Profile of COVID-19 positive patients admitted from March to June 2020 at the Sino-Congolese Friendship Hospital in N'djili from Kinshasa, Democratic Republic of Congo.

Profil des patients positifs à la COVID-19 admis à l'Hôpital de l'Amitié Sino-Congolaise de N'djili du 10 Mars au 30 Juin 2020, Kinshasa, République Démocratique du Congo.

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Résumé
Contexte : L'émergence récente de la COVID-19 dans le monde y compris la République Démocratique du Congo a pour conséquence la compréhension de schéma de transmission, la sévérité, les caractéristiques cliniques et les facteurs de risque d'infection. **Objectifs :** Déterminer le profil des patients positifs au COVID-19 tant sur le plan épidémiologique, clinique, paraclinique et thérapeutique suivi à l'Hôpital de l'Amitié Sino- Congolaise. **Méthodes :** Une étude descriptive réalisée sur un collectif de 83 patients positifs à la Covid-19 du 10 mars au 30 juin 2020. **Résultats :** L'âge moyen est de 46ans dont 63% sont âgés de moins de 50 ans. Soixante-deux patients (75%) étaient des cas non sévères et vingt-un patients (25%) étaient des cas sévères. Le sexe masculin était prédominant (63%) et le *sexe ratio* (M/F) est de 1,68%.Trente pourcent de patients présentaient des comorbidités dont l'hypertension artérielle était prédominante (20,5%). Les symptômes étaient dominés par la tétrade « fièvre-signes de détresse respiratoire-céphalée-toux » dont la fièvre était prédominante (39,8%). Le signe radiographique était pneumopathie interstitielle basale (2,4%) et le signe tomodensitométrique était verre dépoli en plage (1,2%). Le taux de létalité est de 12,3%. Cinquante patients (60%) traités avec (chloroquine+azithromycine+vitamine C+zinc) et vingt-trois patients (27%) traités avec (amoxicilline-acide clavulanique+azithromycine) étaient guéris. **Conclusion :** Cette étude réalisée dans le contexte de la pandémie a montré que l'âge supérieur à 50 ans apparait comme fortement associé à la survenue d'un syndrome de détresse respiratoire aigu et est associé à la mortalité.
Mots-Clés : COVID-19, Hôpital de l'Amitié Sino-Congolaise.

Abstract
Background: The recent emergence of COVID-19 around the world including the Democratic Republic of Congo has resulted in an understanding of the transmission pattern, severity, clinical features and risk factors for infection. **Goals:** Determine the profile of COVID-19 positive patients on the epidemiological, clinical, paraclinical and therapeutic levels followed at the Hospital Sino-Congolese Friendship. **Methods:** A descriptive study carried out on a group of 83 patients positive for COVID-19 from March 10 to June 30, 2020. **Results:** The average age is 46 of which 63% are under 50.Sixty-two patients (75%) were no severe cases and twenty-one patients (25%) were severe cases. Male sex was predominant (63%) and the sex ratio (M/F) was 1.68%. Thirty percent of patients presented with comorbidities in which high blood pressure was predominant (20.5%).The symptoms were dominated by the tetrad " fever-signs of respiratory distress-headache-cough " of which fever was the predominant (39.8%). The radiographic sign was basal interstitial lung disease (2.4%) and the CT sign was plaque ground glass (1.2%). The case fatality rate is 12.3%. Fifty patients (60%) treated with (Chloroquine +azithromycine + vitamin C + zinc) and twenty three patients (27%) treated with (amoxicillin-clavulanic acid + azithromycin) were cured.
Conclusion: This study, carried out in the context of the pandemic, showed that age over 50 appears to be strongly associated with the onset of acute respiratory distress syndrome and is associated with mortality.
Keywords: COVID-19, Sino-Congolese Friendship Hospital.

Introduction

In December 2019, the appearance of several pneumonia cases of unknown origin in Hubei province in China led to the identification, in January 2020, of a new coronavirus [1], called SARS-CoV-2 by the Coronavirus working group of the International Committee for Taxonomy of Viruses, named COVID-19 by the World Health Organization (WHO) [2]. It is a *Betacoronavirus* possibly transmitted to humans by some authors from animals, in the Huanan seafood market, located in the city of Wuhan. Large numbers of infected people frequented with the wet animal market in Wuhan city where live animals were sold. It is suggested that this is the probable zoonotic origin of COVID-19. Previously, the Bat was known as a reservoir of SARS- Cov of 2003 in China [3]. However, Pangolin is now known to be the most probable mamalian intermediate host of SARS-CoV-2 [4].According to data collected by Johns Hopkins University, the COVID-19 pandemic has claimed 857.263 victims worldwide, while at least 25.761.430 cases have been identified since the first detections of the coronavirus at the end of 2019, in China (June 5 [th], 2020).The spread of the new virus called Coronavirus (SARS-CoV-2 or Covid-19), declared by China in December 2019, led to a pandemic as early as March 2020, forcing each health system in affected countries to adapt quickly. A public health emergency of international concern would be a big risk in countries with vulnerable health systems. The relief committee said the spread of COVID-19 can be halted by early detection, isolation, prompt treatment, and execution of a robust system to trace contacts [43]. The recent emergence of COVID-19 worldwide has resulted in an understanding of the transmission pattern, severity, clinical characteristics and risk factors for infection. Studies aimed at determining the epidemiological and clinical characteristics of cases in different contexts are essential to deepen the understanding of this virus and of this pandemic which affects several countries of the world. The Democratic Republic of Congo (DRC) has not been spared by this pandemic. As of September 13, 2020, it has 10,390 confirmed cases with 319 active cases, 9,807 cured and 264 deaths. Kinshasa, capital of the country, is the province that reports the most COVID-19 cases, followed by Central Kongo and Upper Katanga [45]. Several hospitals have been selected for the care of patients suffering from corona virus disease including the Sino-Congolese Friendship Hospital which is located east of the city-Province of Kinshasa, in the Tshangu district. . It is the Referral Hospital in this district. The very first positive case of COVID-19 in the DRC was received at this hospital, we are currently noticing and objectifying several patients diagnosed positive for COVID-19 hospitalized in the Sino-Congolese Friendship Hospital. The clinical course of these patients was benign and malignant. The present study aims to determine the profile of COVID-19 positive patients at the epidemiological, clinical, paraclinical and therapeutic levels followed by the Sino-Congolese Friendship Hospital in the period from March 10 to June 30, 2020.

Methods

This is a descriptive study based on series of cases admitted to the Sino-Congolese Friendship Hospital retained in the care of Covid-19 patients in the period from March 1st 2020 to June 30th 2020. The protocol of this study was approved by the Office of the Ethics Committee of the School of Public Health of the University of Kinshasa (Approval N°: SPH/EC/116/2020). Data recording and statistical analysis were performed with Excel software based on series of cases admitted to Hospital. The criteria for inclusion were: Adult (defined as Age $\geq$ 18 years), Presence or not of comorbidity, Presence of symptoms or not related to SARS-CoV-2, Laboratory confirmation of infection by SARS-CoV-2 by RT- PCR or thoracic CT-Scan, Organic dysfunction judged to be related to SARS-CoV-2. The patients were subjected to the test (RT-PCR) and they are declared cured after two negative RT-PCRs on the eleventh and fourteenth day of treatment. Before the protocol was developed by the COVID-19 Response National Technical Service (Chloroquine + Azithromycin + Vitamin C + Zinc), We have treated patients infected with COVID-19 as having lower respiratory infections lasted 10 days with Amoxicillin-Clavulanic acid + Azithromycin + Vitamine C. The patients received according to the National protocol chloroquine treatment at a dosage of 250 mg tablet bid during10 days, azithromycin at a dosage of 500 mg tablet qd on the first day then 250 mg tablet qd on the following 4 days, vitamine C at the dosage of 500mg IV bid during 10 days or vitamine C syrup thrice during 10 days, Zinc at a dosage of 20 mg tablet once during 10 days and amoxicillin-clavulanic acid either at the dosage of 1000 mg tid during 10 days or at the dosage of 1 g / 125 mg IV bid during 10 days.

Results

During this period, 107 patients were registered of which 83 were PCR positive and 24 negative. Out of 83 positives, 62 were admitted as non severe cases (mild and moderate) and 21 as severe cases.

- **Epidemiological profile**

6% of patients from France were admitted, including 6.5% as non severe cases and 5% as severe cases. 94% contracted the virus locally. The mean age of all positive patients is 46 ± 16 years (30-62years), 62 patients (75%) were non severe cases of which 70.5% were less than 50 years old and 21 patients (25%) were severe cases of which 62% were over 50

years old. Male is predominant over female (63%) and the overall sex ratio (M / F) is 1.68. Six percents of health personnel working in their respective structures contracted the virus and were hospitalized. No staff from the response team at the Hospital has contracted the virus throughout the pandemic. Fifty-two percents came from the municipalities of the city of Kinshasa which are in the constituency or in the district of the Sino-Congolese Friendship Hospital (Table I).

Table I: Epidemiological profile of all patients positive for COVI D-19.

Criteria	All patients n=83	Non severe cases n=62 (75%)	Severe cases n=21 (25%)
Source of cases	94% LC	93,5% LC	95% LC
	6% FC	6,5% FC	5% FC
Age (ans)	46± 16	43± 16	54± 16
	< 50 (63,85%)	< 50(70,5%)	> 50 (61,9%)
Sex	M=63% F=37%	M=53% F=47%	M=90,5% F=9,5%
Sex ratio (M/F)	1,68	1,13	9,5
Profession	3% HW	5% HW	0%HW
	97% NHW	95% NHW	100% NHW
Maritial-Status	67,5% married	60% married	90,5% married
	25% single	31% single	9,5% single
Commune of housing	48% out of district	47% out of district	55% out of district
	52% district	53% district	45% district

Legend :
LC: Patients who contracted the virus locally = Local cases
FC: Foreign Cases
District: patients coming from the communes which are in the district of the Hospital Sino-Congolese Friendship.
*Out of District: patients coming from the communes which are not in the district of the Hospital Sino-Congolese Friendship*
HW : Health Workers
NHW : Non Health Workers

- **Clinical and Paraclinical Profile**

Twenty-four patients (30%) had comorbidities of which high blood pressure (20.5%) was at the first place, followed by diabetes mellitus (9.6%), alcoholism (8.4%), smoking (6%), asthma (3.6%), heart disease (2.4%), obesity (2.4%) and pregnancy. Over 50% of severe cases had comorbidity.
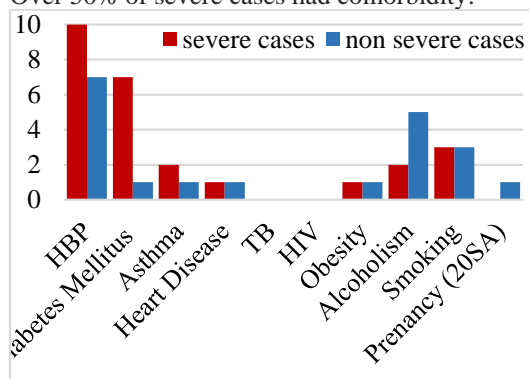
**Graph 1**: frequency of comorbidities in severe and non-severe cases of COVID-19

Fever is the predominant symptom (39.8%) followed by signs of respiratory distress (33.7%), headache (32.5%), cough (25.3%), sore throat (19.3%), rhinorrhea (6%), anosmia (1%), anxiety (1%) and conjunctival pallor (1%). SaO2 varies from 90 to 99 % non severe cases and from 53 to 89% in severe cases. The radiological sign (Chest X-ray) demonstrated in both categories is basal interstitial lung disease (2%) and (5%) and in severe cases, a ground glass image (5%). 73 patients (88%) were cured and 10 (22%) had died. The case fatality rate is 12.3% (Table II).

Table II: Clinical and paraclinical profile in severe and non –serve cases positive for COVID-19.

Criteria	All patients (n=83)	Non case severe (n=62)	Case severe (n=21)
Headache	27(32,5%)	16 (26%)	11 (53%)
Fever	38± 0,5 (39,8%)	38± 0,5 (37%)	39± 0,5 (48%)
Dry cough and fatty cough	21 (2.3%)	12 (19%)	9 (43%)
Sore throat	19 (19,3%)	11 (18%)	5 (24%)
Rhinorrhea	5 (6%)	4 (7%)	1 (5%)
Respiratory distress	28 (33,7%)	7 (11%)	21 (100%)
Anosmia	1 (1,2%)	0 (0%)	1 (5%)
Anxiety	1 (1,2%)	1 (2%)	0 (0%)
Palor	1 (1,2%)	0%	1 (5%)
Clinical outcome	73 (88%) cured	57 (92%) cured	16 (76%) cured
	10 (12%) death	5 (8%) death	5(24%) death
SaO2(%)	83(80±16)	62 (95± 5)	21(71±18)
Chest x-ray (interstitial image)	2 (2,4%)	1 (2%)	1 (5%)
CT-Scan (frosted glass)	1 (1,2%)	0 (0%)	1 (5%)
EKG on normal Day 0	4 (4,8%)	3 (4%)	2 (4%)
Pathological EKG Day 0	8 (9,6%)	6 (10%) (Sinus tachycardia myocardial ischemia, Extrasystole)	2(10%) (Sinus tachycardia myocardial ischemia, Extrasystole)
Day 0 EKG not done	74 (89%)	56 (86%)	18 (86%)
Normal EKG at Day 10	74 (89%)	54 (87%)	20 (90%)
Pathological EKG at Day 10	3 (3,6%)	3 (5%)	0 (0%)
EKG not perfomed at Day 10	7 (8,4%)	5 (8%)	2 (10%)

- **Therapeutic profile**

In this study, 60% of overall COVID-19 patients were on Chloroquine + Azithromycin + Vitamin C + Zinc. Severe cases were also on low molecular weight heparin, on corticosteroids and consumed an average of 10 L/ min. Symptomatic treatment consisted of cough suppressants and analgesics. Co-morbidities were treated with antihypertensives, Oral Diabetes Drugs (ODD) and antileukotrienes.
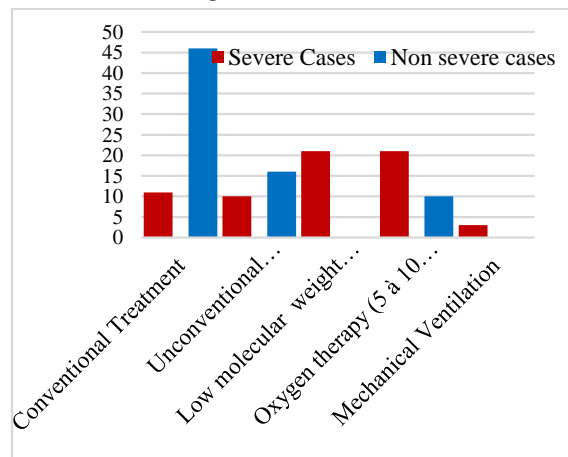
Graph 2: Therapeutic profile in severe and non-severe cases positive for COVID-19

Legend :

Conventional Treatment: Chloroquine+ Azithromycine+ Vitamine C+ Zinc ((Chloroquine cé 250 mg tablet bid// Day 10 et Azithromycine cé 500mg tablet qd/ Day 1 then 250 mg tablet qd/ Day 2-Day 5)

Unconventional Treatment : amoxicillin-clavulanic acid + azithromycin (amoxicillin-clavulanic acid 1000 mg tablet tid//Day 10 or at the dosage of 1 g / 125 mg IV bid // Day 10 + Azithromycine cé 500 mg tablet qd/Day 1 then 250 mg tablet qd/Day 2-Day 5)

- **Observation of severe cases and no severe cases for COVID-19 on conventional versus unconventional treatment**

Nine patients (82%) admitted as severe cases were on chloroquine + azithromycin + vitamin C + zinc and were cured. The mean age of these patients was 45± 16 years. Sixty seven percents of the patients had a comorbidity of which 83% were hypertensive, 50% diabetic and 33% asthma for patients under chloroquine. The pre and post treatment EKG were normal in 20%. Two patients (18%) who received chloroquine + azithromycin + vitamin C + zinc had died. The average age of these patients was 49± 5 years and 90% of these patients presented with a comorbidity of which 100% were hypertensive and alcoholic. Seventy percents of the patients admitted as severe cases were on amoxicillin-clavulanic acid + azithromycin and were cured. The mean age of these patients was 47± 18 years and 43% had comorbidity of which 100% were hypertensive, 67% diabetic and 33% heart disease while 30% had died under this combination. The average age was 67± 5 years of which 67% had a comorbidity of which 100% were diabetic and 50% were hypertensive. Eighty-nine percent of no severe cases received chloroquine + azithromycin + vitamin C + zinc and were cured with an average age of 41± 20 years. Seventeen percents presented with a comorbidity in which hypertension was predominant with 67%, while 11% of these patients on this combination, whose mean age is 41± 12 years, had died. None of these patients had comorbidities. Seven point three percents had a pathologic pre-chloroquine EKG (sinus tachycardia) of which 4.9% presented with comorbidity and 2.4% had a pathologic EKG at the end of treatment (Sinus tachycardia). 100% of no severe cases on amoxicillin-clavulanic acid and azithromycin were cured with an average age of 49 years and 25% presented with comorbidity of which 25% were hypertensive and smokers (Table III and IV).

Table III: Observation of severe cases for COVID-19 to conventional versus unconventional treatment

Conditions	Conventional Treatment (n=11)	Unconventional Treatment (n=10)	Pathological pre-chloroquine EKG	Pathological EKG on D10
Cured	9 (82%)	7 (70%)	0	0
Age of cured cases (years)	45±16	47±18	0	0
Cured cases with comorbidities	**6 (67%)**	**3 (43%)**	0	0
	5 HBP (83%)	3 HBP (100%)		
	3 Diabetes Mellitus (50%)	2 Diabetes Mellitus (67%)		
	2 asthma (33%)	1 Heart disease (33%)		
Cured cases without comorbidities	**3 (33%)**	**4 (57%)**	0	0
Death	2 (18%)	3 (30%)	0	0
Age of death cases(years)	49± 5	67± 5	0	0
Death with comorbidities	1 (50%)	2 (67%)	0	0
	1 HBP (100%)	1 HBP (50%)		
	1 alcohol (100%)	2 Diabetes Mellitus (100%)		
Death without comorbidities	1 (50%)	1 (33%)	0	0

Table IV: Observation of non-severe cases for COVID-19 to conventional versus unconventional treatment

Conditions	Conventional Treatment (n=46)	Unconventional Treatment (n=16)	Pathological pre-chloroquine EKG	Pathological EKG on D10
Cured	41(89%)	16 (100%)	3(7,3%) Sinus tachycardia	1(2,43%) Sinus tachycardia
Age of cured cases (years)	41± 20	41± 12	57± 15	0
Cured cases with comorbidities	7 (17 %)	4 (25%)	2 (4.9 %)	0
	4 HBP (67%) 1 Diabetes Mellitus (17%) 1 Heart disease (17%) 1 Morbid obesity (17%) 1 alcohol (17%) 1 Pregnancy (17%)	1 HBP (25%) 1 Tobacco (25%)	1 Heart disease 1 Pregnancy 1 Morbid obesity	
Cured Cases without comorbidities	35 (85%)	12 (75%)	0	0
Death	5 (11%)	0	0	0
Death cases with Comorbidities	0	0	0	0
Age of death cases	41± 15	0	0	0
Death cases without comorbidities	5 (100%)	0	0	0

Discussion
Epidemiological profile
In the present study, the age range was 30-62 years with an average of 46 years and 63% of the patients were under the age of 50. On the one hand, these data are intermediate with those reported in a few studies of China [14, 15, 16, 29] where the average age was 47 years, 56 years, 51 years and 44 years. On the other hand, they were different with those of Italy [21], Tunisia [26], China [28] and Algeria [31] where 70% of patients were over 50 years old. In Sub-Saharan Africa, the age pyramid, in most countries, being deviated towards the younger ages, one could therefore think that these young people would have less co-morbidity and, therefore, would defend themselves better against COVID-19 [47]. However, this hypothesis must be qualified because chronic non communicable diseases and their associated risk factors occurring at a younger age in Sub-Saharan African compared to the West, chronological (demographic) age does not always correspond to the vascular age which allows a better assessment of cardiovascular risk [48] at age beyond 50 years. The male sex was predominant in our study. The male predominance observed in this study is intermediate with those reported in the literature [14, 15, 16, 21, 28, 29], the rate of which varies from 50% to 82%. On the other hand, in some Maghreb countries [26 and 31], the female sex predominated with 55% and 60.5%. This difference is possibly explained by the higher frequency of risk factors for the severity of the disease in the male population.
Clinical profile, paraclinical and clinical outcome
Co-morbidities are possible risk factors for increasing the severity of COVID-19. Hypertension is the most common comorbidity in this study. In

similar studies [14, 15, 16, 21, 26, 28, 30, 31, 37, 38], the main comorbidities found in the population of hospitalized patients were hypertension (15-64%), diabetes mellitus (7.4-30%) and vascular pathologies (2.5-15%). In contrast, in China [37] and France, diabetes mellitus (19.6%) was the most frequent comorbidity. COVID-19 is manifested mainly by respiratory damage but a richer semiology is starting to be reported [44]. The main symptoms in this study were fever, signs of respiratory distress, headache, cough, and sore throat. In similar studies [14, 15, 16, 21, 28, 29, 31], the cardinal signs of covid-19 associate a fever (88.7% -100%), a cough (67.8-85%), sputum (23-41.3%) and dyspnea (18.7-85%) but asthenia was the most frequently reported sign in Tunisia, 70% [21] and in Algeria, 80.2% [31]. Chest x-ray signs were nonspecific. Patients presented images of interstitial syndrome in 2% of cases. Interstitial anomalies have been reported by Guan et al. [14] in 14.7% of cases. A single patient presented a ground glass image in 1.2% of cases. Frosted glass images were also evident in Tunisia [21] and China [42].In this work, 6% of the deceased patients were over 50 years old and 80% had comorbidity, the main ones being hypertension, diabetes mellitus. The various daily epidemiological reports of the Multisectoral Committee for the response against COVID-19 [45] also indicated that mortality is very high in patients with comorbidities such as hypertension, for which the prevalence of Kinshasa is close to 30% that of certain Western countries [46]. While in France [20], 89% of deceased patients were over 65 years of age and 90% were carriers of comorbidity. The case fatality rate obtained at the Sino-Congolese Friendship Hospital was 12.3%, while in some studies it ranged from 0.7% to 26%

[18, 21, 24, 25]. This difference is explained by the size of the sample. In the study, age over 50 appeared to be strongly associated with the occurrence of acute respiratory distress syndrome and was associated with mortality. On the other hand those of Wu C et al. [16] and Pirnay G et al. [38] Age over 65 was associated with mortality.

Therapeutic profile

The combinations chloroquine + azithromycin + vitamin C + zinc and amoxicillin-clavulanic acid + azithromycin have shown a beneficial effect with 60% and 30% in severe and non severe cases that have comorbidities and an average age of 43 years and 48 years old. We don't know presently if the survival in these group is linked to beneficial effect. What we see is just 60% Discharge in the first group and 30% in the second.

Patients treated with the combination chloroquine + azithromycin + vitamin C + zinc had fewer adverse effects on the EKG (10%). Patients treated with the combination chloroquine + azithromycin + vitamin C + zinc had fewer side effects on the EKG. The beneficial effect of the hydroxychloroquine / azithromycin combination was also demonstrated in a study in France [38] carried out in 68 patients all over the age of 65, of whom 7 had died and 61 were cured. A recent retrospective study showed that the administration of hydroxychloroquine was associated with a significant reduction in mortality in severe forms of covid-19 [39]. In contrast, in a non-randomized study, hydroxychloroquine in severe forms did not show an improvement in the vital prognosis [40].

CONCLUSION

This study, carried out in the context of the pandemic, showed that age over 50 appears to be strongly associated with the occurrence of acute respiratory distress syndrome and is associated with mortality. Combinations of chloroquine + azithromycin + vitamin C + zinc have shown a beneficial effect in 60% of severe and severe cases with or without comorbidities, which have an average age of 43 to 48 years old.

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