

Jaccr Infectiology

ISSN 2712-6412

<https://infectiology.jaccrafrica.com>

Volume 7, Numéro 4 (Octobre, Novembre, Décembre 2025)



Jaccr Infectiology ISSN 2712-6412 est une revue de Jaccr Africa qui est spécialisée dans les Maladies Infectieuses Tropicales en Afrique.

La revue est trimestrielle en parution en ligne. Le délai entre la soumission et la décision finale (Acceptation ou Rejet) est de 04 semaines en moyenne. Cependant un article accepté est publié en ligne en moyenne dans les deux semaines suivant l'acceptation.

Les maladies infectieuses notamment le Paludisme, le VIH Sida, la Tuberculose, Ebola et récemment Coronavirus, constituent un problème majeur de santé publique en Afrique à travers la mortalité et l'impact sur le développement socio-sanitaire dont sont responsables ces maladies.

Selon l'OMS, on estime à plus de 200 millions le nombre de cas de Paludisme dans le monde, avec plus 400. 000 décès. Environ 90 % des décès imputables à cette maladie transmise par des moustiques se produisent sur le continent notamment en Afrique sub-saharienne, tandis que le reste de la mortalité se répartit entre l'Asie du sud-est , l'Amérique du sud, le Pacifique occidental et la Méditerranée orientale.

Jaccr Infectiology voudrait à travers ses publications contribuer à la lutte contre ces maladies dont outre les épidémies, leurs mutations, les nouvelles voies de contamination et la problématique autour des médicaments anti-infectieux sont autant de défis exigeant une formation continue des professionnels de santé fondamentalistes, cliniciens généralistes et spécialistes de tous bords du fait du caractère transversal de ces pathologies pouvant intéresser plusieurs organes.

Vous pouvez soumettre vos manuscrits en Français et en Anglais.

Articles publiés dans ce numéro

(Trouvez après cette liste l'intégralité de chaque article)

Histoplasmosis in immunocompetent subjects: report of 2 cases of *Histoplasma duboisii* infection in Bouaké (Ivory Coast)

IH Dje Bi, L Yéo, Y Kpi, R Dembélé, Y Toh Bi, O Keita, N Soumahoro, I Gué, HV Achi

***Helicobacter pylori* gastritis: epidemiological and diagnostic aspects at the Niamey General Referral Hospital**

AB Abani Bako, HZ El-Hadji Lamine, B Efared, GA Opita, H Salifou Boureima, I Boubacar, EO Adehossi, H Nouhou

Carina perforation secondary to endobronchial tuberculosis: about a case

A Coulibaly, ML Ali Moussa, A Ouédraogo, S Maïga, YI Traoré, L Tagne Mekowa, G Sawadogo, K Boncounou, G Badoum, M Ouédraogo

Incidence and microbiological profile of healthcare-associated infections (HAIs) in intensive care in Niger: a multicentre cross-sectional study of 32 collected cases

S Amadou Hamadou, Y Tahirou, M Nanzir Sanoussi, B Marou, H Daddy, M Gagara, Y-Z Alfred Dogbe, H Maman Lawan, M Niandou, MS Zakari Ado, MS Chaibou, S Mamadou

Evaluation de la consommation des antibiotiques au Service des Maladies Infectieuses et Tropicales (SMIT) du CHNU de Fann

M Thiam, D Thioub, A Bangoura, A Faye, A Lakh, M Sene, M Seydi

**Clinical case**

**Histoplasmosis in immunocompetent subjects: report of 2 cases
of *Histoplasma duboisii* infection in Bouaké (Ivory Coast)**

Histoplasmose médiastino-pulmonaire chez des sujets immunocompétents : à propos de 2 cas
d'infection à *Histoplasma duboisii* à Bouaké (Côte d'Ivoire)

IH Dje Bi^{*1}, L Yéo¹, Y Kpi¹, R Dembélé¹, Y Toh Bi¹, O Keita¹, N Soumahoro¹, I Gué², HV Achi¹

Résumé

Les auteurs rapportent deux cas de pneumopathie à *Histoplasma duboisii* chez deux patients immunocompétents. La fréquence sous-estimée de cette maladie et la non spécificité des signes radio-cliniques respiratoires font que les praticiens y pensent peu. Les diagnostics étaient tardifs car l'affection était prise pour d'autres affections plus fréquentes comme la tuberculose ou les pneumopathies bactériennes trainantes. Les praticiens devraient y penser lorsque les examens pour rechercher la tuberculose ne sont pas positifs et devant l'absence d'amélioration clinique et radiologique malgré des traitements antibiotiques ou antituberculeux instaurés en première intention. L'exploration des lésions cutanées souvent associés notamment les ganglions, facilitait le diagnostic.
Mots-clés : *Histoplasma duboisii*, Pneumopathie, Diagnostic différentiel, Patients immunocompétent.

Abstract

The authors report two cases of *Histoplasma duboisii* pneumonia in two immunocompetent patients. The underestimated frequency of this disease and the nonspecificity of its radioclinical respiratory signs mean that clinicians rarely consider it. Diagnoses were often delayed because the condition was mistaken for other, more common illnesses such as tuberculosis or persistent bacterial pneumonia. Clinicians should consider this diagnosis when tests for tuberculosis are negative and in the absence of clinical and radiological improvement despite first-line antibiotic or antituberculosis treatment. Examination of often associated skin lesions, particularly lymph node involvement, facilitates diagnosis.

Keywords: *Histoplasma duboisii*, Pneumonia, Differential diagnosis, Immunocompetent patients.

Introduction

Histoplasmosis is a deep fungal infection caused by dimorphic fungi. There are two types of histoplasmosis: Histoplasmosis caused by *Histoplasma capsulatum* var. *capsulatum* is the most common and serious form. It is endemic in Central America, South America, Asia, Oceania, and sub-Saharan and sub-Saharan Africa (1-3). This form is responsible for pneumonia and disseminated infection in immunocompromised individuals, especially those immunocompromised by Human Immunodeficiency Virus (HIV) (1,2,4). The histoplasmosis caused by *Histoplasma capsulatum* var. *duboisii*, which is of interest to us in this study, is the rare form found only on the African continent and most frequently in West Africa, where our country, Côte d'Ivoire, is located (2,5-7). The natural habitat of this species appears to be poorly understood. The main route of transmission for this form seems to be airborne; however, transcutaneous transmission has also been described (2,3). The inhaled spore takes the form of a large yeast, 8 µm to 15 µm long, which multiplies within the cell. *Histoplasma capsulatum* var. *duboisii* disseminates via the lymphatic system and causes lesions often localized to cutaneous tissues (ulcerations, nodules, papules, cold abscesses), lymph nodes (adenitis), or osteoarticular tissues (1,8). Mediastinal-pulmonary involvement and disseminated forms are rare (1,3,5). These pulmonary infections can be acute or chronic. Clinical and radiological manifestations are nonspecific and polymorphic, especially in our setting where other pulmonary infections caused by tubercle bacilli and other bacteria are predominant, making diagnosis less straightforward (3,4,8). A definitive diagnosis can be obtained by direct examination after staining with MGG or by examining fresh samples (pus, serous fluid, bronchial secretions, BAL, biopsy) or lymph node appositions, which reveals 10-15 µm double-walled yeasts with an hourglass-shaped outline (thin base of budding) or a "giant cell" granuloma with plasmodia containing large, rounded or oval yeasts in an intrahistiocytic position on

histology (1,2,9-11). Medical treatment is based on antifungals, including amphotericin B, ketoconazole, imidazole derivatives, and itraconazole (1,2,9,12). The prognosis of pulmonary histoplasmosis depends on the quality and promptness of management. (13). The authors report in this article two cases of pulmonary histoplasmosis caused by *Histoplasma capsulatum* var. *duboisii*, seen in the pulmonology department of Bouaké (Côte d'Ivoire). The objective of this work was to demonstrate the possibility of severe cases of *Histoplasma duboisii* pneumonia in immunocompetent individuals and to encourage clinicians to consider this possibility in cases of acute or chronic diffuse pneumonia.

Clinical cases

Case n°1

Ms. SM, a 48-year-old fishmonger and former farmer, lives in Béoumi, a city in central Côte d'Ivoire. She consulted a doctor for a chronic cough and a general decline in health. Her medical history revealed that her symptoms had been evolving for over 36 months, beginning with a dry cough that started at a random time and without any apparent trigger. This cough had become productive, bringing up mucopurulent, non-foul-smelling sputum, without hemoptysis. One month after the onset of the illness, she developed moderate right-sided chest pain, exacerbated by the cough. These symptoms occurred in the context of intermittent, unquantified fever, asthenia, anorexia, progressive weight loss of approximately 4 kilograms, and amenorrhea (absence of pregnancy). Given these symptoms, chest X-rays performed at health centers and the Abobo tuberculosis center reportedly revealed infiltrates and cavities throughout the right lung, and GenXpert sputum analysis did not detect *Mycobacterium tuberculosis* complex. The patient was treated for clinically diagnosed pulmonary tuberculosis with antituberculosis drugs (3 tablets of the combination Rifampicin (R), Isoniazid (H), Pyrazinamide (Z), and Ethambutol (E), which the

patient took every morning). Despite good adherence to this treatment, the patient's condition worsened, with persistent cough and the development of left supraclavicular and axillary lymphadenopathy. The patient had no known prior medical history. She had made several trips to Mali a few months before her illness (outside of Côte d'Ivoire) and had never visited bat caves. Her surgical and family history were also unremarkable. Physical examination revealed a weight of 47 kg with malnutrition (body mass index (BMI): 14.88 kg/m²). Her WHO performance status was 2. She presented with umbilicated papules scattered over her body and a fluctuating, slightly painful, inflamed left supraclavicular lymph node, aspiration of which yielded frank, non-fetid pus (Figure 1). Pleuropulmonary examination revealed crackles on the left and collapse of the right hemithorax. Examination of the cardiovascular, digestive, and

obstetric/gynecological systems was normal. A chest CT scan revealed right lung parenchymal destruction with mediastinitis and compensatory hyperinflation of the left lung (Figure 2). Sputum examinations (sputum culture and sensitivity testing, GeneXpert) were again negative, and mycological examination of lymph node pus and urine revealed large, figure-eight-shaped yeasts suggestive of *Histoplasma capsulatum*. Elsewhere, HIV serology was negative, fasting blood glucose was 0.97 g/L, and C-reactive protein (CRP) was 96 mg/L. Microcytic anemia was noted (hemoglobin 9.8 g/dL), and transaminase levels were normal. The patient was treated with itraconazole 200 mg orally, initially three times daily for three days, then twice daily for four months. Clinical progress was marked by the regression of symptoms and good tolerance of the treatment.



Figure 1 : Frank pus from the axillary lymph node puncture, microbiological examination of which revealed *Histoplasma capsulatum* var *duboisii*.

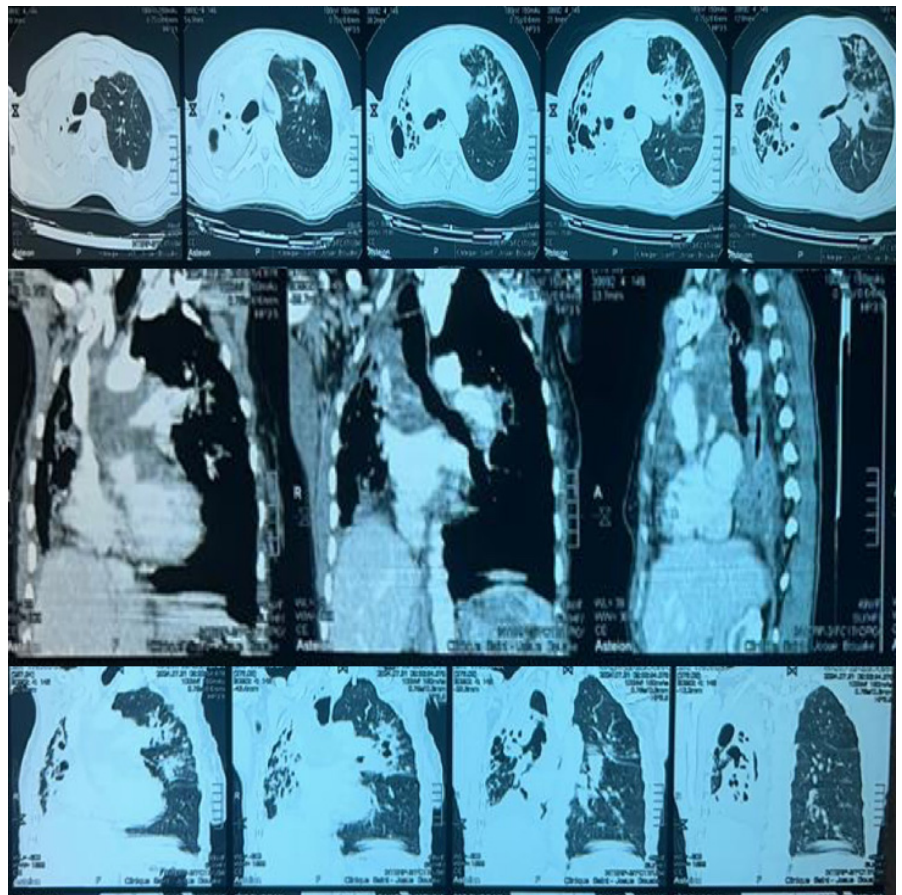


Figure 2: Thoracic CT scan of patient SM (case 1) showing right parenchymal destruction with mediastinitis and compensatory hyperinflation of the left lung.

Case n°2

Two months after case 1, we hospitalized Mr. KS, aged 23, a job seeker residing in Soubré, for a deterioration of his general condition associated with a chronic dry cough.

The illness had been progressing for approximately 16 months, characterized by evening and nighttime fever without chills, asthenia, anorexia, and progressive, unquantified weight loss. Despite antimalarial and antibiotic treatments, the disease progressed, marked by the appearance of pustules initially located on the anterior chest and subsequently spreading to the entire upper body (face, chest, scalp, and fingers). Approximately seven months after the onset of the illness, despite several treatments, a dry cough, significant weight loss, hypoesthesia, and motor weakness in the lower limbs developed. The patient had no known medical history. He had never traveled outside of Côte d'Ivoire and had never visited bat caves. His surgical and family history was also unremarkable. The physical examination revealed

A BMI of 16.26 kg/m², a temperature ranging from 37.9 to 38.8°C, and a WHO performance status of 4. The pleuropulmonary examination revealed pulmonary hypoventilation in the right hemithorax. Cutaneous and mucosal examination showed disseminated umbilicated papules throughout the body and a fluctuating mass approximately 6 centimeters in diameter in the right lateral cervical region (Figure 3). Elsewhere, the examination revealed a fluctuating dorsal gibbosity, the exploratory aspiration of which yielded frank pus, and evidence of slow spinal cord compression with a lesion level at T4. The chest X-ray showed atelectasis of the right lung associated with a well-defined, homogeneous mediastinal opacity suggestive of mediastinal lymphadenopathy (Figure 4). The thoracolumbar CT scan showed lysis involving the vertebrae with bone sequestra and epiduritis, and an amputation along the spinal cord at T2-T8 and L2-L5. Serum protein electrophoresis and urine protein testing were normal. GeneXpert testing of pus collected from the gibbosity did not detect *Mycobacterium tuberculosis* complex.

Mycological examination of the pus revealed large, figure-eight-shaped yeasts on direct examination, and culture isolated *Histoplasma capsulatum* variant *duboisii*. The remaining workup revealed a negative HIV serology, a CRP of 93 mg/L, an ALT of 25 IU/L, and an AST of 115 (approximately twice the normal value). Blood glucose, serum electrolytes, urea, and creatinine levels were normal. Apart from microcytic anemia (hemoglobin 9 g/dL), the blood count appeared normal. On the 5th day of hospitalization, the patient experienced sudden respiratory distress with a pulse oximetry saturation of 57%, which led to the patient's death before the start of antifungal treatment.



Figure 3: (case 2) noted the presence of umbilicated papules disseminated throughout the body and a fluctuating mass in the right laterocervical region.

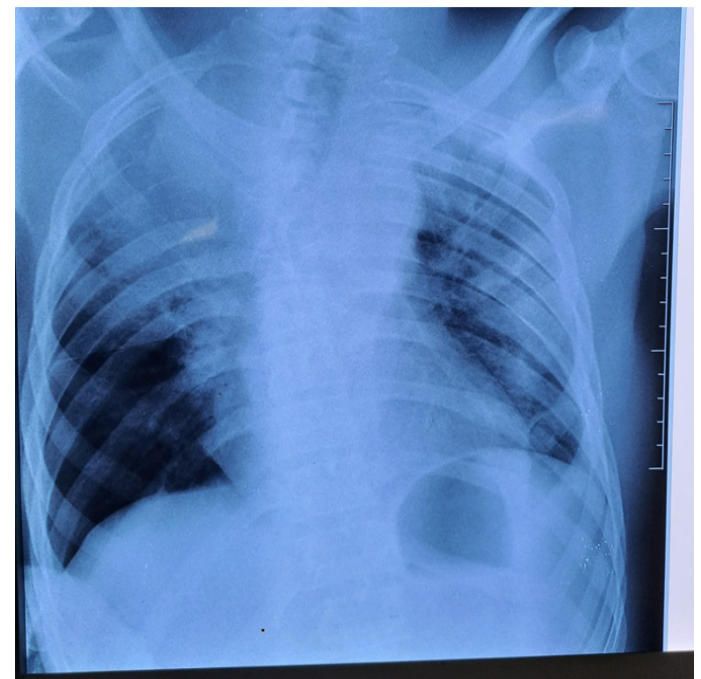


Figure 4 : (case 2) the chest X-ray showed atelectasis of the right lung associated with a homogeneous mediastinal opacity with well-defined external contours suggesting mediastinal lymphadenopathy.

Discussion

Histoplasmosis is a deep fungal infection caused by *Histoplasma capsulatum* of which there are two varieties: *capsulatum* and *duboisii*. *Histoplasma capsulatum* var. *duboisii* is called African histoplasmosis because it was found only on the African continent, particularly in sub-Saharan Africa where it appeared to be predominant in West Africa (1,2,5) . According to Oladele et al., this disease seemed to be neglected, and the reported prevalences did not reflect its true extent. According to their study, there was an increase in the number of reported cases in Côte d'Ivoire and Mali (5) . The patient presented in our first case was a trader who traveled frequently to these two countries. In Côte d'Ivoire, the first case of histoplasmosis was described about half a century ago; subsequently, other isolated cases were observed (6-8,14) . Despite its endemicity, the true incidence of this disease is unknown. A study that examined autopsies performed on HIV patients who died in Ivory Coast in 1998 found only 1.42% of cases of histoplasmosis (15)

Regarding pathogenesis, *Histoplasma capsulatum* var. *duboisii* is responsible for lesions often localized to cutaneous, lymph node, or osteoarticular tissues (8) . Unlike the *capsulatum* variety, its pathogenicity appears to be less linked to the presence of immunosuppression, particularly HIV infection. (2, 16, 17) . The two patients we observed were not infected with HIV and had no prior medical history. Authors had also described cases of histoplasmosis caused by *Histoplasma duboisii* in immunocompetent individuals.

Mediastinal-pulmonary involvement and disseminated forms are rare, especially in immunocompetent individuals. African authors have described a few rare cases of visceral involvement (14, 16-18) . Respiratory manifestations are polymorphic and nonspecific. In the two patients we presented, the symptoms developed gradually, with an insidious deterioration of the patients' general condition and a chronic cough that could be productive or dry.

Radiological examinations revealed images of infiltrates, cavitation, and pulmonary destruction in the first case, and mediastinal-hilar lymphadenopathy associated with atelectasis in the second patient. These clinical and radiological manifestations are also observed in other pulmonary diseases, including tuberculosis and sarcoidosis (4, 8) . The high frequency of tuberculosis makes it the first diagnostic hypothesis considered and often retained in cases of chronic respiratory illness involving chronic cough, persistent fever, and general malaise, even when diagnostic tests appear inconclusive. In the literature, cases similar to mediastinal-pulmonary sarcoidosis have been described (19) . In our cases, respiratory abnormalities were associated with bone lesions in the first patient (bone lysis affecting the vertebrae with bone sequestra and epiduritis) and skin lesions in both patients (disseminated umbilicated papules over the entire body and fluctuating lymphadenopathy). These skin and bone lesions were frequently observed in African studies and seemed suggestive of histoplasmosis caused by *Histoplasma duboisii* (20, 21) . They may precede or occur after the respiratory manifestations. Their presence could help clinicians in the etiological investigation, but they were also nonspecific, especially in a context where several infectious diseases are prevalent. The diagnostic difficulties of mediastinal-pulmonary histoplasmosis are multifaceted. In addition to the clinical and radiological resemblance to other, more common conditions, the diagnostic tools available in our setting are not used routinely. Diagnostic certainty could be achieved by direct examination after staining with MGG or fresh samples (sputum, pus, serous fluid, bronchial secretions, BAL, biopsy) or lymph node appositions (1,2,9,10) . Examination of lymph node pus and urine allowed for diagnosis in both cases. Mycological examinations of sputum or bronchial secretions are not always prescribed due to the neglect of mycological pathologies in favor of bacterial infections, which are more frequent. There was also insufficient technical capacity in most health centers in the country, outside of regional or university

hospitals. Medical treatment is based on antifungals, including amphotericin B, ketoconazole, imidazole derivatives, and itraconazole. The prognosis usually seems good for isolated cutaneous or lymph node involvement, but pulmonary involvement can lead to debilitating sequelae such as restrictive respiratory failure. (2,12,13) . Delayed treatment could cause patient death. According to some authors, “factors associated with death during histoplasmosis due to *Histoplasma* var. *duboisii* were a Performance Status ≥ 3 , altered mental status, dyspnea, a CRP concentration ≥ 75 mg/L, a hemoglobin level < 9 g/dL and/or a platelet count $< 100,000$ / mL , and an interstitial infiltrate on chest X-ray” (13) . Most of these factors were observed in our second patient who died. Other diseases such as pulmonary histoplasmosis should be considered when respiratory symptoms are present, or when suggestive skin or lymph node lesions are present, and if tests for tuberculosis are negative in our setting. Although the prevalence of this disease is low or unknown, Côte d’Ivoire remains an endemic area for this disease, where cases can be observed in different localities. By thinking about it early, we could improve the prognosis of this disease.

Conclusion

The underestimated frequency of *Histoplasma duboisii* pneumonia and the nonspecificity of its radioclinical respiratory signs mean that clinicians rarely consider it. Clinicians should consider it when tests for tuberculosis are negative and in the absence of clinical and radiological improvement despite the initiation of antibiotic or antituberculosis treatment.

*Correspondence :

DJE BI Irié Hospice

ihospice@yahoo.fr

Available online : November 21, 2025

- 1 : University Hospital of Bouaké , Department of Pulmonology
- 2 : University Hospital of Bouaké, Dermatology Department

© Journal of african clinical cases and reviews 2025

Conflict of interest : None

References

- [1] Drouhet E. Les histoplasmoses, mycoses d’importation en 1986. Rôle du SIDA. Bull Soc Fr Mycol Méd. 1987;16(1):29-39.
- [2] Maslin J, Morand J-J, Menard G, Claude V. Histoplasmoses. Med Trop. 2002;62:589-93.
- [3] Bastin R, Charmot G, Frottier, Vildé J-L. Maladies infectieuses et parasitaires. Pathologie médicale. 2e éd. Paris: Flammarion Médecine; p.201-2.
- [4] Bourée P. Tuberculose, histoplasmoses et VIH. Méd Santé Trop. 2013;23(1):18-9.
- [5] Oladele RO, Ayanlowo OO, Richardson MD, Denning DW. Histoplasmosis in Africa: An emerging or a neglected disease? PLoS Negl Trop Dis. 2018;12(1):e6046.
- [6] Sanni RB, Denoulet C, Coulibaly B, Nandiolo R, Kassi E, Honde M, et al. À propos d’un cas ivoirien d’histoplasmoses osseuse et cutanée à *Histoplasma capsulatum* var. *duboisii*. Bull Soc Pathol Exot. 1998;91:151-3.
- [7] Koffi N, Boka M, Anzouan-Kacou JB, Akadanguy E. L’histoplasmoses africaine à localisation ganglionnaire. Bull Soc Pathol Exot. 1997;90(3):182-3.
- [8] Drouhet E. Les aspects cliniques de l’histoplasmoses africaine. Ann Soc Belge Méd Trop. 1972;52:391-406.
- [9] Anaissie EJ. Focus on Fungal Infections: An Update on Diagnosis and Treatment: Scientific Symposium [Internet]. Chicago: University of

- Chicago Press; 1992 [cité 2 sept 2024]. Disponible sur: <https://pascal-francis.inist.fr/vibad/index.php?action=getRecordDetail&idt=4596937>
- [10] Hage CA, Azar MM, Bahr N, Loyd J, Wheat LJ. Histoplasmosis: Up-to-Date Evidence-Based Approach to Diagnosis and Management. *Semin Respir Crit Care Med*. 2015;36(5):729-45.
- [11] Simão Ferreira M, Borges AS. Histoplasmose. *Rev Soc Bras Med Trop*. 2009;42(2):192-8.
- [12] Marchon B, Meurisse JJ, Auvergnat JC, Armengaud M. Itraconazole et histoplasmose ganglionnaire africaine chez un sujet non immunodéprimé. *Méd Infect*. 1992;22:234-5.
- [13] Françoise U, Nacher M, Bourne-Watrin M, Epelboin L, Thorey C, Demar M, et al. Développement d'un score pronostique de la mortalité de l'histoplasmose associée au VIH. *Méd Mal Infect Form*. 2023;2(2):120-1.
- [14] Monu A. Neuf cas d'histoplasmose diagnostiqués au CHU d'Abidjan. Thèse Méd. Abidjan; 1976.
- [15] Ndhatz M, Domoua K, Coulibaly G. Pathologie pulmonaire et infection rétrovirale. Étude nécropsique à propos de 70 cas à Abidjan. *Rev Pneum Clin*. 1993;49:211-21.
- [16] Zida A, Niamba P, Barro-Traoré F, Korsaga-Somé N, Tapsoba P, Briegel J, et al. Disseminated histoplasmosis caused by *Histoplasma capsulatum* var. *duboisii* in a non-HIV patient in Burkina Faso: Case report. *J Mycol Méd*. 2015;25(2):159-62.
- [17] Troh E, Doukoure B, Diomande M, Kouacou-Lohoues MJ, N'Dah KJ, Abouna AD. Histoplasmose surrénalienne chez un sujet immunocompétent: à propos d'une observation à Abidjan (Côte d'Ivoire). *J Mycol Méd*. 2010;20(2):124-7.
- [18] Ehui E, Koffi E, Doukouré B, Tanon A, Kouakou K, Eholié S, et al. Histoplasmose intestinale à *Histoplasma duboisii* chez un patient infecté par le VIH-1 à Abidjan, Côte d'Ivoire. *Méd Mal Infect*. 2009;39:64.
- [19] Wesseliuss HM, Lieveld A, van Dijk K, Hekker TAM, Peters EJG. Histoplasmosis in a patient with sarcoidosis. *Ned Tijdschr Geneeskd*. 2022;166:6335.
- [20] Carme B, Hayette MP, Ngaporo AI, Ngolet A, Darozzin F, Moyikoua A. Histoplasmose africaine à *Histoplasma duboisii* (*H. capsulatum* var. *duboisii*): quatorze cas congolais observés en 10 ans (1981-1990). *J Mycol Méd*. 1993;3:67-73.
- [21] Histoplasmose au Mali : à propos de 22 cas. Thèse de doctorat d'État en médecine n°42. École nationale de Médecine et de Pharmacie; 1985.

To cite this article

IH Dje Bi, L Yéo, Y Kpi, R Dembélé, Y Toh Bi, O Keita et al. Histoplasmosis in immunocompetent subjects: report of 2 cases of *Histoplasma duboisii* infection in Bouaké (Ivory Coast). *Jaccr Infectiology* 2025; 7(4): 1-7

<https://doi.org/10.70065/2574.jaccrInfect.001L012111>

**Original article**

***Helicobacter pylori* gastritis: epidemiological and diagnostic aspects
at the Niamey General Referral Hospital**

Gastrites à *Helicobacter pylori* : aspects épidémiologiques et diagnostiques
à l'hôpital général de référence de Niamey

AB Abani Bako^{*1,2}, HZ El-Hadji Lamine³, B Efared^{1,4}, GA Opita¹, H Salifou Boureima²,
I Boubacar⁴, EO Adehossi⁵, H Nouhou¹

Résumé

Introduction : L'infection à *Helicobacter pylori* (H. pylori) est la plus répandue dans le monde selon l'OMS. Le but de notre étude était de contribuer à l'étude des aspects diagnostiques de la gastrite chronique induite par H. pylori à l'Hôpital Général de Référence (HGR).

Méthodologie : nous avons mené une étude transversale à caractère prospectif, descriptif et analytique portant sur une période d'un (01) an, allant du 1er octobre 2021 au 30 Septembre 2022.

Résultats : Nous avons colligé 143 cas de gastrite chronique soit une fréquence de 7.84%. La moyenne d'âge était 44,5 ans avec des extrêmes entre 11 et 78 ans. Le sexe féminin prédominait dans 54 % (n=80) avec un sex-ratio H/F de 0,79. L'épigastralgie était le symptôme le plus fréquent dans 74,683% (n=107). Sur le plan endoscopique, les lésions prédominaient dans

l'antre dans 53,85% (n=77), représentées en majorité par un érythème dans 90,91% (n=130). Sur le plan histologique, l'inflammation était présente dans 100% (n=143), d'intensité modérée dans 75,52% (n=108) associée à H. pylori dans 70,63% (n=101). Le test à l'uréase était positif dans 62,22%, le test antigénique des selles dans 54,34% et la sérologie dans 76,92% des cas.

Conclusion : Devant la fréquence des pathologies gastriques liées à l'infection à H. pylori la mise en place d'un protocole diagnostique adapté à notre contexte permettrait une meilleure prise en charge.

Mots-clés : gastrite chronique, *Helicobacter Pylori*, HGR, Niamey.

Abstract

Introduction : *Helicobacter pylori* (H. pylori) infection is the most widespread disease in the world

according to the WHO. The aim of our study was to contribute to the study of the diagnostic aspects of chronic gastritis induced by *H. pylori* at the General Referral Hospital (HGR).

Methodology: We conducted a prospective, descriptive, and analytical cross-sectional study over a one-year period, from October 1, 2021, to September 30, 2022.

Results: We collected 143 cases of chronic gastritis, representing a frequency of 7.84%. The mean age was 44.5 years, with a range from 11 to 78 years. Females predominated in 54% of cases (n=80), with a male-to-female ratio of 0.79. Epigastric pain was the most frequent symptom, present in 74.683% of cases (n=107). Endoscopically, lesions were predominantly located in the antrum in 53.85% (n=77), mostly presenting as erythema in 90.91% (n=130). Histologically, inflammation was present in 100% (n=143), of moderate intensity in 75.52% (n=108), and associated with *H. pylori* in 70.63% (n=101). The urease test was positive in 62.22%, the stool antigen test in 54.34%, and serology in 76.92% of cases.

Conclusion: Given the frequency of gastric pathologies related to *H. pylori* infection, the implementation of a diagnostic protocol adapted to our context would allow for improved management.

Keywords : chronic gastritis, *Helicobacter pylori* , HGR, Niamey.

Introduction

Helicobacter pylori (*H. pylori*) infection is the most widespread in the world according to the WHO [1]. It is more prevalent in Black, Hispanic, and Asian populations [2]. The discovery of *H. pylori* in chronic active gastritis by Warren and Marshall in 1988 [3] brought renewed interest to the study of this condition; indeed, it is the most frequent cause of gastritis and peptic ulcers worldwide [4]. The prevalence of chronic gastritis and its age distribution vary between countries [1,5]. Today, chronic gastritis

is better assessed, thanks to the advent of upper gastrointestinal endoscopy, which allows for biopsies for histopathological examination, as well as other methods for detecting *H. pylori*, such as the urease test, the stool antigen test, and serology. In our study, we aim to contribute to the study of the diagnostic aspects of *H. pylori*- induced gastritis at the General Reference Hospital (HGR).

Methodology

This was a prospective, descriptive and analytical cross-sectional study covering a period of one (01) year, from October 1, 2021 to September 30, 2022.

Included in this study were patients with digestive clinical signs suggestive of gastritis, who underwent upper digestive endoscopy and an anatomopathological examination of the gastric biopsy confirming chronic gastritis.

Upper gastrointestinal endoscopy with systematic biopsies was performed using a SONOSCOPE HDL 35E gastroscope. *H. pylori* testing was performed histologically in all cases and, depending on availability, by urease test, stool antigen test and serology.

The biopsy sample intended for the urease test was pipetted and placed in 1 ml of Urea-Indole medium in an incubator at 37°C for 24 hours. Urease activity was detected when the indicator color changed from yellow-orange to fuchsia pink.

Biopsy fragments intended for histopathological examination were identified according to the sampling site (fundus and antrum) and preserved in 10% buffered formalin. Specimens received at the pathology and cytology laboratory were examined using routine techniques. The report was prepared based on the 1994 revised Sidney classification system. No special staining or immunohistochemical markers were used.

H. pylori antigen in stool, we used a rapid immunochromatographic membrane test, the RAPID OnSite™ test kit from CTK Biotech, Inc. The result

is positive or reactive if the C and T lines develop.

H. Pylori serology was performed in the blood by measuring specific IgG antibodies directed against the bacterium.

Data collection was based on individual patient records containing information gathered during outpatient consultations and reports of various examinations. The collected data were entered and analyzed using EPI Info version 7.2.2.6. Microsoft Office 2016 (Word and Excel) was used for text entry and table creation. The chi-square test and Fisher's exact test were used to investigate the association between the different variables. An association was considered statistically significant if the p-value was less than or equal to 0.05. Sensitivity (Se), specificity (Sp), positive predictive value (PPV), and negative predictive value (NPV) were calculated for the urease test, stool antigen test, and serology, with the presence of *H. pylori* on histology serving as the reference standard.

Results

During the study period, 1823 patients consulted the hepatogastroenterology department of the general referral hospital. Among these patients, 299 presented with upper gastrointestinal symptoms, of whom 143 underwent upper gastrointestinal endoscopy and histopathological examination of the gastric biopsy performed, representing a frequency of 7.84%, which constituted our study population.

The average age was 44.5 years with extremes between 11 and 78 years (**Figure 1**). The female sex predominated in 54% (n=80) with a male/female sex ratio of 0.79.

The reported risk factors were NSAID use in 39.86% (n=57), tea consumption in 27.29% (n=39), tobacco use in 22.38% (n=32), coffee consumption in 19.58% (n=28), and alcohol consumption in 4.9% (n=7). The medical history was dominated by chronic epigastric pain in 57.64% (n=82), including 7.69% (n=11), followed by gastrointestinal bleeding in 4.9% (n=7). Clinical signs, often associated, were dominated by

epigastric pain in 74.683% (n=107) (Table I).

The most frequent lesion observed during endoscopy was erythema, appearing in 90.91% (n=130), alongside other associated lesions (Table II). The lesions were located in the antral, pangastric, and medullary regions in 53.85% (n=77), 39.16% (n=56), and 18.2% (n=27), respectively. Risk factors were not significantly associated with symptoms or endoscopic findings. However, NSAID use was common in patients with epigastric pain (33.7%) and was the main risk factor for the observed endoscopic lesions (70.65%). Conversely, a significant association was observed between certain symptoms and lesions observed during endoscopy: epigastric pain and erythema (p=0.028); chest pain and congestion (p=0.013); hematemesis and ulceration (p= 0.005).

Histologically, gastritis (inflammation) was present in 100% (n=143), with moderate activity in 52.44% (n=75), and *H. pylori* was present in 70.63% (n=101) (Table III). We found no significant correlation between the endoscopic and histological findings. However, we observed that: erythema and congestion lesions corresponded to gastritis in all cases; erythema, ulceration, erosion, congestion, and nodule lesions corresponded to the presence of *H. pylori* on histology in 70%, 81.8%, 83.3%, 77.8%, and 58.5% of cases, respectively. Risk factors were also not significantly linked to histological lesions; however, NSAID use corresponded to gastritis on histology in 59.6%.

Other tests have enabled the direct or indirect detection of *H. pylori*, the results of which are shown in Table IV.

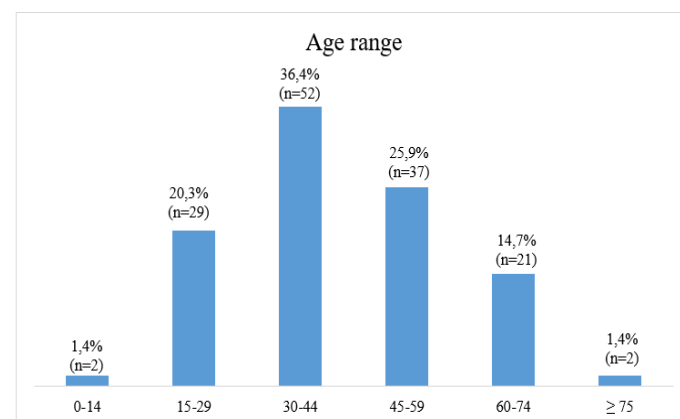


Figure 1 : Distribution of patients according to age groups

Table I : Distribution of patients according to clinical symptoms

Clinical signs	Staff	Percentage
Epigastric pain	107	74.83
Dyspepsia	23	16.08
Vomiting	18	12.59
Belching	13	9.09
Gastroesophageal reflux	9	6.29
Hematemesis	5	3.5
Dysphagia	5	3.5
Hiccups	4	2.8
Chest pain	3	2.2
Regurgitation	3	2.1

Table II : Distribution of patients according to endoscopic lesions

Endoscopic lesions	Staff	Percentage
Erythema	130	90.91
Nodule	41	28.67
Ulceration	22	15.38
Erosion	12	8.39
Congestion	9	6.29
No injuries	1	0.7

Table III : Distribution of patients according to histological lesions

Histological lesions	Density %(n)			
	Lightweight	Moderate	Severe	Absent
Inflammation	20.97% (30)	75.52% (108)	3.49% (5)	0
Activity	24.47% (35)	52.44% (75)	1.39% (2)	21.67% (31)
Atrophy	4.89% (7)	0	0	95.1% (136)
Metaplasia	2.79% (4)	0	0	97.2% (139)
Lymphoid follicle	13.28% (19)	3.49% (5)	0	83.21% (119)
Presence of H. pylori	31.47% (45)	35.66% (51)	3.50% (5)	29.47% (42)

Table IV : Distribution of patients according to *H. pylori* detection tests

Test	Result	H. pylori result n(%)		Value of tests in relation to the presence of H. pylori in histology			
		Positive	Negative	Se	Sp	VPP	VPN
Urease test	Positive	22 (48.88)	6 (13.33)	66.67%	50%	0.78	0.35
	Negative	11 (24,44)	6 (13.33)				
Stool antigen test	Positive	22 (48.88)	3 (8.88)	66.67%	75%	0.88	0.5
	Negative	11 (24,44)	9 (20)				
Serology	Positive	6 (46.15)	4 (30.76)	100%	42.86%	0.6	1
	Negative	0 (0)	3 (23.07)				

p > 0.05 for all crossovers

Discussion

The objective of this study was to contribute to the investigation of the diagnostic aspects of chronic gastritis caused by *H. pylori*. To this end, 143 patients were included in the Hepatogastroenterology Department of the Niamey General Referral Hospital (Niger), who underwent upper gastrointestinal endoscopy and histopathological examination of gastric biopsy. This represented 7.84% of all consultations in the department.

The mean age in our series was 42.29 years, similar to African data [5,6]. A female predominance of 56% was observed, with a male-to-female ratio of 0.79 in our study. In the literature, there is no significant sex predominance; some studies report a female predominance in the same proportions as our study [5,7], while others report a male predominance [8]. However, it is generally accepted that men and women have the same risk of infection at any age [9].

In our study, epigastric pain was the main reason for consultation reported in 74.83% of patients, a finding also observed in other studies [10]. Although a high proportion of subjects reported epigastric pain following NSAID use (33.7%), this observation did not reach statistical significance, suggesting that the association between these factors and pain is not was nodular in 28.67% of cases, a finding that was

less pronounced in the literature. This variability is explained by the fact that these studies included both symptomatic and asymptomatic individuals during endoscopy. Indeed, the prevalence of *H. pylori* infection was significantly higher in patients with endoscopic nodular gastritis [11]. In our study, it was 58.5%.

Histologically, gastritis was of moderate activity in 52.44% of cases in our study, associated with *H. pylori* in 70.63%. Indeed, the presence of *H. pylori* in the gastric mucosa is thought to trigger the activation of its defense mechanisms, including the proliferation of neutrophils [12].

Our work has established the value of *H. pylori* diagnostic tests in the general referral hospital. Histological examination detects infection and assesses mucosal lesions. It has been the most widely used test since the work of Warren and Marshall [3]. The urease test is recommended for diagnosis and monitoring of eradication if the urea breath test is not feasible [13]. The immunochromatographic test uses monoclonal antibodies to detect *H. pylori* antigen in stool. It offers good sensitivity and specificity, along with three main advantages: speed, reduced technical complexity, and low cost [14]. In our study, the sensitivity and specificity were 66.67% and 75%, respectively. Serology has an excellent negative predictive value (NPV), as all individuals infected

with *H. pylori* have a humoral IgG response. In our series, the NPV was 0.6. Even though the positive predictive value (PPV) was excellent in our study (1), it is considered mediocre because even after eradication of the infection, antibodies persist for an unpredictable duration [15]. Serology is useful in patients on antibiotics or for whom proton pump inhibitors (PPIs) cannot be discontinued. It is, in fact, the only diagnostic test not influenced by these treatments [16]. In practice, the choice between different tests can be made based on their performance, but especially on availability and cost.

Conclusion

The diagnosis of chronic gastritis is histological; however, *H. pylori* can be detected using several invasive and non-invasive tests. Current recommendations favor non-invasive tests and reserve digestive endoscopy with biopsies for cases of alarm symptoms (weight loss, anemia, dysphagia) or when antibiotic resistance is suspected, for eradication testing. Eradication of *H. pylori* helps prevent complications and significantly reduces the risk of gastric cancer.

*Correspondence :

ABANI BAKO Aïchatou Balaraba

a_abani@yahoo.fr

Available online : November 21, 2025

- 1 : Department of Basic and Mixed Sciences, Faculty of Health Sciences, Abdou Moumouni University of Niamey
- 2 : Laboratory of Anatomical and Cytological Pathology of the Niamey General Referral Hospital
- 3 : Visceral Surgery Department of the Niamey General Referral Hospital

- 4 : Laboratory of Anatomical and Cytological Pathology of the National Hospital of Niamey
- 5 : Internal Medicine Department of the Niamey General Referral Hospital

© Journal of african clinical cases and reviews 2025

Conflict of interest : None

References

- [1] Andoulo FA, Noah DN, Tagni-Sartre M, Ndam EC, Blackett KN. Épidémiologie de l'infection à *Helicobacter pylori* à Yaoundé : de la particularité à l'énigme Africaine. *Pan Afr Med J*. 2013;16:115.
- [2] Brown H, Cantrell S, Tang H, Epplein M, Garman KS. Racial Differences in *Helicobacter pylori* Prevalence in the US: A Systematic Review. *Gastro Hep Adv*. 2022;1(5):857-68.
- [3] Warren JR, Marshall B. Unidentified curved bacilli on gastric epithelium in active chronic gastritis. *Lancet*. 1983;1(8336):1273-5.
- [4] Fauchère JL. La folle histoire de la découverte de *Helicobacter pylori*. *Feuillets Biol*. 2017;336:51-8.
- [5] Essadik A, Benomar H, Rafik I, Hamza M, Guemouri L, Kettani A, Maachi F. Aspects épidémiologiques et cliniques de l'infection à *Helicobacter pylori* à travers une étude marocaine. *Hegel*. 2013;3(3):163-9.
- [6] Adjéka SD, Kouamé GD, Bangoura AD, Yaogo A, Méité M, Kissi H, Koffi AA, et al. Prévalence des ulcères gastroduodénaux et des lésions précancéreuses gastriques au cours de la gastrite chronique à *Helicobacter pylori* selon le système de Sydney : à propos de 52 cas. *Health Sci Dis*. 2020;21(3):1765.
- [7] Werme K, Bisseye C, Ouedraogo I, Yonli AT, Ouermi D, Djigma F, et al. Diagnostic moléculaire d'*Helicobacter pylori* par PCR chez les patients en consultation gastroentérologique au Centre

- Médical Saint Camille de Ouagadougou. *Pan Afr Med J.* 2015;21:123.
- [8] Kpossou AR, Kouwakanou HB, Ahouada C, Vignon RK, Sokpon CNM, Zoundjiekpon V, et al. Infection par *Helicobacter pylori* : prévalence et facteurs associés d'après un test respiratoire à l'urée marquée au carbone 14. *Pan Afr Med J.* 2021;40:266.
- [9] Kasmi H, Doukani K, Ali A, Tabak S, Bouhenni H. Epidemiological profile of *Helicobacter pylori* infection in patients with digestive symptoms in Algeria. *J Epidemiol Glob Health.* 2020;10(4):293-7.
- [10] Hafidi R, Oubaha S, El Gamrani Y, Diffaa A, Samlani Z, Krati K. Infection à *Helicobacter pylori* : aspects épidémiologiques, cliniques et endoscopiques. *J Afr Hepato Gastroenterol.* 2013;7:74-7.
- [11] Yalaki S. The frequency of nodular gastritis in adult patients and its relation with *Helicobacter pylori* and histopathologic findings. *Eur Res J.* 2019;5(5):822-6.
- [12] Varon C, Mégraud F. Infection à *Helicobacter pylori* et cancer gastrique. *Rev Francoph Lab.* 2013;456:67-76.
- [13] Blanco S, Forné M, Lacombe A, Prat C, Cuesta MA, Latorre I, et al. Comparison of stool antigen immunoassay methods for detecting *Helicobacter pylori* infection before and after eradication treatment. *Diagn Microbiol Infect Dis.* 2008;61(2):150-5.
- [14] Wu DC, Wu IC, Wang SW, Lu CY, Ke HL, Yuan SS, et al. Comparison of stool enzyme immunoassay and immunochromatographic method for detecting *Helicobacter pylori* antigens before and after eradication. *Diagn Microbiol Infect Dis.* 2006;56(4):373-8.
- [15] Lehours P. Aspects diagnostiques et thérapeutiques de l'infection à *Helicobacter pylori*. *J Biol Méd.* 2023;112(47):183-6.
- [16] Lamarque D, Burucoa C, Courillon-Mallet A, de Korwin JD, Delchier JC, Fauchère JL, et al. Révision des recommandations françaises sur la prise en charge de l'infection par *Helicobacter pylori*. *Hépatogastro.* 2012;19:475-502.

To cite this article

AB Abani Bako, HZ El-Hadji Lamine, B Efared, GA Opita, H Salifou Boureima, I Boubacar et al. *Helicobacter pylori* gastritis: epidemiological and diagnostic aspects at the Niamey General Referral Hospital. *Jaccr Infectiology* 2025; 7(4): 8-14
<https://doi.org/10.70065/2574.jaccrInfect.002L012111>

**Clinical case****Carina perforation secondary to endobronchial tuberculosis: about a case**

Perforation de la carène secondaire à la tuberculose endobronchique : à propos d'un cas

A Coulibaly^{*1,2}, ML Ali Moussa³, A Ouédraogo³, S Maïga³, YI Traoré³, L Tagne Mekowa³,
G Sawadogo³, K Boncounou³, G Badoum³, M Ouédraogo^{2,3}

Résumé

Introduction : Une perforation de la carène secondaire à la tuberculose endobronchique n'est pas courante, encore moins d'autres causes infectieuses. Nous rapportons un cas de perforation de la carène avec fistule broncho-nodale secondaire à une tuberculose au décours d'une bronchoscopie chez une patiente asthmatique suivie à la clinique Edgard Ouédraogo de Ouagadougou (Burkina Faso).

Cas clinique : patiente de 33ans, asthmatique. Reçue pour une exacerbation d'asthme. L'examen à l'entrée retrouve une patiente consciente avec un Glasgow 15, un état général stade II performance statut de l'OMS, une dyspnée sifflante, une toux grasse avec difficulté d'expectorer. Un traitement d'urgence en aérosolthérapie de bronchodilatateur inhalé. Devant l'absence d'amélioration après 5 jours de traitement ; a motivé une fibroscopie bronchique, qui objectivait une carène et l'orifice

de la bronche souche droite siège des sécrétions purulentes très visqueuses d'allures caséeuses, adhérant fortement à la muqueuse bronchique. Le test Xpert MTB/RIF sur lavage bronchoalvéolaire détectait le *Mycobacterium tuberculosis* détecté moyen sans résistance à la rifampicine. Un traitement antituberculeux (2RHZE/4RH) fut initié. L'évolution était marquée par l'amélioration très significative de la symptomatologie. À M2 de son traitement antituberculeux, la bronchoscopie de contrôle objectivait des lésions révélant une perforation de la carène avec une excroissance à l'orifice de la bronche souche droite. L'évolution sous traitement antituberculeux et corticothérapie de fond pour l'asthme fut favorable, avec guérison clinique et microbiologique à M6.

Conclusion : Ce cas illustre l'importance d'évoquer la tuberculose devant une exacerbation d'asthme résistante en zone endémique et le rôle central de la

bronchoscopie dans la détection des complications destructrices rares mais graves telles que la perforation de la carène.

Mots-clés : Tuberculose endobronchique, perforation, carène, bronchoscopie, fibroscopie bronchique.

Abstract

Introduction : Carinal perforation secondary to endobronchial tuberculosis is uncommon, and even less so from other infectious causes. We report a case of carinal perforation with bronchodilary fistula secondary to tuberculosis following bronchoscopy in an asthmatic patient followed at the Edgard Ouédraogo Clinic in Ouagadougou (Burkina Faso).

Clinical case: A 33-year-old female patient with asthma was admitted for an asthma exacerbation. On admission, she was conscious with a Glasgow Coma Scale (GCS) score of 15, a WHO performance status of stage II, wheezing dyspnea, and a productive cough with difficulty expectorating. Emergency treatment with inhaled bronchodilator was initiated. Due to the lack of improvement after 5 days of treatment, a bronchoscopy was performed. This revealed a carina and the opening of the right main bronchus containing highly viscous, caseous purulent secretions strongly adhering to the bronchial mucosa. The Xpert MTB/RIF test on bronchoalveolar lavage detected *Mycobacterium tuberculosis* with moderate resistance to rifampicin. Antituberculosis treatment (2RHZE/4RH) was initiated. The patient's condition improved significantly, with a marked improvement in symptoms. Two months into his antituberculosis treatment, a follow-up bronchoscopy revealed lesions including a perforation of the carina with an outgrowth at the opening of the right main bronchus. His progress under antituberculosis treatment and maintenance corticosteroid therapy for asthma was favorable, with clinical and microbiological recovery at six months.

Conclusion: This case illustrates the importance of considering tuberculosis in the event of an exacerbation of resistant asthma in an endemic area and the central role of bronchoscopy in the detection

of rare but serious destructive complications such as carina perforation.

Keywords: Endobronchial tuberculosis, perforation, carina, bronchoscopy, bronchoscopy.

Introduction

Tuberculosis (TB) is an infectious, contagious, curable disease with endemic-epidemic characteristics, caused by *Mycobacterium tuberculosis*. It generally affects the lungs but can also affect other organs [1]. The consequences of tuberculosis are numerous. Carina perforation secondary to tuberculosis is uncommon, and even less so due to other infectious causes. Endobronchial tuberculosis represents a specific form of tuberculosis [2]. It is often underdiagnosed and characterized by clinical, radiological, and endoscopic polymorphism, which can lead to confusion with other etiologies such as lung cancer, asthma, or pneumonia. Its true incidence cannot be assessed because bronchoscopy is not routinely performed in all patients suspected of having pulmonary tuberculosis [3].

We report a case of carina perforation with bronchodilary fistula secondary to bronchopulmonary tuberculosis following bronchoscopy in an asthmatic patient regularly followed at the Edgard Ouédraogo clinic in Ouagadougou (Burkina Faso).

Clinical case

A 33-year-old female water and sanitation engineer, with a history of asthma since July 2022, had no significant medical or surgical history and no known exposure to tuberculosis. In February 2023, she was admitted for an asthma exacerbation with wheezing and a productive cough that was difficult to expectorate. On admission, she was conscious with a Glasgow Coma Scale (GCS) score of 15, a performance status of stage II according to the World Health Organization (WHO), an oxygen saturation of 92% on room air, a normal temperature, normal blood

pressure, and a pulse of 90 beats/minute. There were no signs of tuberculosis infection.

The initial paraclinical workup: the complete blood count revealed leukocytosis with a predominance of neutrophils, elevated C-reactive protein, and elevated procalcitonin. The frontal chest X-ray showed bronchopneumonia with infiltrates in the pulmonary area (Figure 1). Antibiotic therapy (amoxicillin-clavulanic acid) combined with a rapid-acting bronchodilator, corticosteroids, and inhaled mucolytics was initiated.

The absence of improvement after 5 days of treatment; This prompted a bronchoscopy, which revealed a carina and the opening of the right main bronchus containing highly viscous, caseous purulent secretions, strongly adhering to the bronchial mucosa, which were difficult to aspirate, resulting in partial obstruction of the right

main bronchus (Figure 2). The Xpert MTB/RIF test on bronchoalveolar lavage confirmed the presence of *Mycobacterium. Tuberculosis* without rifampicin resistance. Antituberculosis treatment (2RHZE/4RH) was initiated at a dose of 4 tablets in the morning on an empty stomach. The patient's condition improved significantly, with a marked improvement in symptoms.

At month 2 of his antituberculosis treatment, a follow-up bronchoscopy revealed lesions including a perforation of the carina with an outgrowth at the opening of the right main bronchus (Figures 3 and 4). The patient responded well to antituberculosis treatment and maintenance corticosteroid therapy for asthma, with clinical and microbiological recovery at month 6.



Figure 1: The frontal chest X-ray showed an appearance of bronchopneumopathy with infiltrates at the pulmonary focus



Figure 2: Endoscopic view of a patient in the supine position centered on the carina, showing purulent, caseous-appearing secretion with partial obstruction of the right main bronchus



Figure 3: Endoscopic view at M2 of antituberculosis treatment of a patient in the supine position centered on the carina, with mucosal cleansing and presence of an outgrowth in the right main bronchus



Figure 4: Endoscopic view at M2 of antituberculosis treatment with mucosal cleaning showing perforation of the carina

Discussion

Endobronchial tuberculosis is a tuberculous infection of the tracheobronchial tree, confirmed by bacteriological and/or histological evidence, with or without parenchymal involvement [4,5]. It represents approximately 10 to 20% of pulmonary tuberculosis cases, but remains underdiagnosed due to its atypical clinical presentation [5,6]. Exacerbations of resistant asthma should prompt investigation for an infectious cause, particularly tuberculosis in endemic areas.

In our case, the chest X-ray did not strongly suggest tuberculosis, given the atypical symptoms and the absence of signs of tuberculosis infection. Asthma exacerbations have always been thoroughly investigated to determine their cause. Among these etiologies are bronchopulmonary infections (viruses, bacteria, fungi, etc.), of which tuberculosis is frequently found in our setting.

Bronchoscopy is a very common examination in pulmonology, with several advantages and used for the diagnosis of certain bronchopulmonary conditions including cancers and tuberculosis.

Endobronchial involvement of tuberculosis (TBE) is rare and often presents with misleading manifestations [6]. Perforation of the carina is an extremely rare complication, seldom reported [7]. The most probable pathophysiological mechanism is the fistulization of a tuberculous mediastinal lymph node into the carina, leading to destruction of the bronchial wall and the formation of a bronchodillary fistula. This hypothesis is supported by the endoscopic appearance observed in our case.

Several causes can be considered, either direct implantation of the tubercle bacillus onto the tracheobronchial tree from an adjacent pulmonary parenchymal lesion, or direct infiltration of the airways by the mediastinal lymph node adjacent to the tuberculosis, while lymphatic and hematogenous dissemination is rare [8,9].

The diagnosis of common pulmonary tuberculosis is usually straightforward, guided by clinical and radiological findings and confirmed by positive

bacterial cultures [10]. The radioclinical presentation is atypical, misleading, and often delayed, highlighting the diagnostic challenges in certain forms. As with our patient, she was being treated for asthma and presented with wheezing dyspnea and a dry cough, initially misdiagnosed as an asthma exacerbation.

endobronchial tuberculosis treatment is to eradicate the *Mycobacterium tuberculosis* bacillus and prevent complications such as bronchial stenosis. This treatment is similar to that used for pulmonary tuberculosis [11]. Our patient received the protocol in place according to the national tuberculosis control program in Burkina Faso: a 2-month initial phase of combination therapy (Rifampicin, Isoniazid, Pyrazinamide, and Ethambutol) followed by a 4-month continuation phase of Rifampicin and Isoniazid. The clinical and paraclinical outcome was favorable.

endobronchial tuberculosis is often late, resulting in airway stenosis with its associated complications such as post-obstructive pneumonia, atelectasis, hemoptysis, wheezing, subcutaneous emphysema, pneumothorax, pneumomediastinum, mediastinitis, dyspnea and hemoptysis [12,13].

Some rarer causes of bronchial fistulas include pulmonary silicosis, Hodgkin's disease, histoplasmosis, hydatidosis, HIV infection, Wegener's granulomatosis, sarcoidosis or amyloidosis, trauma and congenital anomalies [14].

Conclusion

Endobronchial tuberculosis. This case highlights two key aspects: the need to consider tuberculosis in the presence of an atypical or resistant asthma exacerbation in endemic areas; and the essential role of bronchoscopy in the diagnosis and monitoring of rare but serious complications of TB, such as carinal perforation. Early diagnosis and appropriate management can prevent irreversible bronchial damage.

***Correspondence :**

Aly Coulibaly

alycoul1985@yahoo.com

Available online : November 21, 2025

- 1 : Infectious Diseases Department, Koudougou Regional Hospital Center, Burkina Faso
2 : Edgard Ouédraogo Clinic in Ouagadougou, Burkina Faso
3 : Department of Pulmonology, Yalgado Ouédraogo University Hospital, Burkina Faso

© Journal of african clinical cases and reviews 2025

Conflict of interest : None

References

- [1] World Health Organization. Global tuberculosis report 2023. Geneva: WHO; 2023.
[2] Smith LS, Schillaci RF, Sarlin RF. Endobronchial tuberculosis: serial fiberoptic bronchoscopy and natural history. *Chest*. 1987;91:644-7.
[3] Sahin F, Yıldız P. Characteristics of endobronchial tuberculosis patients with negative sputum acid-fast bacillus. *J Thorac Dis*. 2013;5:764-70.
[4] Hoheisel G, Chan KM, Chan HS, Chan KS, Teschler H, Costabel U. Endobronchial tuberculosis: diagnostic features and therapeutic outcome. *Respir Med*. 1994;88:593-7.
[5] Rikimaru T. Endobronchial tuberculosis. *Expert Rev Anti Infect Ther*. 2004;2:245-51.
[6] Aouadi S, Bayoudh A, Gharsalli H, Brahem E, Berraies M, Ghariani A, et al. Apport de la fibroscopie bronchique dans la prise en charge de la tuberculose endobronchique. *Rev Mal Respir*. 2014;3:A105-6.
[7] Smart J. Endobronchial tuberculosis. *Br J Tuberc*

Dis Chest. 1951;40:61-8.

- [8] Matthews JI, Matarese SL, Carpenter JL. Endobronchial tuberculosis simulating lung cancer. *Chest*. 1984;86:642-4.
[9] Smith LS, Schillaci RF, Sarlin RF. Endobronchial tuberculosis: serial fiberoptic bronchoscopy and natural history. *Chest*. 1987;91:644-7. (doublet de la réf. 2)
[10] Chaouch N, Saad S, Zarrouk M, Racil H, Cheikh Rouhou S, Nefzi K, et al. Difficulté diagnostique de la tuberculose bronchopulmonaire pseudotumorale. *Rev Mal Respir*. 2011;28:9-13.
[11] Manal E, Nahid Z, Hanane B, Najiba Y. La tuberculose endobronchique. *Rev Pneumol Clin*. 2017;73(2):55-60.
[12] Lee JH, Park SS, Lee DH, et al. Endobronchial tuberculosis: clinical and bronchoscopic features in 121 cases. *Chest*. 1992;102:990-4.
[13] Lee P, Kupeli E, Mehta AC. Airway stents. *Clin Chest Med*. 2010;31:141-50.
[14] Brinchault G, Rochefort-Morel C, Morel V, Edan C, Caulet-Maugendre S, Lena H, et al. Fistulisation d'adénopathies médiastinales dans les bronches en rapport avec une maladie de Hodgkin. *Rev Mal Respir*. 2004;21:137-40.

To cite this article

A Coulibaly, ML Ali Moussa, A Ouédraogo, S Maïga, YI Traoré, L Tagne Mekowa et al. Carina perforation secondary to endobronchial tuberculosis: about a case. *Jaccr Infectiology* 2025; 7(4): 15-19

<https://doi.org/10.70065/2574.jaccrInfect.003L012111>



Original article

Incidence and microbiological profile of healthcare-associated infections (HAIs) in intensive care in Niger: a multicentre cross-sectional study of 32 collected cases

Incidence et profil microbiologique des infections associées aux soins (IAS) en réanimation au Niger : étude transversale multicentrique à propos de 32 cas colligés

S Amadou Hamadou*¹, Y Tahirou¹, M Nanzir Sanoussi¹, B Marou^{1,2}, H Daddy^{1,2}, M Gagara^{1,2}, Y-Z Alfred Dogbe¹, H Maman Lawan³, M Niandou⁴, MS Zakari Ado⁵, MS Chaibou^{1,2}, S Mamadou^{2,4}

Résumé

Objectif : Déterminer l'incidence des infections associées aux soins (IAS).

Méthodologie : Il s'agit d'une étude prospective multicentrique analytique et descriptive allant du 1er novembre 2023 au 30 avril 2024 (6 mois). Etaient inclus dans l'étude tous les patients âgés d'au moins 18 ans infectés et non infectés dont la durée d'hospitalisation est supérieure ou égale à 48H. Les variables étudiées étaient les variables sociodémographiques, le délai de séjour avant la réanimation et en réanimation, les facteurs de risque, le mode de sorti de la réanimation, les procédures invasives, les prélèvements effectués et la résistance des germes.

Résultats : Au total 124 patients ont été inclus, 32 infectés avec une fréquence de 25,8%. Une prédominance masculine a été observée, avec une sex-

ratio de 1,46. L'âge moyen était de 39,81±16,33 ans avec des extrêmes allant de 18 à 73ans. L'infection urinaire était l'infection associée aux soins la plus rencontrée. Les Bacille GRAM Négatif (BGN) étaient majoritaires (68,6%). Les microorganismes les plus fréquents étaient *E. coli* (12,2%), *K. pneumoniae* (12,2%), *Staphylococcus à coagulase négative* (12,2%). La mortalité globale est de 34,7% et la majorité de ces germes étaient majoritairement résistant à la plupart des antibiotiques testés. Malheureusement la mortalité était de 34,7%.

Conclusion : les IAS sont très fréquentes en réanimation notamment chez les patients porteurs de dispositif invasif. Un accent doit être mis sur les règles d'hygiène en milieu de réanimation et un contrôle plus strict sur la prescription des antimicrobiens

Mots-clés : Infections nosocomiales, réanimation, Niger, HNN, HNABD, HGR.

Abstract

Objective: To determine the incidence of healthcare-associated infections (HAIs).

Methodology: This was a prospective, multicenter, analytical, and descriptive study conducted from November 1, 2023, to April 30, 2024 (6 months). All patients aged 18 years and older, infected and uninfected, with a hospital stay of 48 hours or more were included. The variables studied were sociodemographic factors, length of stay before and during ICU admission, risk factors, mode of discharge from ICU, invasive procedures, samples taken, and bacterial resistance.

Results: A total of 124 patients were included, 32 of whom were infected (25.8%). A male predominance was observed, with a male-to-female ratio of 1.46. The mean age was 39.81 ± 16.33 years, ranging from 18 to 73 years. Urinary tract infection was the most common healthcare-associated infection. Gram-negative bacilli (GNB) were predominant (68.6%). The most frequent microorganisms were *E. coli* (12.2%), *K. pneumoniae* (12.2%), and *coagulase-negative Staphylococcus* (12.2%). The overall mortality rate was 34.7%, and the majority of these organisms were resistant to most of the antibiotics tested.

Conclusion: Healthcare-associated infections (HAIs) are very common in intensive care, particularly in patients with invasive devices. Emphasis must be placed on hygiene protocols in the ICU and stricter control over antimicrobial prescriptions.

Keywords: Nosocomial infections, resuscitation, Niger, HNN, HNABD, HGR.

contract a healthcare-associated infection in hospital settings, with the highest reported frequency in the Eastern Mediterranean (11.8%), Southeast Asia (10%), and lower prevalence in Europe (7.7%), the Western Pacific (9%), and Africa (2.5% to 14.8%) [2-6]. In Niger, we have no data on HAIs in intensive care units. We propose to study the incidence of these HAIs in intensive care units in Niamey, Niger, hence our study.

Methodology

This was a prospective, multicenter, analytical, and descriptive study conducted over a six-month period, from November 1, 2023, to April 30, 2024, in the Intensive Care Units (ICUs) of Niamey hospitals: the Niamey National Hospital (HNN), the Amirou Boubacar Diallo National Hospital (HNABD), and the Niamey General Referral Hospital (HGR). The study included all adult patients aged 18 years and older who were hospitalized in the ICU for at least 48 hours. The variables studied were the patients' sociodemographic characteristics, their origin before admission to the ICU, the mode of discharge from the ICU, risk factors, invasive procedures, microbiological samples taken, and the antibiotic resistance of the causative organisms in cases of microbiological isolation. The collected data were entered using Microsoft Office (Word, Excel) version 2019 and processed using Sphynx plus² version 5 statistical software, with Chi-square and Fisher's exact tests performed. Informed consent from patients or their caregivers was a prerequisite for patient inclusion.

Introduction

Formerly known as nosocomial infections (NIs), healthcare-associated infections (HAIs) are infections that occur during or following a patient's care, whether diagnostic, therapeutic, palliative, preventive, or educational, and if the infection was neither present nor incubating at the start of that care [1]. Worldwide, more than 1.4 million people

Results

Of the 401 adult patients admitted during the period of our study (from November 1, 2023 to April 30, 2024), 124 stayed for at least 48 hours, among whom 32 (25.8%) had at least one nosocomial infection (Figure 1).

We identified 35 episodes of healthcare-associated infections (HAIs) in 32 patients (3 bacteremias,

27 urinary tract infections, 1 ventilator-associated pneumonia, 2 surgical site infections, and 2 central nervous system infections), for an infection-to-infected-patient ratio of 1.09. The mean age of our patients was 44.8 years (standard deviation 17.84, range 18–90 years). The most frequently encountered invasive device was the urinary catheter (99.20%), with a mean duration of 7.20 days (standard deviation 6.13, range 3–50 days). It was responsible for the most common HAI (urinary tract infection) in 77.10% of cases, with *Acinetobacter spp.* being the predominant strain (13.60%). From a bacteriological standpoint, Gram-negative bacilli (GNB) were the most frequently detected organisms, predominantly represented by *Klebsiella pneumoniae* (12.20%) and *Escherichia coli* (12.20%), followed by *Acinetobacter spp.* (12.20%), coagulase-negative staphylococci (12.20%), and *Enterobacter aerogenes* (9.80%). (Table 1)

The *E. coli* strains were resistant to penicillin and fluoroquinolone families but susceptible to

carbapenems and ceftazidime. As for the *K. pneumoniae* strains, they had high levels of resistance to most antibiotics except for carbapenems and amikacin, against which resistance was low or nonexistent. The other isolated bacterial strains had similar resistance profiles. In the strains of *Enterobacter aerogenes* isolated, a very high level (100%) of resistance to penicillins and fluoroquinolones except for carbapenems was observed.

Acinetobacter strains were more frequently resistant to the tested antibiotics. *Staphylococcus aureus* was particularly resistant to almost all tested antibiotics except fusidic acid and vancomycin. Two-thirds were resistant to methicillin. The same was true for *Enterobacter cloacae* strains, which showed resistance to all penicillins, quinolones, and aminoglycosides except meropenem and piperacillin/tazobactam.

A death rate of 34.70% was recorded.

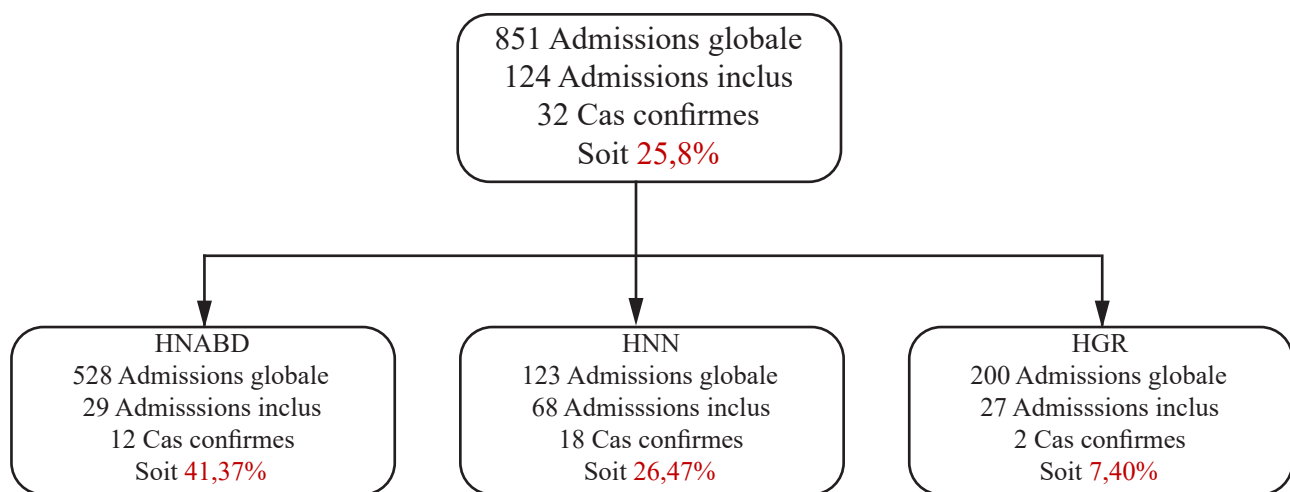


Figure 1: Distribution of ILS cases by hospital

Discussion

We found 32 cases of HAI, representing a prevalence of 25.80%. The literature reports a disparity in prevalence across studies depending on the year and geographical location, which could be explained by methodological differences, including the type and duration of the study, the patient profile, and the

diagnostic criteria for HAIs, among others.

Our subjects were predominantly young (mean age 44.82 years). Séné S [7], El Rhazi [8], and Fall ML [9] also found a predominance of young people in these ILS (37, 38, and 38.71 years). This could be explained by the high frequency of traumatic injuries at this age, but also by the high frequency of hemorrhagic strokes in the young subjects in our study.

Table I: Isolated germs responsible for healthcare-associated infections

Gram	Germ	Number (n)	Percentage (%)
BG N	<i>Escherichia coli</i>	5	12.20%
	<i>Klebsiella pneumoniae</i>	5	12.20%
	<i>Acinetobacter spp</i>	5	12.20%
	<i>Enterobacter Aerogenes</i>	4	9.80%
	<i>Enterobacter cloacae</i>	2	4.90%
	<i>Pseudomonas spp</i>	2	4.90%
	<i>Serratia odorifera</i>	1	2.40%
	<i>Stenotrophomonas maltophilia</i>	1	2.40%
	<i>Raoultella ornithinolytica</i>	1	2.40%
	<i>Citrobacter freundii</i>	1	2.40%
	<i>Salmonella spp</i>	1	2.40%
CG P	<i>Coagulase-negative Staphylococcus</i>	5	12.20%
	<i>Staphylococcus aureus</i>	3	7.40%
	<i>Enterococcus spp</i>	1	2.40%
Yeasts	<i>Candida albicans</i>	1	2.40%
	<i>Candida non albicans</i>	2	4.90%
BAAR	<i>Mycobacterium tuberculosis</i>	1	2.40%

In our series, urinary catheterization was performed in 99.20% of cases with an average duration of 7.20 days and a standard deviation of 6.13 and extremes of 3 days to 50 days.

The work of Savey et al. [10] found similar results to ours, showing that 87.2% of patients had an indwelling urinary catheter, with an average catheterization duration of 11.1 days. Ossaga Madjoue [11] also found that 98% of his patients had a urinary catheter, with an average catheterization duration of 13.48%. The most common urinary tract infection in our study was urinary tract infection, representing 77.10% of cases, followed by bacteremia at 8.60%. Nosocomial pneumonias represented only 2.90% of cases in our series.

Indwelling urinary catheterization is the main risk factor for nosocomial urinary tract infections. The duration of catheterization is closely linked to the incidence of nosocomial urinary tract infections, as

confirmed by the work of Njall et al. [12] who had found that all infected patients had urinary catheters. Dia et al [5] reported that urinary tract infection was the leading cause of healthcare-associated infections (HAIs) in 40% of cases.

The same applies to the Grape [13] which found a frequency of around 33.30%. Sene S [7] and Bourzama S [14] reported that the first ILS was respiratory infection with 30.70% and 29% respectively.

In these last two studies, urinary tract infections accounted for 25.10% and 23% respectively. This high incidence was attributed to underlying pathologies, including frailty and prolonged bed rest, which hinders the reduction of bladder catheterization time.

From a microbiological standpoint, we isolated forty-one (41) microorganisms, the majority of which were Gram-negative bacilli (68.60%), followed by Gram-positive cocci (staphylococci and enterococci) at 20%, and yeasts at 8.60%. From Senegal to Benin,

including Morocco, Tunisia, and Mali, other authors had also reported a predominance of these Gram-negative bacilli, in proportions ranging from 59% to 90%. [7, 9, 14-17]

Of these Gram-negative bacilli, *Escherichia coli*, *Klebsiella pneumoniae*, and *Acinetobacter* were the most frequently found, at roughly equal proportions (12.20%). Many authors have also reported these bacteria in their studies, albeit in varying proportions. The majority of germs isolated in our series were multi-resistant to almost all common antibiotics. This resistance may be acquired or natural, but it is primarily due to their hospital-acquired nature, resulting from the misuse and inappropriate use of antibiotics and a lack of knowledge about the bacterial flora in our hospital wards. The few antibiotics to which the bacteria were susceptible are either unavailable on the local market or expensive, and most of our patients could not afford them.

Rare germs were isolated and were resistant to all antibiotics tested; these were *Raoultella ornithinolytica* and *Stenotrophomonas maltophilia*. *Escherichia coli* exhibited 100% resistance to ampicillin, amoxicillin/clavulanic acid, ceftriaxone, gentamicin, ciprofloxacin, and levofloxacin; 75% resistance to amikacin; however, 100% susceptibility to cefoxitin and carbapenems, and 60% susceptibility to piperacillin-tazobactam. Bourzama S [14] reported 100% resistance to ampicillin, 75% to ciprofloxacin, 25% to ceftriaxone, 100% susceptibility to imipenem and amikacin, 75% to ceftriaxone, and 50% to gentamicin. In the study by Séné S [7], the susceptibility profile of *Escherichia coli* showed resistance to almost all antibiotics with intermediate susceptibility to cefoxitin, cefuroxime and susceptibility to imipenem, amikacin.

Escherichia coli strains were sensitive to amikacin at 82.35%, nitrofurantoin at 90.90%, fosfomycin at 100% and imipenem at 83.33%; however, they were resistant to amoxicillin-clavulanic acid at 88.88%, ticarcillin at 99.44%, cefotaxime at 93.75%, ceftazidime at 94.11%, nalidixic acid at 77.77% and cotrimoxazole at 93.33% [19]

Klebsiella pneumoniae strains were 100% resistant to gentamicin, amoxicillin-clavulanic acid, ceftriaxone, cefotaxime, ceftazidime, and aztreonam. However, they were 100% susceptible to amikacin, ertapenem, and meropenem, 80% susceptible to piperacillin-tazobactam, 60% susceptible to levofloxacin, and 40% susceptible to ciprofloxacin.

Bourzama S [14] reported a resistance profile of *Klebsiella pneumoniae* of approximately 100% to ampicillin, amoxicillin, ampicillin-sulbactam, cotrimoxazole, and ticarcillin-clavulanic acid. Resistance was 86.60% to ciprofloxacin, 85.70% to ceftriaxone, and 84.60% to gentamicin. Séné S [7] also reported resistance to tetracyclines, fluoroquinolones, and aminoglycosides. Zbair M [18] also found that *Klebsiella* strains had very high resistance rates to ciprofloxacin, ceftriaxone, and gentamicin. In contrast, Kassogue M [19] found strains of *Klebsiella* sensitive to amikacin (81.25%), cefoxitin (72.22%), imipenem (100%), decreased sensitivity to piperacillin-tazobactam (25%), cefoxitin (55.55%), gentamicin (50%), tobramycin (38.88%) and ciprofloxacin (30%) but resistant to ticarcillin (100%), cefotaxime (93.75%), ceftazidime (93.75%), nalidixic acid (77.77%) and cotrimoxazole (86.66%). Our study reports a mortality rate of 34.70%. However, it is difficult to distinguish between nosocomial infections and underlying pathology as the cause of death. Nevertheless, we believe that nosocomial infections remain the primary cause of death in the intensive care unit. Multidrug-resistant bacteria represent a significant problem, highlighting the need for hygiene measures and the rational use of antibiotics [7, 22].

Conclusion

Healthcare-associated infections (HAIs) are a reality in our intensive care units, with a predominance of young males. These infections were linked to the presence of invasive devices, including bladder catheterization, with urinary tract infection being the first HAI. Gram-negative bacilli were the most

frequently identified pathogens, and these bacteria were resistant to most of the antibiotics tested. A change in behavior is necessary to reduce this very high incidence. Emphasis must be placed on hygiene protocols in the intensive care unit and stricter control of antimicrobial prescriptions.

***Correspondence :**

Saley AMADOU HAMADOU

hamadouamadousaley@gmail.com

Available online : November 21, 2025

1 : Niamey National Hospital

2 : Abdou Moumouni University of Niamey

3 : André Salifou University and Zinder National Hospital

4 : Amirou Boubacar Diallo National Hospital of Niamey

5 : Niamey General Referral Hospital

© Journal of african clinical cases and reviews 2025

Conflict of interest : None

References

- [1] Comité technique national des infections nosocomiales (CTIN). Cent recommandations pour la surveillance et la prévention des infections nosocomiales. 2^e éd. Guide Technique d'Hygiène Hospitalière. 2004.
- [2] Duce G, Fabry J, Nicolle L. Prévention des infections nosocomiales : guide pratique. 2^e éd. Genève: World Health Organization, Dept of Epidemic and Pandemic Alert and Response; 2008. 71 p.
- [3] Bagheri-Nejad S, Allegranzi B, Syed SB, Ellis B, Pittet D. Infections liées aux soins de santé en Afrique : une étude systématique. *Bull World Health Organ*. 2011 Oct;89(10):757-65.
- [4] Lamarque D. Prévalence des infections nosocomiales dans un hôpital pédiatrique à Ouagadougou. *Med Trop*. 2003 Mar;63:636-7.
- [5] Dia NM, Ka R, Dieng C, Diagne R, Dia ML, Fortes L, et al. Résultats de l'enquête de prévalence des infections nosocomiales au CHNU de Fann (Dakar, Sénégal). *Med Mal Infect*. 2008 May;38(5):270-4.
- [6] Gosling R, Mbatia R, Savage A, Mulligan J, Reyburn H. Prévalence des infections nosocomiales dans un hôpital tertiaire de référence dans le nord de la Tanzanie. *Ann Trop Med Parasitol*. 2003;97:69-73.
- [7] Séné Sagne MVT. Aspect épidémiologique et bactériologique des infections nosocomiales au service de réanimation du CHU Aristide Le Dantec : étude rétrospective de janvier 2013 à décembre 2014. Dakar: Université Cheikh Anta Diop; 2017. Mémoire N°106. 69 p.
- [8] El Rhazi K, Elfakir S, Berraho M, Tachfouti N, Serhier Z, Kanjaa C, et al. Prévalence et facteurs de risque des infections nosocomiales au CHU Hassan II de Fès (Maroc). *East Mediterr Health J*. 2007;13(1):56-63.
- [9] Fall ML. Infections nosocomiales à la réanimation du Centre Hospitalier Universitaire Aristide Le Dantec : étude prospective de novembre 2005 à octobre 2007. Thèse Méd. Dakar; 2008. N°124.
- [10] Savey A, Machut A. Surveillance des infections nosocomiales en réanimation adulte : Réseau REA-Raisin, France, résultats 2011. Saint-Maurice: Institut national de veille sanitaire (INVS); 2013. 30 p.
- [11] Ossaga Madjoue AD. L'infection nosocomiale : profil épidémiologique et bactériologique en milieu de réanimation à l'hôpital principal de Dakar. Thèse Méd. Dakar: Université Cheikh Anta Diop; 2016. N°106.

- [12] Njall C, Adiogo D, Bitá A, Ateba N, Sume G, Tchoua R, et al. Écologie bactérienne de l'infection nosocomiale au service de réanimation de l'hôpital Laquintinie de Douala, Cameroun. *Pan Afr Med J.* 2013;14:8.
- [13] Réseau d'alerte, d'investigation et de surveillance des infections nosocomiales (RAISIN). Enquête de prévalence 2006 des infections nosocomiales : résultats préliminaires. 2007. Disponible sur : <http://www.invs.sante.fr> (...) Consulté le 20 juillet 2024.
- [14] Bourzama S. Aspects épidémiologiques et bactériologiques des infections nosocomiales à la réanimation du CHU Aristide Le Dantec : étude prospective du 1^{er} janvier au 30 juin 2018. Mémoire DES, Université Cheikh Anta Diop; 2019. N°88.
- [15] Diop AK. Bactériémies acquises en réanimation : aspects épidémiologiques et thérapeutiques dans le service de réanimation polyvalente du Centre Hospitalier Universitaire de Dakar. Thèse Méd. Dakar; 2001. N°26.
- [16] Afle FCD, Quenum KJMK, Hessou S, Johnson RC. État des lieux des infections associées aux soins dans deux hôpitaux publics du sud Bénin : CHU de Zone d'Abomey-Calavi/Sô-Ava et Centre Hospitalier de Zone de Cotonou 5. *J Appl Biosci.* 2018 Mar 26;121(1):12192.
- [17] Jaffel S, Boussofara M, Thabet L. Les infections nosocomiales chez les traumatisés en réanimation. *Rev Tunis Biol Clin* [Internet]. 2019 [cité 18 mai 2024];26(2). Disponible sur : <https://rtbc.org.tn/ojs/index.php/rtbc/article/view/111>.
- [18] Zbair M. La résistance bactérienne dans les infections nosocomiales : aspects épidémiologiques, cliniques, thérapeutiques et évolutifs. Thèse Méd. Dakar; 2016. N°296.
- [19] (Doublon de la réf. 17 – supprimé dans l'organisation Vancouver.)
- [20] Abeghe Angoué TA. Prévalence des infections nosocomiales dans 10 services du CHU du Point G [PhD Thesis]. Bamako: Université des Sciences, des Techniques et des Technologies de Bamako; 2020 [cité 14 oct 2024]. Disponible sur : <https://bibliosante.ml/handle/123456789/4442>.
- [21] Kassogue M. Profil clinique et microbiologique des infections associées aux soins en réanimation au CHU du Point G. Thèse Méd. Bamako: Université des Sciences, des Techniques et des Technologies de Bamako; 2021. 170 p.
- [22] Merrer J. Epidémiologie des infections nosocomiales liées au cathéter en réanimation. *Ann Fr Anesth Réanim.* 2005;24:278-81.

To cite this article

S Amadou Hamadou, Y Tahirou, M Nanzir Sanoussi, B Marou, H Daddy, M Gagara et al. Incidence and microbiological profile of healthcare-associated infections (HAIs) in intensive care in Niger: a multicentre cross-sectional study of 32 collected cases. *Jaccr Infectology* 2025; 7(4): 20-26

<https://doi.org/10.70065/2574.jaccrInfect.004L012111>



Article original

Evaluation de la consommation des antibiotiques au Service des Maladies Infectieuses et Tropicales (SMIT) du CHNU de Fann

Evaluation of antibiotic consumption in the Department of Infectious and Tropical Diseases (SMIT) at the University Hospital Center of Fann

M Thiam^{*1}, D Thioub², A Bangoura¹, A Faye¹, A Lakh^{2,3}, M Sene^{1,3}, M Seydi^{2,3}

Résumé

Introduction : Les antibiotiques représentent un pilier essentiel dans le traitement des infections. Toutefois, leur usage inapproprié entraîne une montée de la résistance bactérienne, parallèlement à une augmentation de leur consommation. L'objectif de cette étude était d'évaluer la consommation d'antibiotiques au service des maladies infectieuses et tropicales (SMIT) de l'hôpital de Fann.

Méthodologie : Cette étude rétrospective a été réalisée chez des patients hospitalisés au SMIT du 02 Janvier au 31 Décembre 2023, nous y avons inclus tous les patients ayant consommés des antibiotiques durant leur hospitalisation et exclus ceux qui n'en avaient pas consommés durant leur hospitalisation ou venus pour une simple consultation.

Résultats : Nous avons analysé 113 fiches de patients dont 56,63% étaient de sexe féminin

contre 43,36% pour le sexe masculin soit un sex-ratio de 0,77. La tranche d'âge la plus représentée était celle de [20,25 ans], avec 15,9 % des patients. Le *Mycobacterium tuberculosis* était le germe le plus retrouvé dans les produits pathologiques (22,22%) suivi des *Staphylococcus spp* (14,81%), *Pseudomonas aeruginosa* (11,11%), *Klebsiella pneumoniae* (11,11%) et *Escherichia coli* (11,11%). La ceftriaxone était la molécule la plus consommée au SMIT avec 33,33% suivi par le cotrimoxazole avec 17,98%. La famille des bêta-lactamines était la plus consommée soit 1031 DDJ et 719 DDJ/1000JH suivies des Sulfamides antibactériens soit 658 DDJ et 459 DDJ/1000JH.

Conclusion : La ceftriaxone a été la molécule la plus prescrite au SMIT et la famille des bêta-lactamines a été la famille d'antibiotique la plus consommée durant l'année 2023.

Mots-clés : Antibiotiques, Maladies Infectieuses et Tropicales, Consommation.

Abstract

Introduction: Antibiotics are essential in the treatment of infections. However, their inappropriate use leads to a rise in bacterial resistance, along with an increase in their consumption. The objective of this study was to evaluate antibiotic consumption in the Infectious and Tropical Diseases Department (SMIT) of Fann Hospital.

Methodology: This retrospective study was carried out on patients hospitalized at SMIT from January 2nd to December 31st, 2023. We included all patients who consumed antibiotics during their hospitalization and excluded those who did not consume them during their hospitalization or who came for a simple consultation.

Results: we analyzed 113 patient records, of which 56.63% were female and 43.36% male, for a sex ratio of 0.77. The most represented age group was [20-25 years], with 15.9% of patients. *Mycobacterium tuberculosis* was the most frequently found germ in pathological products (22.22%) followed by *Staphylococcus spp* (14.81%), *Pseudomonas aeruginosa* (11.11%), *Klebsiella pneumoniae* (11.11%) and *Escherichia coli* (11.11%). Ceftriaxone was the most frequently used drug at the SMIT (33.33%), followed by cotrimoxazole at 17.98%. Beta-lactams were the most commonly used class of drugs, at 1031 DDD and 719 DDD/1000 patient-days, followed by antibacterial sulfonamides at 658 DDD and 459 DDD/1000 patient-days.

Conclusion: Ceftriaxone was the most prescribed molecule at SMIT and the beta-lactam family was the most consumed family of antibiotics during the year 2023.

Keywords: Antibiotics, Infectious and Tropical Diseases, Consumption.

Introduction

Les antibiotiques sont des substances d'origine naturelle ou synthétique utilisés pour traiter des infections causées par des micro-organismes divers notamment des bactéries. Leur découverte et leur émergence au XXème siècle a révolutionné la médecine moderne permettant de sauver des millions voire des milliards de vie humaine [1]. Cependant, leurs utilisations abusives sans prescription ou sous prescription hasardeuse ont favorisé l'émergence de souches résistantes parfois même multi résistantes [2, 3]. Cette résistance se propage rapidement, notamment dans les hôpitaux, où diverses bactéries peuvent venir en contact étroit avec d'autres, ce qui élargit la résistance aux communautés environnantes [4,5]. En outre, la consommation mondiale d'antibiotique a augmenté de 65 % entre 2000 et 2015 tandis que le taux de consommation d'antibiotiques a augmenté de 39 %, passant de 11,3 à 15,7 DDJ (Doses Définies Journalières) pour 1000 habitants et par jour (DDJ/1000JH) [6]. Dans ce contexte, la gestion raisonnée de la consommation d'antibiotique au sein des établissements de santé est devenue une priorité. L'évaluation de cette consommation, tant en terme quantitatif que qualitatif, est essentielle pour comprendre les dynamiques de prescription [7]. Cette étude s'inscrit dans cette dynamique en cherchant à évaluer la consommation des antibiotiques au service des maladies infectieuses et tropicales (SMIT) de l'hôpital de Fann.

Méthodologie

Il s'agissait d'une étude rétrospective descriptive qui s'est déroulée du 02 Janvier au 31 Décembre 2023, soit une durée de 12 mois. L'étude concernait tous les patients hospitalisés dans le Service des Maladies Infectieuses et Tropicales (SMIT) et ayant consommés des antibiotiques durant notre période d'étude. Les données étaient recueillies sur une fiche d'enquête, à partir des dossiers médicaux des patients. Les variables étudiées étaient : les paramètres socio-démographiques (âge, sexe, comorbidité), les données cliniques et les motifs de prescription de

l'antibiothérapie (nature de l'infection, examens bactériologiques, germe isolé et l'antibiogramme) et l'antibiothérapie prescrite (DCI, la classe thérapeutique de l'antibiotique, nom commercial, voie d'administration, la dose/prise (mg, g)). Nous avons évalué les consommations d'antibiotiques, exprimées en doses définies journalières (DDJ) selon les normes de l'OMS puis en DDJ/1000JH. Les données ont été saisies sur Google Sheets et analysées avec le logiciel R et présentées sous forme de tableaux et de figures. Les résultats ont été exprimés en pourcentage et en chiffre.

Résultats

• Caractéristiques Socio-démographiques

Notre population d'étude était constituée de 56,63% de femme, soit un sexe ratio de 0,77. La tranche d'âge la plus représentée était celle de [20,25 ans], avec 15,9 % des patients. La tuberculose et les bronchopneumopathies chroniques ont été les motifs de prescription d'antibiotiques les plus fréquents respectivement 24% et 17,70% des patients (Tableau I).

La majorité des patients ne présentaient pas de comorbidité soit 51,94 %. Tout de même nous notons qu'une bonne partie était séropositif (19,38%) (Figure 1).

• Données cliniques et les motifs de prescription de l'antibiothérapie

Des examens bactériologiques ont été effectués chez 65,79% de nos patients, le test Gènextpert a été l'examen le plus fréquemment réalisé, représentant 35,04 % des cas, suivi par l'hémoculture (22,63 %), l'ECBU (12,41 %) et l'ECB du LCR / Liquide pleural (11,68 %) (Figure 2). Parmi tous les examens biologiques effectués, seulement 20 % ont donné des résultats positifs, contre 80 % de résultats négatifs.

Le *Mycoplasma tuberculosis* a été le micro-organisme le plus isolé des examens biologiques effectués sur les patients qui sont revenus positifs avec 22,22% suivi par les *Staphylococcus Spp* (14,81%) (Figure 3). L'antibiogramme a été réalisé seulement chez

13,28%.

• Antibiothérapie prescrite

La voie intraveineuse était la voie d'administration la plus utilisée sur les patients hospitalisés sous antibiothérapie en 2023 avec 55,26 % (Figure 4).

La bi-antibiothérapie représentait environ 43,36 % des stratégies thérapeutiques adoptées pour notre population d'étude, suivi par la mono-antibiothérapie avec 25,66 %. (Tableau II).

La durée moyenne d'hospitalisation était de 17 jours, le nombre de jour maximal d'hospitalisation 45 jours et le minimal de 2 jours avec une variabilité élevée. Le nombre de jours d'hospitalisation la plus fréquente était de 8 jours.

La ceftriaxone (céphalosporine 3ème génération), le cotrimoxazole, et l'association amoxicilline-acide clavulanique étaient les molécules les plus consommées dans notre étude (Tableau III).

La famille des bêtalactamines était la plus utilisée par les patients durant l'année 2023, avec une consommation de 1030,66 DDJ, soit 718,73 DDJ/1000JH (figure 5).

Tableau I : Répartition des patients hospitalisés sous antibiothérapie selon la nature de l'infection.

Nature de l'infection	Effectif (N)	Pourcentage (%)
Tuberculose	27	24
Bronchopneumopathie	20	17,7
Méningite	13	11,5
Dermohypodermite	10	8,85
Bactériémie	8	7,08
Tétanos	5	4,42
Fièvre typhoïde	4	3,54
Toxoplasmose	4	3,54
Autres*	22	19,37
TOTAL	113	100

Autres* : cellulite, sepsis, diarrhée, spondylodiscite, toux chronique, gastroentérite, paludisme, suppuration intra crânienne, Syphilis

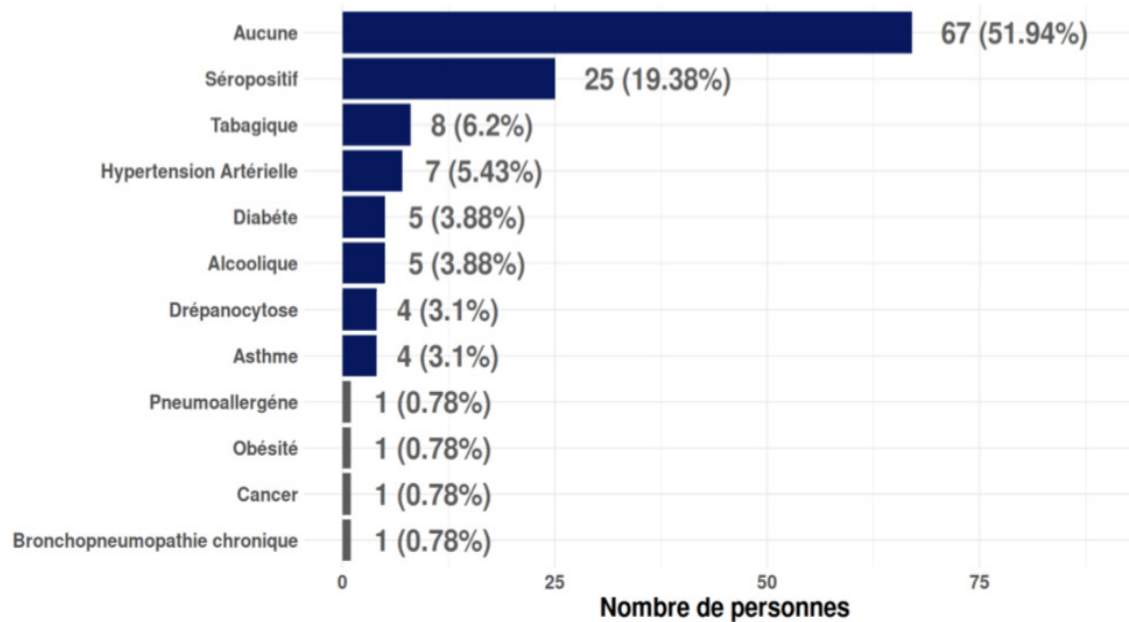


Figure 1 : Répartition des patients hospitalisés sous antibiothérapie selon leur comorbidité.

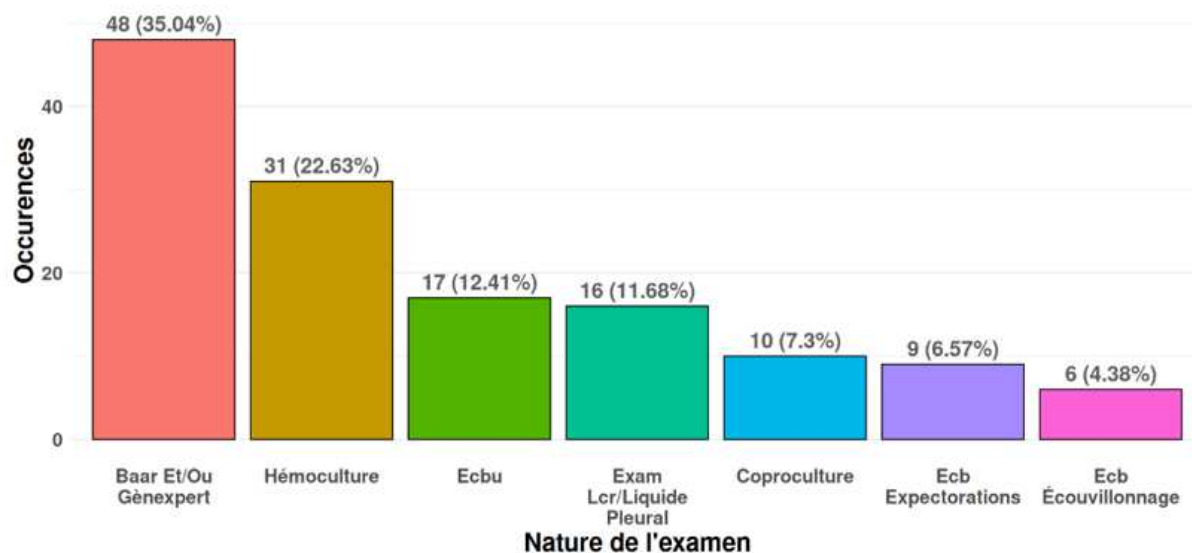


Figure 1 : Répartition des patients hospitalisés sous antibiothérapie selon leur comorbidité.

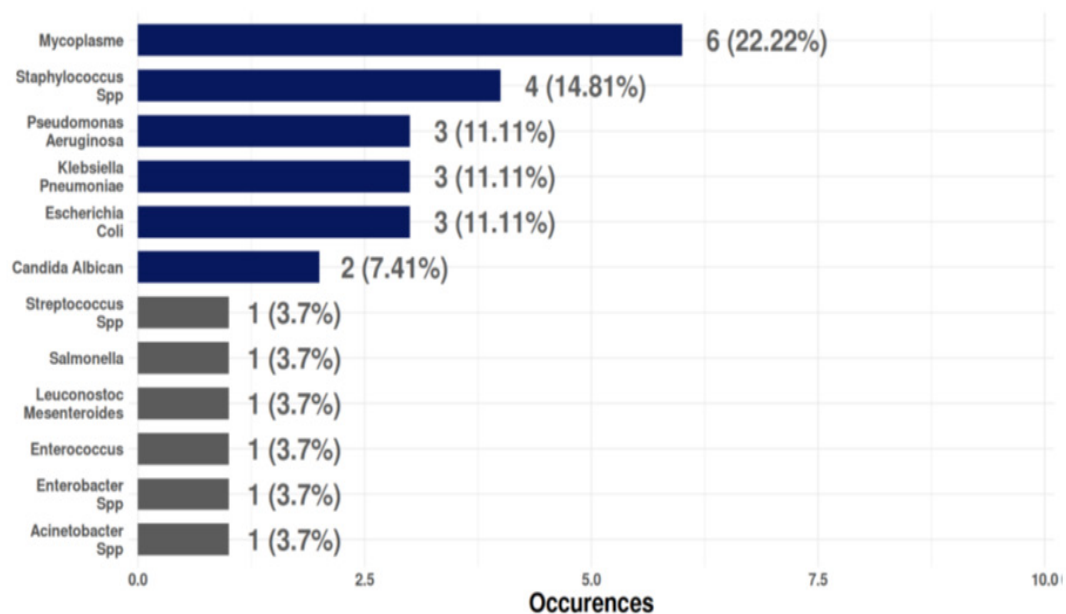


Figure 3 : Les microorganismes isolés chez des patients sous antibiothérapie.

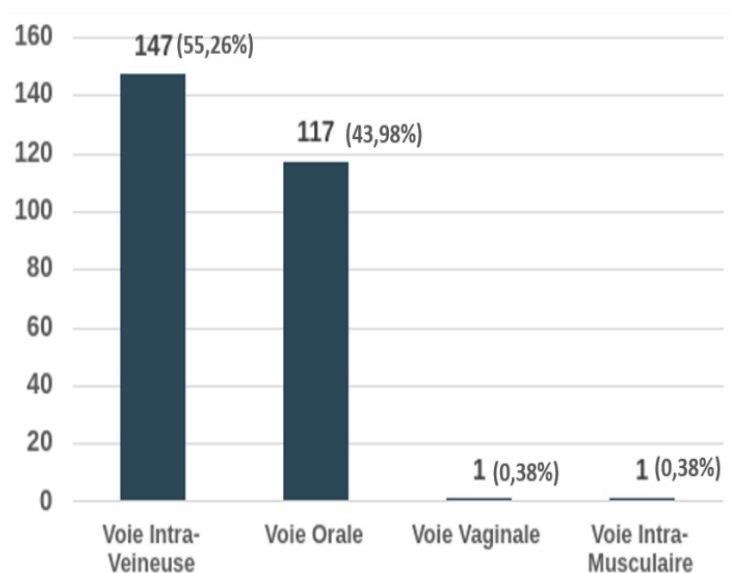


Figure 4 : Voies d'administration utilisées chez les patients sous antibiothérapie.

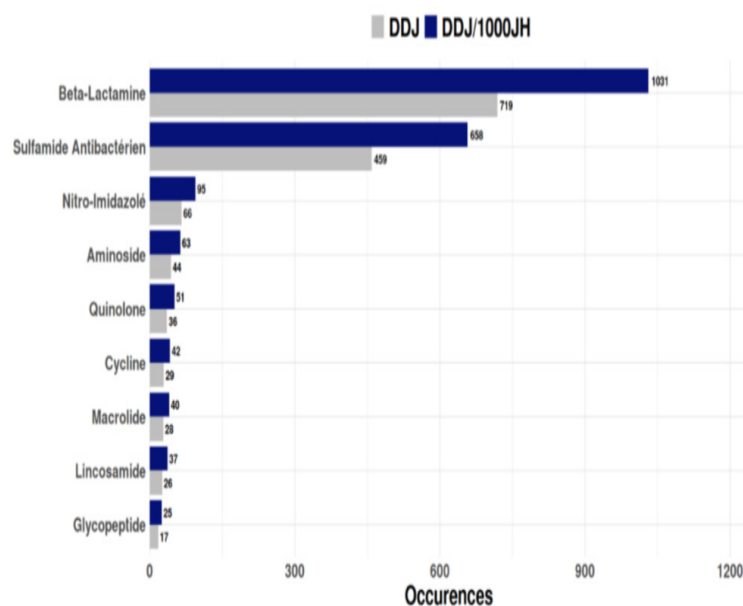


Figure 5 : Familles d'antibiotiques consommées en DDJ et DDJ/1000JH chez les patients sous antibiothérapie.

Tableau I : Répartition des patients hospitalisés sous antibiothérapie selon la nature de l'infection.

Nature de l'infection	Effectif (N)	Pourcentage (%)
Tuberculose	27	24
Bronchopneumopathie	20	17,7
Méningite	13	11,5
Dermohypodermite	10	8,85
Bactériémie	8	7,08
Tétanos	5	4,42
Fièvre typhoïde	4	3,54
Toxoplasmose	4	3,54
Autres*	22	19,37
TOTAL	113	100

Tableau II : Molécules consommées chez les patients sous antibiothérapie.

Nombre Molécules Consommées	Effectif (N)	Pourcentage (%)
Mono-antibiothérapie	29	25,66
Bi-antibiothérapie	49	43,36
Tri-antibiothérapie	21	18,58
Quadri-antibiothérapie	13	11,5
Quintu-antibiothérapie	1	0,9
Total	113	100

Tableau III : Consommation des antibiotiques des patients sous antibiothérapie en DDJ et DDJ/1000JH.

Antibiotiques	Familles d'antibiotiques	DDJ	DDJ/1000JH
Amox-Acide Clav	Bêtalactamines	190,93	133,15
Ceftriaxone		805,98	562,05
Céfépime		10,5	7,32
Phénoxy méthylpénicilline		2,5	1,74
Imipénème		19,75	13,77
Benzathine Benzylpénicilline		1	0,7
Gentamycine	Aminosides	28	35,25
Amikacine		35,25	24,58
Azithromycine	Macrolides	8,33	5,8
Clarithromycine		32	22,3
Cotrimoxazole	Sulfamides Antibactériens	657,67	458,62
Métronidazole	Nitro-imidazolés	94,6	65,96
Ciprofloxacilline	Quinolones	38,25	26,67
Lévofloxacilline		10	6,97
Ofloxacilline		3	2,09
Clindamycine	Lincosamides	5	3,49
Lincomycine		31,67	22,08
Doxycycline	Cyclines	42	29,29
Vancomycine	Glycopeptides	25	17,43
TOTAL		2041,43	1439,26

Discussion

À l'issue de notre étude, réalisée au SMIT sur une période d'une année, nous avons enregistré un total de 113 patients, avec une prédominance féminine (56,63%) contre 43,36% pour le sexe masculin soit un sex-ratio de 0,77. Dans une étude similaire, Sidibé avait aussi trouvé une prédominance féminine de 53% au Mali [8]. La tranche d'âge [20-25 ans] était la plus fréquente avec 15,9% des patients, suivie de celle des patients de [15 – 20 ans] avec 11,5%. Par contre d'autres études comme celle de Bolly au Mali, avait montré une dominance de la tranche d'âge [30 – 39 ans] avec 25,8 % suivi de la tranche de [40 – 49 ans] avec 15,8% [9]. Les personnes vivant avec le VIH (PVVIH) représentaient une proportion significative de notre population d'étude, soit 19,38 %. Ce résultat est inférieur à celui de Dega qui a mené une étude similaire au Mali dans un service des maladies infectieuses et tropicales et qui a trouvé une fréquence de PVVIH de 70% [10]. En raison de la déficience de leur système immunitaire, les PVVIH sont particulièrement vulnérables aux infections [11,12]. La tuberculose et les bronchopneumopathies chroniques sont les motifs de prescription d'antibiotiques les plus fréquents respectivement 24% et 17,70% des patients. Zarrouki avait trouvé une pneumopathie acquise sous ventilation mécanique (PNAVM) (58%) comme première cause de prescription d'antibiotiques dans leur étude, suivie par l'infection urinaire (13%) puis l'infection neuroméningée (7%) [13]. Le *Mycobacterium tuberculosis* était le germe le plus fréquemment isolé, représentant 22,22 % des cas. Les autres germes identifiés comprenaient *Staphylococcus spp.* (14,81 %), *Pseudomonas aeruginosa* (11,11 %), *Klebsiella pneumoniae* (11,11 %) et *Escherichia coli* (11,11 %). Nos résultats sont similaires à ceux de l'étude de Dega, qui a rapporté des entérobactéries à gram négatif telles que *E. coli*, *Klebsiella pneumoniae* et *Pseudomonas spp.*, ainsi que *Mycobacterium tuberculosis* et *Staphylococcus aureus*, avec des fréquences respectives de 30 %, 15 %, 6 %, 14,2 % et 10,6 % [10]. La consommation

globale des antibiotiques en 2023 chez 113 patients hospitalisés au SMIT était de 2041,43 DDJ et 1408,21 DDJ/1000JH. Nos résultats diffèrent de ceux obtenus par Dega dans un service de maladies infectieuses au Mali, où la consommation était estimée à 1417,8 DDJ et 365,1 DDJ/1000JH [10]. Soufiane, dans son étude au service de réanimation à Meknès au Maroc, retrouve une consommation globale des antibiotiques de 1691,9 DDJ/1000JH en 2017 et 1604,7 DDJ/1000JH en 2018 [14]. Cette consommation d'antibiotiques pourrait s'expliquer, d'une part, par la durée d'hospitalisation qui est longue, et d'autre part, par la prise en charge de certaines pathologies, qui nécessitent l'administration de doses élevées d'antibiotiques [4,15,16]. Néanmoins, Cela peut être à l'origine de résistance aux antibiotiques, un problème fréquent [4]. La famille des bêta-lactamines était la plus consommée soit 1031 DDJ et 719 DDJ/1000JH suivies des Sulfamides antibactériens soit 658 DDJ et 459 DDJ/1000JH et des Nitroimidazolés soit 96 DDJ et 66 DDJ/1000JH. Mokrani et Hamdani au CHU de Tizi Ouzou en Algérie en 2017, a rapporté que les bêta-lactamines constituaient l'élément principal de l'arsenal anti-infectieux, avec une consommation de 948,8 DDJ/1000JH. Elles étaient suivies des fluoroquinolones en deuxième position (383,98 DDJ/1000JH), et du métronidazole en troisième position (383,87 DDJ/1000JH) [17]. La forte consommation de céphalosporines de 3^e génération, notamment la ceftriaxone, pourraient être à l'origine la persistance de germes multirésistants de la famille des entérobactéries. Ceci a été démontré dans l'étude réalisée par chaouch et *al.* avec une corrélation statistiquement significative recensée entre les taux des entérobactéries résistantes aux céphalosporines de 3^e génération, en particulier celles sécrétrices de bêta-lactamases à spectre étendue, et la consommation des céphalosporines de 3^e génération [18]. Le coût relativement faible des bêta-lactamines, leur bonne efficacité et tolérance justifient la place privilégiée qu'occupe cette classe thérapeutique dans les recommandations d'antibiothérapie aux urgences [19,20]. Cependant l'évaluation qualitative des

prescriptions dans notre étude montre une conformité par rapport aux recommandations nationales de bon usage des antibiotiques [21]. 43,36 % de nos patients avaient reçu une bi-antibiothérapie. Ce phénomène est assez noté en milieu pédiatrique en Afrique sub-saharienne où on a fréquemment fait appel en premier à la bi-antibiothérapie [22,23,24]. Par contre, une étude réalisée par Douffou et *al* avait montré une prédominance de l'utilisation de la mono-antibiothérapie (55,6%) suivie de la bi-antibiothérapie (40,7%) et la tri-antibiothérapie (3,7%) [25]. L'utilisation de la bi-antibiothérapie pourrait être justifiée par les raisons suivantes : élargir la couverture empirique fournie par deux agents antimicrobiens ayant des spectres d'activité différents, exploiter la synergie observée *in vitro* entre deux agents antibiotiques par rapport à un seul, ou prévenir ou retarder l'émergence d'une résistance pendant le traitement antimicrobien [26,27,28]. Chez La majorité de nos patients (43,36%), les antibiotiques étaient administrés par la voie intra-veineuse. Cette dernière occasionne une absorption directe et entière des antibiotiques, ce qui est important dans certaines situations cliniques [29].

Conclusion

Cette étude représente l'une des premières au Sénégal et constitue une base solide pour une meilleure surveillance de la prescription et de la consommation des antibiotiques dans les années à venir. Toutefois, il reste impératif d'approfondir les recherches sur la résistance bactérienne et d'adopter des pratiques de prescription plus rigoureuses. Des programmes de sensibilisation à l'utilisation rationnelle des antibiotiques, associés à une formation continue des professionnels de santé, devraient être mis en place pour réduire la surconsommation et limiter le risque de résistance. À long terme, il serait pertinent d'intégrer des outils de gestion numérique des prescriptions et de renforcer la collaboration entre les différents services de santé, afin d'optimiser l'usage des antibiotiques et de protéger leur efficacité pour les

générations futures.

*Correspondance :

Muhammed THIAM

thiammuhammedthomas@gmail.com

Disponible en ligne : 21 Novembre 2025

1 : Pharmacie Hospitalière CHNU Fann

2 : Service des Maladies Infectieuses et Tropicales
CHNU FANN,

3 : Université Cheikh Anta Diop (UCAD), Dakar
Sénégal

© Journal of african clinical cases and reviews 2025

Conflict of interest : None

References

- [1] Hutchings MI, Truman AW, Wilkinson B. Antibiotics: past, present and future. *Curr Opin Microbiol.* 2019;51:72-80.
- [2] Shorr AF. Review of studies of the impact on Gram-negative bacterial resistance on outcomes in the intensive care unit. *Crit Care Med.* 2009;37(4):1463-9.
- [3] Salam MA, Al-Amin MY, Salam MT, Pawar JS, Akhter N, Rabaan AA, Alqumber MAA. Antimicrobial Resistance: A Growing Serious Threat for Global Public Health. *Healthcare (Basel).* 2023;11(13):1946.
- [4] Struelens MJ. The epidemiology of antimicrobial resistance in hospital acquired infections: problems and possible solutions. *BMJ.* 1998;317(7159):652-4.
- [5] Opatowski M. Résistance bactérienne aux antibiotiques : apport du système national des données de santé. Thèse Santé Publique. France;

2020. 570 p.

2020. 96 p.

- [6] Klein EY, Van Boeckel TP, Martinez EM, Pant S, Gandra S, Levin SA, et al. Global increase and geographic convergence in antibiotic consumption between 2000 and 2015. *Proc Natl Acad Sci USA*. 2018;115(15):3463-70.
- [7] Mohamadloo A, Zarein-Dolab S, Ramezankhani A, Jamshid J. The main factors of induced demand for medicine prescription: a qualitative study. *Iran J Pharm Res*. 2019;18(1):479-87.
- [8] Sidibe MB. Évaluation de la prescription des antibiotiques chez les patients hospitalisés dans les services du CHU du Point G. Thèse Pharm. Mali; 2021. 111 p.
- [9] Bolly F. Évaluation de la consommation des antibiotiques aux services des maladies infectieuses et tropicales et de médecine interne au CHU du Point G. Thèse Pharm. Mali; 2023.
- [10] Dega AK. Évaluation de la consommation des antibiotiques dans le service des maladies infectieuses et tropicales du CHU Point-G. Thèse Pharm. Mali; 2021.
- [11] Riccardi N, Rotulo GA, Castagnola E. Definition of Opportunistic Infections in Immunocompromised Children on the Basis of Etiologies and Clinical Features: A Summary for Practical Purposes. *Curr Pediatr Rev*. 2019;15(4):197-206.
- [12] Nasri G, Ben Ayed H, Ben Hamida M, Trabelsi B, Baklouti M, Ben Jemaa M, et al. Particularités épidémio-cliniques et facteurs de risques des infections associées aux soins chez les patients immunodéprimés. *Med Mal Infect*. 2024;3(2):76-7.
- [13] Zarrouki MY. Consommation des antibiotiques en réanimation. Thèse Méd. Marrakech; 2009. 48 p.
- [14] Soufiane D. La consommation des antibiotiques en service de réanimation de l'hôpital militaire Moulay Ismail de Meknès. Thèse Méd. Meknès; 2020. 96 p.
- [15] Flaherty JP, Weinstein RA. Infection nosocomiale causée par des organismes résistants aux antibiotiques dans l'unité de soins intensifs. *Infect Control Hosp Epidemiol*. 1996;17:236-48.
- [16] Gold HS, Moellering RC. Antimicrobial-drug resistance. *N Engl J Med*. 1996;335:1445-53.
- [17] Mokrani S, Hamdani S. Évaluation de la consommation des antibiotiques au service de réanimation médicale du CHU de Tizi-Ouzou. Mémoire. Algérie; 2017.
- [18] Chaouch C, Hassairi A, Riba M. Relations entre la résistance bactérienne et la consommation des antibiotiques. *Ann Biol Clin*. 2014;72(5):555-60.
- [19] Van Werkhoven CH, Postma DF, Mangen MJ, Oosterheert JJ, Bonten MJ. Cost-effectiveness of antibiotic treatment strategies for community-acquired pneumonia: results from a cluster randomized cross-over trial. *BMC Infect Dis*. 2017;17(1):52.
- [20] Bianchini ML, Jeffres MN, Campbell JD. Cost-effectiveness analysis of new beta-lactam beta-lactamase inhibitor antibiotics versus colistin for the treatment of carbapenem-resistant infections. *Hosp Pharm*. 2022;57(1):93-100.
- [21] Ordre National des Médecins du Sénégal (ONMS). Recommandations des usages : Bon usage des antibiotiques. ONMS; 2010. 27 p.
- [22] Adisa R, Orherhe OM, Fakeye TO. Evaluation of antibiotic prescriptions and use in under-five children in Ibadan, South-Western Nigeria. *Afr Health Sci*. 2018;18(4):1189-201.
- [23] Sylla A, Keita Y, Diouf CS, Guèye M, Seck N, Ndongo AA, et al. Évaluation de l'utilisation des antibiotiques dans un hôpital pédiatrique sénégalais. *Arch Pediatr*. 2014;21:797-8.
- [24] Soumana A, Kamaye M, Moussa A, Dima H, Guero I, Idde I, Mamane I. Prescription des antibiotiques en milieu pédiatrique : étude

descriptive réalisée à l'hôpital national de Lamordé de Niamey (Niger). *Med Afr Noire*. 2015;62(6):331-7.

- [25] Doffou E, Attoukora A, Kamena BK, et al. Analyse pharmaceutique des prescriptions d'antibiotiques aux urgences médicales d'un hôpital de référence en Côte d'Ivoire. *Rev Anesth Réanim Med Urg Toxicol*. 2022;14:43-4.
- [26] Dupont H, Carbon C, Carlet J. La monothérapie par une bêta-lactamine à large spectre est aussi efficace que son association avec un aminoglycoside dans le traitement de la péritonite généralisée sévère : essai contrôlé randomisé multicentrique. *Antimicrob Agents Chemother*. 2000;44:2028-33.
- [27] Gribble MJ, et al. Essai prospectif randomisé de la monothérapie à la pipéracilline par rapport aux schémas thérapeutiques combinés carboxypénicilline-aminoglycoside dans le traitement empirique des infections bactériennes graves. *Antimicrob Agents Chemother*. 1983;24:388-93.
- [28] Milatovic D, Braveny I. Développement de résistances au cours d'une antibiothérapie. *Eur J Clin Microbiol*. 1987;6:234-44.
- [29] Zamoner W, de Freitas FM, Garms DS, de OliveiraMG, BalbiAL, PonceD. Pharmacokinetics and pharmacodynamics of antibiotics in critically ill acute kidney injury patients. *Pharm Res Per*. 2016;4(6):e00280.

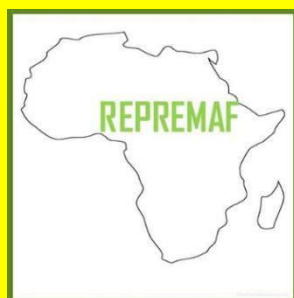
Pour citer cet article

M Thiam, D Thioub, A Bangoura, A Faye, A Lakh, M Sene et al. Evaluation de la consommation des antibiotiques au Service des Maladies Infectieuses et Tropicales (SMIT) du CHNU de Fann. *Jaccr Infectiology* 2025; 7(4): 27-36

<https://doi.org/10.70065/2574.jaccrInfect.005L012111>

RÉSEAU DE PROMOTION DE LA RECHERCHE MÉDICALE EN AFRIQUE

REPREMAF



<https://repremaf.org>

REPREMAF a pour but d'aider à la production scientifique en médecine et sciences sanitaires apparentées.

Il s'agit d'un réseau ouvert à tous les prestataires du domaine de la santé.

REPREMAF se veut un cadre d'échange fructueux et de partage scientifique d'expérience entre les praticiens du continent africain et d'ailleurs.

En outre, REPREMAF constitue une vitrine et un canal de diffusion des parutions des articles de JACCR-AFRICA (Journal africain des cas cliniques et revues) en parution online.

En plus du Journal, le REPREMAF dispose d'une maison d'édition intitulée : " Les éditions du REPREMAF" qui permet d'éditer des livres du domaine de la médecine et sciences sanitaires apparentées afin de promouvoir la recherche médicale en Afrique à travers les écrivains scientifiques africains du continent et ceux de la diaspora.

Par ailleurs, REPREMAF œuvre dans la formation continue en matière de recherche médicale par la diffusion des outils de recherche, la divulgation des rencontres scientifiques et compte rendu de congrès mais aussi l'organisation de colloques REPREMAF autour de thèmes pertinents de la Recherche médicale en Afrique. Visitez régulièrement cette page pour être au courant de nos activités en cours.

Le REPREMAF se donne aussi une mission d'accompagner les doctorants et d'autres étudiants en santé pour la rédaction de leurs thèses, mémoires et rapports de stage.

REPREMAF dispose également d'un *Moteur de Recherche* à vocation *panafricain* sur Recherche Médicale contenant des données africaines en santé et cela dans l'intention de promouvoir la Recherche Médicale sur le continent dont les données sont très peu visibles et accessibles à la communauté scientifique. Trouvez ci-dessous le lien pour accéder au moteur en question.