Acta Biomed 2021; Vol. 92, Supplement 2: e2021339 DOI: 10.23750/abm.v92iS2.12672

Brief report: impact of the first wave of the Covid-19 pandemic on emergency surgical activities at the National Reference University Hospital of N'Djamena

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Abstract. *Aim of the work:* An evaluation of Covid-19 pandemic impact on emergency surgical activities at the CHU-RN in N'Djamena, Chad. *Method:* A retrospective study of patients admitted to the surgical emergency room during the first wave of the pandemic (April-June 2020). The data were compared to those of patients admitted during the same period in 2019 (control group). *Results:* A total of 3248 patients were received: 2366 in 2019 and 882 in 2020. Respective reduction of 50% of admissions and 31% of emergency operations were observed. The average age (30 years) and male predominance remained unchanged. The average admission time went from 72 hours in 2019 to 7 days in 2020. We also noticed that digestive emergencies, such as acute generalized peritonitis (6.6% vs 14.4%, $p < 0.1$) and strangulated hernias (6.6% vs 15.2% p: 0.07) were more severe in 2020. *Conclusion:* COVID-19 had reduced admissions and urgent surgical interventions.

Keywords: COVID-19, Surgical emergencies, Africa, Chad.

Introduction

The COVID-19 pandemic has modified the organization of care and changed the way general surgery is performed at the University Hospital of National Reference of Ndjamena (CHU-RN) as it has everywhere in the world. Health priorities and care circuits have changed.

While emergency surgery remained a priority, interventions for functional surgery have been postponed. All surgical specialties have seen their practice modified and destructured by the pandemic (1, 2). In Chad, the first case of COVID-19 was reported on 19 March 2020 in the city of N'Djamena. Since then, the number of confirmed cases has increased from 1 to 848 at the end of June 2020 with 72 deaths and 718 cured (3). The Chadian government immediately instituted a state of health emergency, insisting on the following measures: isolation of N'Djamena, curfew from 8 pm to 5 am, mandatory wearing of facemasks, and observance of social distancing (3). In April 2020, the clinical department of the CHU-RN asked the surgical divisions to deprogram as soon as possible all elective surgical procedures requiring postoperative resuscitation or continuous monitoring, despite the loss of opportunity for patients. Nevertheless, the surgical emergency room at the CHU-RN remained open. The aim of this study was to assess the impact of the Covid-19 pandemic on emergency surgical activities at the CHU-RN.

Patients and Methods

A retrospective and analytical study have been conducted in the surgical emergency room of the

CHU-RN. Two periods have been considered: The 3-month period, after the announcement of the state of health emergency decided by the government from April to June 2020 and the same period one year earlier (April, May, June 2019).

All patients admitted to the emergency room or operated on during both periods with a complete record were included. Sociodemographic, clinical, type of emergencies (traumatic, digestive, urological, other ...), duration of hospitalization, surgical procedures, morbidity and mortality were recorded.

A comparative analysis of the data concerning surgical activities was evaluated between the two selected periods, as well as the evolutionary aspects of the patients managed. Correlations between variables in the two groups were comparatively sought. A threshold of $p<0.05$ was considered statistically significant.

Results

Surgical emergency admissions at CHU-RN were 2366 in 2019 and 882 in 2020 implying a 50% reduction in attendance during the pandemic (2020). The surgical emergencies operated (digestive, ortho traumatology, urology) had involved 308 patients among which 183 patients recruited in 2019 and 125 patients during the pandemic (2020). A 31% decrease in urgent surgical activities was reported during the COVID-19 period. The mean age of patients was 29 years in 2019 and 34 years in 2020 with a male predominance in both groups.

Urgent pathologies were classified into two groups (traumatic/non-traumatic) reported in Table I.

During the pandemic, traumatic emergencies were reduced by one third (1/3). The 308 patients operated on during the two study periods reported digestive, orthopedic trauma and urological emergencies (Table II).

Trauma emergencies were 51 cases in 2019 and 40 cases in 2020, dominated in both groups by limb fractures. In both phases of the study, 193 patients were admitted for abdominal surgical emergencies. The number of patients admitted during the COVID-19 pandemic decreased by 10% compared with the previous period: 112 (58%) to 81 patients (42%) (Table III).

Digestive diseases were also managed at a more advanced stage. During the pandemic, a decrease in interventions for acute appendicitis (15.8% vs 14%, $P<0.008$) and intestinal obstruction (6% vs 8% $p<0.05$) was observed. There were more appendicular peritonitis and peptic ulcer perforation (6.6% vs. 14.4%, $P< 0.1063$) in 2020 than in 2019. More strangulated hernias were seen during COVID-19 (6.6% vs 15.2%, p: 0.07). Concerning traumatic abdominal emergencies, abdominal wounds concerned 32 patients (17.5%) in 2019 and 14 (11.2%) in 2020. The delay between the first symptom and the consultation was longer, with an average of 7 days during COVID-19 vs 72 hours before ($p < 0.0001$). Urological emergencies consisted of 20 (10.9%) cases in 2019 and 4 (3.2%) during the pandemic, dominated by acute urine retention (1.6%) and perineal gangrene (1.6%). In this series, mortality was 7.7% in 2019 and 7.2% in 2020. Morbidity was 27% before the pandemic and 39% during the pan-

Table 1: Distribution of emergencies according the type of emergency

EMERGENCIES	2019		2020		Total
	N	%	N	%	
Non traumatic	45	24,6	**79**	**63,2**	124
Traumatic	**138**	**75,4**	46	36,8	184
Total	183	100	125	100	**308**

$khi^2 = 29.3019$; p=0,0000

Table 2: Distribution of emergency surgery patients according to surgical specialties

Type of urgent pathologies	2019		2020		Total	khi²	P
	N	%	N	%			
Traumatology	51	27,9	40	32,0	91	0.3810	0.5370
Urology	20	10,9	4	3,2	24	3.7434	0.0244
Digestive	112	58	81	42	193	0.342	0.5579
Total	**183**	**100**	**125**	**100**	**308**		

Table 3: Distribution of patients according emergency digestive surgery

Diagnostic	2019		2020		Total	khi²	P
	N	%	N	%			
Digestives emergencies	**112**	**61,2**	**81**	**60,8**	**193**	0.342	0.5579
*** Non traumatic ;**							
Acute appendicitis	**29**	**15,8**	**14**	**11,2**	**43**		
Hernia	12	6,6	19	15,2	31		
Intestinal obstruction	**11**	**6**	**10**	**8,0**	**21**	**0.3072**	**0.0579**
Peritonitis	12	6,6	18	14,4	30		
Proctology	6	3,3	3	2,4	9		
Others*			2	1,6	2		
Liver abscesses	5	2,7	1	0,8	6		
*** Traumatic ;**							
Abdominal wounds	**32**	**17,5**	**14**	**11,2**	**46**	**1.9762**	**0.1597**
Abdominal countusion	**5**	**2,7**	**0**	**0,0**	**5**	**1.2536**	**0.02462**

*cholecystitis (1) and woundering spleen (1).

demic. Morbidity was dominated in both groups by parietal suppuration.

Discussion

The COVID-19 pandemic has had a considerable impact on health systems and society in general worldwide. It has changed the organization of care. Thus, general emergency surgery remains a priority, but almost everywhere, interventions for functional surgery are to be postponed (1). In our hospital's emergency surgery departments (urology, digestive and orthotraumatology), a 31% decrease in emergency surgery was observed. The COVID-19 pandemic affected the pre-existing system of emergency surgical care delivery in low-income countries like Chad, where infrastructure and resources are limited (2). During the pandemic, we also observed a 50% reduction in admissions to surgical emergencies at the CHU-RN. This reduction in surgical activities has been found in several series. Thus, a worldwide survey reported a similar 79% decrease in neurosurgical procedures (1). An Italian study reported a reduction in walk-in surgical emergencies of 86% in the first month following the state of health emergency in the country. This decrease occurred despite the reservation of a specialized center for emergency medical and surgical care for non-COVID-19 infected patients (4). Work in San Francisco and Bangladesh reported that operating room activities were reduced by 80% and 54% respectively (5-6). In their context, they attributed the decrease to the redeployment of a large part of resources to the care of COVID-19, as well as to blockages leading to poor access to health care. In our series, the decline observed was probably multifactorial and deeply linked to the increasing anxiety of the public to go to the hospital, also considering the government messages to "stay at home". This is compounded by the reluctance of primary care providers to send patients to the hospital to limit potential exposure to COVID-19 and to mitigate the risk of overburdening the hospital system.

In this study, unsurprisingly, we found a predominance of young male subjects. In Africa, overall, surgical emergencies concern young male adults (7). We note a smaller number of traumatic emergencies, particularly fractures of the limbs and abdominal wounds/contusions (75.4% in 2019 VS 36.8% in 2020). Before the pandemic, the emergency room of the CHU-RN used to manage an average of 9 limb fractures related to road accidents per day (8). During the pandemic, the average number of limb fractures was reduced to one every two days. During the study period of the COVID-19 pandemic, we note a decrease in appendectomies and intestinal obstruction procedures. Similar results were reported by European authors (9). In their context,

they opted for a temporary protocol: appendicitis seen early and uncomplicated cholecystitis were treated conservatively (antibiotic therapy) or by laparoscopy (9). We do not have this experience. In our context, during the period considered Covid-19 some patients with acute appendicitis consulted later than normal. For this reason, we found many cases of acute generalized peritonitis, mainly of appendicular origin (75%) during the pandemic. Moreover, in N'Djamena the etiologies of peritonitis have been dominated for a decade by penetrating wounds (7). This trend was reversed during the pandemic. Traumatic digestive emergencies clearly decreased. The restrictive measures imposed by the government (curfew, confinement) have reduced the number of criminal acts at the origin of traumatic surgical pathologies treated in emergency, in particular penetrating abdominal wounds. Paradoxically, we found an increase in strangulated hernias during the pandemic period (6.6% in 2019 VS 15.2 in 2020). This could be explained by the fact that all scheduled surgeries were cancelled during COVID-19. Consequently, simple hernias only come to the hospital in case of strangulation. Some studies have found, in contrast, a decrease in hernia surgery during the pandemic period (10). Overall, our study also shows a delay in consultation in the group of patients received during COVID-19, implying more advanced and complex conditions to be treated with recourse to resuscitation and a longer duration of hospitalization. Similar results have already been reported in literature (11). During the two periods considered in our study, mortality remained almost the same. However, some series report higher mortality during the pandemic (6,11). In our series, we only noticed higher morbidity in the 2020 group of patients. This could be related to the delay of consultation or refusal to consult early for fear of contracting COVID-19 in the hospital. The group of patients received during the COVID-19 period in our practice had a lot of peritonitis and strangulated hernias. These are often complicated by parietal suppuration, which prolong the hospital stay of the patients. These findings, together with the socio-economic consequences of the measures imposed by the state of health emergency, also raise the problem of access to quality care in low-income countries.

Conclusion

The COVID 19 pandemic had a negative impact on surgical activities at the CHU-RN. Both admissions to the surgical emergency department and emergency surgical procedures decreased, by half and one third respectively, compared to the same period without Covid-19. This study is preliminary. It should be extended over a longer period with a multi-center recruitment in the different hospitals of N'Djamena to allow a better interpretation of the results.

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Received: 30 May 2021
Accepted: 30 November 2021
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