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Original article

Ebola outbreak in Conakry, Guinea: Epidemiological, clinical, and outcome features

Épidémie d'Ebola à Conakry, Guinée : aspects épidémiologique, clinique et évolutif

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Abstract

Objectives. – The authors studied the epidemiological, clinical, and outcome features of the Ebola virus disease in patients hospitalized at the Ebola treatment center (ETC) in Conakry to identify clinical factors associated with death.

Materials and methods. – A prospective study was conducted from March 25 to August 20, 2014. The diagnosis of Ebola virus infection was made on real-time PCR.

Results. – Ninety patients, with a positive test result, were hospitalized. Their mean age was 34.12 ± 14.29 years and 63% were male patients. Most worked in the informal sector (38%) and in the medical and paramedical staff (physicians 12%, nurses 6%, and laboratory technicians 1%). Most patients lived in the Conakry suburbs (74%) and in Boffa (11%). The main clinical signs were physical asthenia (80%) and fever (72%). Hemorrhagic signs were observed in 26% of patients. The comparison of clinical manifestations showed that hiccups ($P = 0.04$), respiratory distress ($P = 0.04$), and hemorrhagic symptoms ($P = 0.01$) were more frequent among patients who died. Malaria (72%) and diabetes (2%) were the most frequent co-morbidities. The crude case fatality rate was 44% [95% confidence interval (33–54%)]. The average hospital stay was 7.96 ± 5.81 days.

Conclusion. – The first Ebola outbreak in Conakry was characterized by the young age of patients, discrete hemorrhagic signs related to lethality. Its control relies on a strict use of preventive measures.

Keywords: Ebola; Guinea ZEBOV; Conakry

Résumé

Objectifs. – Cette étude avait pour objectifs de décrire les aspects épidémiologique, clinique et évolutif de la maladie à virus Ebola chez les patients hospitalisés au centre de traitement d'Ebola (CTE) de Conakry ainsi que d'identifier les facteurs cliniques associés au décès.

Matériel et méthodes. – Il s'agissait d'une étude prospective réalisée du 25 mars au 20 août 2014. Le diagnostic d'infection à Ebola reposait sur la PCR en temps réel.

Résultats. – Quatre-vingt-dix patients testés positifs ont été hospitalisés. La moyenne d'âge était de 34,12 ± 14,29 ans et 63 % étaient des hommes. La majorité évoluait dans le secteur économique informel (38 %) et dans le corps médical et paramédical (12 % de médecins, 6 % d'infirmiers et 1 % de laborantins). Les patients provenaient essentiellement de la banlieue de Conakry (74 %) et de la préfecture de Boffa (11 %). Les principaux signes cliniques étaient l'asthénie physique (80 %) et la fièvre (72 %). Les signes hémorragiques ont été retrouvés chez 26 %. Le hoquet ($p = 0,04$), la détresse respiratoire ($p = 0,04$) et les signes hémorragiques ($p = 0,01$) étaient plus présents chez les patients décédés. Le paludisme (72 %)

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et le diabète (2 %) étaient les principales comorbidités. La létalité a été de 44 % [intervalle de confiance 95 % (33–54 %)]. La durée moyenne d'hospitalisation était de 7,96 ± 5,81 jours.

Conclusion. – Cette première épidémie à Conakry était caractérisée par le jeune âge des patients, des signes hémorragiques discrets mais associés à la létalité. Son contrôle passe par une application stricte des mesures de prévention.

Mots clés : Ebola ; Guinea ZEBOV ; Conakry

1. Introduction

The Ebola and Marburg viruses are currently some of the most virulent pathogens for humans. They cause a disease characterized by acute fever, inconstantly associated with an hemorrhagic syndrome, with a rapidly fatal outcome for 90% of those patients with the most severe presentations [1]. However, all clinical presentations included, the case-fatality rate of Ebola infections is variable and was estimated between 55 and 76% in the various outbreaks reported since 1976 [2]. The extremely rapid outcome of the disease, the high mortality rate, and the absence of specific treatment and vaccine make these viruses a major problem for public health in populations of Sub-Saharian Africa [3].

Ebola virus, previously confined to Central Africa, was recently identified in West Africa. The first Ebola outbreak was officially notified in Guinea on March 21, 2014. The disease has since spread to other neighboring countries. The virological investigation identified Ebola Zaire (ZEBOV) as the causative agent. The sequencing of the full genome and a phylogenetic analysis proved that the Guinea ZEBOV was different from the ZEBOV strains found in the Democratic Republic of Congo and Gabon [4].

Our objectives were to describe the epidemiological, clinical, and outcome features of the Ebola virus disease (EVD) in patients hospitalized at the Conakry Ebola treatment center (ETC) and to identify the clinical signs and symptoms associated with death.

2. Materials and methods

2.1. Population and study site

We included patients presenting with an Ebola virus infection confirmed by RT-PCR [4,5] performed through the Guinea "hemorrhagic fever project" laboratory who were managed at the Donka Teaching Hospital ETC in Conakry. The ETC was opened on March 2014 by the Donka Department of Infectious and Tropical Diseases, in collaboration with MSF Belgium, and is fully devoted to the treatment of patients infected with the Ebola virus.

2.2. Data collection

The medical staff collected the patient data prospectively from March 25 to August 20, 2014: age, sex, occupation, home location, comorbidities, symptoms, treatments administered during the hospital stay, and outcome.

Working in the economical informal sector was defined by as having an occupation without any fixed wage: workers, merchants, and farmers.

Recovery was defined as the absence of clinical signs and a negative RT-PCR result for Ebola virus.

2.3. Statistical analyses

We collected socio-demographic, and clinical data, as well as data relative to death. We analysed indicative variables using the Chi^2 test or the Fisher exact test and continuous variables using Student's *t*-test and Mann-Whitney's test. The level of significance was set at 5%. The data was analyzed with SPSS Version 17.0 (SPSS Inc., Chicago, IL, USA).

3. Results

Ninety patients infected by Ebola virus were hospitalized in the ETC during the study period. The number of admissions varied from week to week with peaks at the 3rd, 16th, and 10th weeks with respectively 12, 10, and 8 cases (Fig. 1). The mean age was 34 ± 14 years, with 57 male patients (63%). Most patients worked in the informal economical sector ($n = 34$, 38%) or were medical and paramedical staff (physicians $n = 11$; 12%, nurses $n = 5$; 6% and laboratory workers $n = 1$; 1%). Most patients were from the Conakry suburbs ($n = 67$, 74%) and from Boffa ($n = 10$, 11%). The socio-demographic characteristics of patients are listed in Table 1. The mean time from symptom onset to hospitalization was 6 ± 3 days.

The most frequent clinical signs were asthenia (80%), fever (72%), nausea/vomiting (60%), diarrhea (34%), and myalgia (23%). Fourteen percent of patients presented with respiratory distress and 26% with hemorrhagic signs (Table 2). Hiccups ($P = 0.04$), respiratory distress ($P = 0.04$), and hemorrhagic signs ($P = 0.01$) were significantly more frequent in patients who died than in survivors in a univariate analysis (Table 3). Malaria ($n = 65$; 72%) and diabetes ($n = 2$%) were the most frequent comorbidities.

The case fatality rate was 44% [95% confidence interval (33–54%)]. Twenty of the 39 patients who died presented with hypovolemic shock, 13 with septic shock, and 6 with cardiovascular collapse.

The therapeutic management included rehydration (oral rehydration solution, Ringer's lactate), vitamin therapy, antibiotic prophylaxis for the prevention of bacterial infections