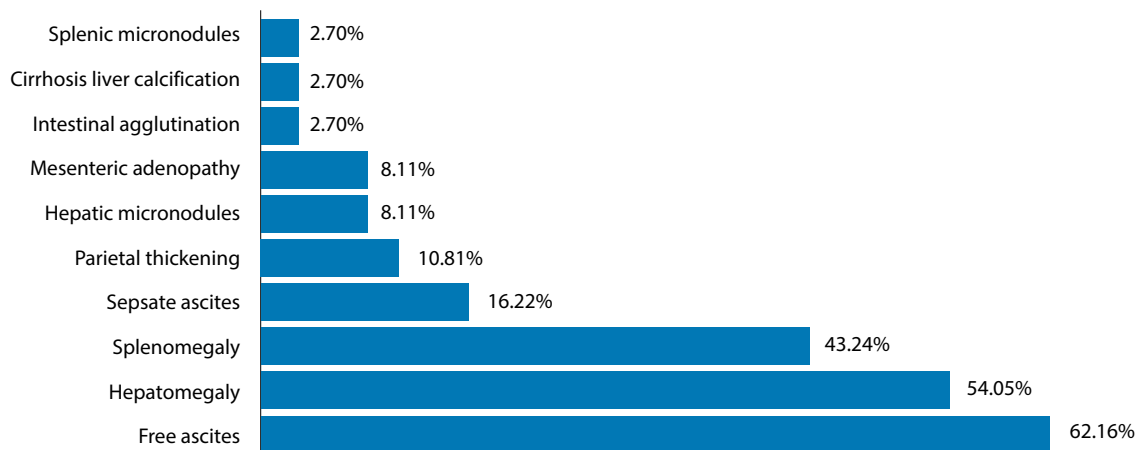


Figure 3: Results of ultrasound examinations from patients monitored for digestive tuberculosis at the university clinics for hepato-gastroenterology and internal medicine, 2011–2021 ($n = 30$)

Table III: Distribution of patients according to clinical features

	<i>n</i>	%
Asthenia	36	97.3
Abdominal pain	36	97.3
Abdominal distension	36	97.3
Anorexia	35	94.6
Fever	33	83.1
Weight loss	33	83.1
Night sweats	14	37.8
Constipation	6	16.2
Vomiting	5	13.5
Diarrhoea	3	8.1
Jaundice	2	37.8

Table IV: Distribution of patients monitored for digestive tuberculosis according to their physical signs obtained at the university clinics for hepato-gastroenterology and internal medicine, 2011–2021 ($n = 37$)

	<i>n</i>	%
Ascites	34	91.8
Abdominal tenderness	31	83.7
Hepatomegaly	29	78.4
Splenomegaly	19	51.3
Pleural fluid effusion syndrome	10	27.0
Abdominal collateral venous circulation	7	18.9
Crackling rales	6	16.2
Adenopathies	5	13.5
Abdominal mass	4	10.8
Defence	3	8.1

vertigo and pruritus (8%), and ringing in the ears and anaemia (2.7%).

After six months, the evolution was favourable and without complications in 19 cases (51%), with five cases of hepatotoxicity, seven cases of digestive disorders, and three deaths. Factors such as HIV ($p = 0.037$) and undernutrition ($p = 0.005$) were statistically

Table V: Univariate analysis of factors associated with death

Characteristics	Prognosis						Observation
	Death		Therapeutic success		Total		
	Number	%	Number	%	Number	%	
Gender							
Female	3	100	18	52.9	21	56.8	21
Male	0	0	16	47.1	16	43.2	16
Total	3	100	34.00	100	37	100	37
p-value (Fisher's exact) = 0.243							
Origin							
Rural	2	66.7	10	29.4	12	32.4	12
Urban	1	33.3	24	70.6	25	67.6	25
Total	3	100	34	100	37	100	37
p_value (Fisher's exact) = 0.241							
Age category							
< = 18	0	0	2	5.9	2	5.4	2
19-33	1	33.3	5	14.7	6	16.2	6
34-48	0	0	18	52.9	18	48.6	18
49-63	1	33.3	3	8.8	4	10.8	4
>64	1	33.3	6	17.6	7	18.9	7
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 0.159							
Profession							
State agent	1	33.3	9	26.5	10	27	10
Craftsman	1	33.3	2	5.9	3	8.1	3
Other	0	0	3	8.8	3	8.1	3
Shopkeeper	1	33.3	6	17.6	7	18.9	7
Housewife	0	0	5	14.7	5	13.5	5
Retired	0	0	4	11.8	4	10.8	4
Pupil/Student	0	0	5	14.7	5	13.5	5
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 0.743							
Income							
Low income	1	33.3	19	55.9	20	54.1	20
Medium income	1	33.3	6	17.6	7	18.9	7
High income	1	33.3	9	26.5	10	27	10
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 0.755							
Delay before consultation							
< = 46	1	33.3	6	17.6	7	18.9	7
47-76	1	33.3	11	32.4	12	32.4	12
77-106	0	0	6	17.6	6	16.2	6
> = 107	1	33.3	11	32.4	12	32.4	12
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 1.000							
Diagnostic circumstances							
Medical consultation	0	0	3	8.8	3	8.1	3
Medical hospitalisation	3	100	31	91.2	34	91.9	34
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 1.000							

Table V: Continued

Characteristics	Prognosis						Observation
	Death		Therapeutic success		Total		
	Number	%	Number	%	Number	%	
HIV							
No	0	0	24	70.6	24	64.9	24
Yes	3	100	10	29.4	13	35.1	13
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 0,037							
Undernutrition							
No	1	33.3	34	100	35	94.6	35
Yes	2	66.7	0	0	2	5.4	2
Total	3	100	34	100	37	100	37
p_value (Fisher's exact) = 0.005							
Anaemia							
No	1	33.3	3	8.8	4	10.8	4
Yes	2	66.7	31	91.2	33	89.2	33
Total	3	100	34	100	37	100	37
p-value (Fisher's exact) = 0.298							
Length of hospital stay (days)							
3-8	1.0	33.3	21.0	61.8	22.0	59.5	22
11-16	0.0	0.0	9.0	26.5	9.0	24.3	9
17-22	1.0	33.3	3.0	8.8	4.0	10.8	4
> = 23	1.0	33.3	1.0	2.9	2.0	5.4	2
Total	3.0	100.0	34.0	100.0	37.0	100.0	37
p-value (Fisher's exact) = 0.101							

significantly associated with death in univariate analysis (Table V).

Discussion

Socio-demographic characteristics

In our study, 21/37 patients were women, giving a sex ratio of 0.8. This result corresponds with studies in Tunisia by Noomeneet al.,⁵ who found 67 women out of 90 cases, giving a sex ratio of 0.34. Similarly, Benjouad found 308 women out of 509 patients, giving a sex ratio of 0.65.⁴ A female predominance of 54.7% was also found in the study by Seidou et al.⁶

In these various studies and our own, women were the most affected. This can be explained by the fact that the peritoneal location of DTB was predominant in our study and that in women, the peritoneum communicates with the outside world via the external genital organs. Moreover, women are more affected by HIV than men in our country. This female predominance consistently reported in studies on DTB contrasts with the epidemiological curiosity of male excess in notified TB cases in most reports, including in Benin.

Our study's average age was 44 ± 15.81 years (range 18–78). This is similar to studies by Noomene et al.⁵ in Tunisia, who found an average age of 44.13 years (range 16–79). Although all ages were

represented, we might conclude that young adults were the most affected by DTB, as reported for all TB cases, irrespective of the localisations.

In our study, DTB mainly affected low-income socio-professional groups (48.6%). Also, Benjouad obtained a 74.45% low socio-economic level in his thesis in Morocco.⁴ The stress to which the population is subjected due to the precariousness of their living conditions and the difficulties in accessing healthcare are all reasons that could justify these results. It should be noted that most data analyses have confirmed a positive association between poverty indicators and TB in various contexts.⁷ Our study is in line with this literature.

Clinical data

In our study, 3/37 patients (8%) had a personal or family history of TB. In the series by Benjouad, around 4.32% of patients had a personal history of TB, and 16.3% had a TB infection, similar to our results.⁴ In India, Chaudhary et al.⁸ found 8.46% with a personal history of TB in their study. In Pakistan, Saaq et al.⁹ found that 9.87% had a personal history of TB in 2012. These figures are similar to ours.

Immunocompromised patients comprised 48.6% of our study population. Hu et al.¹⁰ in Taiwan found similar results, with 58%

immunocompromised. Also, Benjouad reported 13 cases of HIV in his study.⁴

Clinical signs were variable and unspecific, including general signs such as fever and an altered general condition, and organ signs such as abdominal pain, abdominal distension, intestinal transit disorders, vomiting, rectal syndrome, subocclusive syndrome, and secondary amenorrhoea. The most frequent signs are weight loss and fever, found in 70% of cases in the literature, and abdominal pain.¹¹

In our study, approximately 97.3% of patients had a general deterioration in their condition, and approximately 83.8% had a fever. Abdominal pain was present in 97.3% of cases and transit disorders in 24.33%. In 2012, Chalya et al.¹² reported that the most frequent signs were abdominal pain (90%), weight loss (65–75%), fever (35–50%), and diarrhoea (25–50%) in Monastir. The frequency of clinical signs in patients with DTB in other series is similar to our own.

In our study, ascites were noted in 92% of cases, of which 61.8% were of moderate abundance. Peritoneal TB was diagnosed in 89% of patients. The study by Touré et al.¹³ at Conakry University Hospital from 2000 to 2005 found 660 cases of DTB out of 2 580 cases of TB (i.e. a frequency of 2.9%, 96.9% of which were peritoneal). Peritoneal TB was noted in 61% of cases, followed by intestinal TB (22.2%), abdominal lymph node TB (4.4%), gallbladder's TB (2.2%) and peritoneo-hepatic TB (10%) in the study by Noomene et al.⁵ Peritoneal localisation was the most frequent. According to Shinga et al.¹⁴ at the CHU de Fann in Senegal, the intestinal form accounts for 3–5% of all visceral localisations in 2019, which is in line with our study, where the intestinal localisation was 5.4%.

Paraclinical data

Diagnosing DTB is challenging based on clinical findings alone, especially when DTB is isolated. In such cases, paraclinical investigations are essential. The diagnosis was probable in 86.5% of cases, based on presumptive factors, such as lymphocytic ascites rich in protides associated with a positive TST and a favourable course of treatment.

A definite diagnosis was made in 13.5% of cases. That can be explained by the patients' difficulties in complying with paraclinical examinations.

Treatment and outcome

All patients (100%) in our series received first-line anti-TB treatment, with one side effect in 49% of patients. These included digestive disorders (19%), hepatic cytolysis (13.5%), vertigo and pruritus (8%), and ringing in the ears and anaemia (2.7%). In Turkey, Akgun showed that an anti-bacillary treatment established in 509 patients, according to the anti-TB programme over a six-month follow-up, had a favourable and complication-free evolution in 474 cases (93.1%).¹⁵ Seven patients developed hepatotoxicity, and six cases presented a skin reaction.¹⁵

Progression under treatment is generally favourable. Relapses are possible, especially if treatment is stopped early. Late complications are mainly observed when diagnosis and treatment are delayed. They are dominated by fibrosis and peritoneal adhesions responsible for ureteral stenosis, intestinal obstruction, and ectopic pregnancy and infertility in women. Death in DTB is generally secondary to delayed diagnosis, leading to dissemination of the TB disease.⁴ In the absence of underlying disease, the mortality rate is less than 10%. In the case of underlying pathology, mortality is much higher.¹⁶

Of the hospitalised patients, 8% died. This mortality rate is higher than in Benjouad, Abdallah et al.,¹⁷ and Chaudhary et al.,⁸ where the mortality rates were 1%, 1.1%, and 1.2%, respectively.⁴ This difference could be explained by the delay in diagnosis and therapeutic management in our series. In our study, factors such as HIV ($p = 0.037$) and undernutrition ($p = 0.005$) were statistically significantly associated with death in univariate analysis.

Conclusion

This study showed that DTB affects young adults, usually women. Nearly half of the patients had at least one immunosuppressive factor (mainly HIV infection). Peritoneal involvement was predominant. The short six-month regimen mostly resulted in treatment success. HIV and undernutrition were associated with death in this study. A larger prospective study would provide a better understanding of prognostic factors. Improving the socio-economic status of populations and combating HIV infection could help reduce the incidence of this condition.

Conflict of interest

The authors declare no conflict of interest.

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Ethical approval


Before study commencement, approval was obtained from the director of CNHU-HKM by a service note whose references (N°1211/MS/CNHU-HKM/DAF/SRH/DRFDS) authorised the study and data collection.

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