



RESEARCH ARTICLE

Impact of the Admission Period on the Mortality of Hospitalized Patients in the Service of Resuscitation of Souro Sanou Teaching Hospital(Chu-Ss) of Bobo-Dioulasso

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Abstract

Objective: To evaluate the impact of the admission period on mortality in the resuscitation department of Souro Sanou teaching hospital in Bobo-Dioulasso

Methods: This was a 6 months prospective cohort study, from July 1st to December 31, 2016. All patients admitted in the resuscitation department during study period were included. Patients were classified on two groups according to their admission period: P1 defined as on-hours (from 06:00 to 18:00 hours on weekdays) and P2 as off-hours.

Results: A total of 203 patients were included. The mean age was 35.17 +/- 22.23 years. The sex-ratio was about 1.6 (125 men and 78 women). The two groups were comparable as far as socio demographic (age, sex, origin), clinical (shock, prognostic score) and therapeutic characteristics (catecholamine support, intubation, invasive mechanical ventilation) are concerned. There was an increased mortality in P2 group (OR=2.59, p=0.025). Two others independent mortality factors have been identified: ICU intubation (OR=3.87; p=0.035) and shock state (OR=5.91, p=0.002).

Conclusion: This study revealed an excess mortality (at least twice as much mortality) for admissions outside working hours in resuscitation department of Souro Sanou teaching Hospital. This results suggest to better organize our functioning.

Keywords: Admission; Mortality; Resuscitation department

Introduction

Resuscitation is a medical discipline that deals with serious, unstable patients, requiring one to several organ replacements. Despite medical progress, mortality in intensive care units remains high (around 20%) with great variability according to the specificities of services [1,2].

Resuscitation admissions are open 24 hours a day and services are organized so that patients can be accommodated at any time and day of the week. However, the availability and quality of staff (doctors and paramedical teams) and technical means (imaging, laboratories), differ according to the admission period, whether it is during a day of the week, at the weekend or at night. So, hard at the day-care periods (weekends and nights), there is less medical presence available and there is less discussion about the diagnosis and management of a patient, with a possible deterioration of the prognosis [3]. The results of the studies on this subject are very discordant from one intensive care unit to another [4] and the data are almost non-existent in developing countries. This led us to evaluate the impact of the admission period on mortality in the resuscitation department of Souro Sanou

teaching hospital in Bobo-Dioulasso, taking into account our organization and hypothesizing that the periods with less medical presence may be associated with poorer prognosis and poorer management.

Patients and Methods

It is a cohort prospective collection over a period of six months from 1st July to 31st December 2016. Were included in our study, all patients admitted to the Resuscitation department during the study period. Patients who died less than one hour after admission were not included. The admission hours have been grouped into two main periods:

- P1 is working hours between 6:00 am and 6:00 pm working days (Monday to Friday).
- P2 is the non-working hours between 6pm and 6am the following day for working days; and between 6 am

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and 6 am the next day for non-working days (Saturday, Sunday and holidays).

The resuscitation service had 14 beds and accommodated an average of 500 patients per year. The medical team of the service, in a day of week (P1), is composed of three intensivists doctors, one or two doctors specializing in anaesthesia and intensive care, two interns and three externals. The guard periods (P2) are performed by a doctor resuscitator, accompanied by a doctor specializing in anesthesia and intensive care, and optionally an intern in medicine. The daily organization of medical tours is as follows: a clinical and therapeutic tour in the morning (between 8 am and 10 am), one visit in the afternoon (between 3 pm and 5 pm) and one at night by the guard team.

Between the medical tours, an intern and / or a senior doctor respond to any request from the nurses. The role of the medical team is to ensure the continuity of care of the service, the management of admissions to resuscitation, specialized advice in emergencies and in the various services. The paramedical

team of the day consists (P1) of three state-certified nurses and a nursing assistant. Custody (P2) is provided by two nurses (three teams of two for non-working days). The service did not have a stock of drugs; these were entirely the responsibility of the patient. For this study we were interested in the socio-demographic characteristics of the patients (age, sex), their admission periods, the reason for admission, the pathologies motivating admission, the gravity scores (IGS II and MPM II), the administered treatments and evolution during hospitalization in intensive care.

This data was collected on collection cards, from the clinical records, entered with the Epi Data version 3.1 software and analyzed with the stata version 12.0 software. Qualitative variables were expressed in number and percentage. Then, they were compared with the Chi2 test with possible Yates correction or the Fisher test depending on the case. Quantitative variables were expressed as mean and standard deviation (mean ± SD: standard deviation). Then they were compared with the Student *t* test. The differences between the groups were considered significant when a value of *p* less than or equal to 0.05 was found. To determine the independent mortality factors, a logistic regression fit including all significant variables was performed.

Results

We included a total of 203 patients, most of which (127) were admitted to non-working hours. Patients had a mean age of 35.17 years with extremes ranging from 14 days to 92 years old. There was a male predominance (61.6%) with a sex ratio = 1.6. The main characteristics of patients are resumed in (Table 1-3).

Both patient groups were comparable in terms of characteristics and therapeutics (tables 2 and 3)

In univariate analysis based on mortality, mortality factors found were: age (*p* = 0, 012), sex (*p* = 0.036) and shock (*p* <0.0001).

Characteristics	Number (%) / Mean ± SD
Sex	Number (%)
Male	125 (61.6)
Female	75 (38, 4)
Mean age ± SD	35.17 +/- 22, 23
Period of admission	Number (%)
P1	76 (37, 44%)
P2	127 (62, 56%)
Provenance of patients	Number (%)
Surgical emergencies	129 (63, 55%)
Medical emergencies	28 13, 79%)
Maternity	27 (13, 30%)
Private Medical Center	19 (9, 36%)

Table 1 : Main characteristics of the population.

Characteristics	Working Hours, N = 76	Non-Working Hours, N = 127	P
Sex M / F: n (%)	41/35	84/43	0.084
	53.95 / 46.05	66.14 / 33.86	
Age: n (%)	36.44 ± 21.42	34.40 ± 17.5	0.52
Pathologies: n (%)			
Medical	25	22	0,008
	(32,89)	-17.32	
Surgical	37	92	
	-48.68	-72.44	
Obstetric	14	13	
	-18.42	-10.24	
Presence of shock number (%)	13 (17.10%)	27 (21.26%)	0.4
Probability of Death (IGS: MPM) Mean ± SD	18.81 ± 21.66	23.53 ± 22.66	0.14

Table 2: Characteristics of Patient Groups by Admission Period.

Therapeutic Parameters and Evolution	Working Hours, N = 76	Non-Working Hours, N = 127	P
Mechanical ventilation: not(%)	8 (11,59)	12 (11,43)	1
Vascular filling delay	1.02 +/- 0.15	1	0.2
Vasopressors: n(%)	6 (8.70)	15 (14,29)	0.34
Average time	1	1	-
Tracheal intubation: n(%)	18 (25.71)	18 (17,31)	0.179
Average delay intubation	2.5 +/- 1.97	4.76 +/- 6.52	0.42
Average length of stay (h)	111.27 +/- 121.77	102.40 +/- 130.87	
Death (%)	-48.68%	-54.33%	0, 43

Table 3 : Characteristics of patients according to therapeutics and evolution.

Mortality Factors	Odd Ratio	95% Confidence Interval	P
Admission to non-working hours	2.59	[1,129-5,942]	0,025
Intubation in intensive care	3.87	[1.099 to 13.669]	0,035
Shock	5.91	[1.905 to 18.379]	0,002

Table 4: Multivariate analysis according to mortality (adjustment by logistic regression).

Three independent mortality factors were found in multivariate analysis (Table 4): admission to non-working hours, intubation resuscitation and shock.

Discussion

The two population groups were comparable according to the main characteristics studied in single-variate and multivariate analysis. Thus, there was no significant difference in age and severity of the pathologies according to the admission period. It was the same in most studies assessing the impact of the admission deadline on ICU mortality [3, 5,6] and reflecting the level of severity of patients admitted to intensive care that is independent of the time of admission.

We found as independent factors of mortality: admission to non-working hours (OR = 2.59), intubation in intensive care (OR: 3.87) and shock (OR = 5.91).

Tracheal intubation and shock are classic factors that reflect the severity of the pathology in resuscitation. There was excess mortality for patients admitted to non working hours. This can be justified by the absence of Resuscitator doctor on site during permanence and guards. There is no visit during the night to prevent and immediately take care of vital distress. But we should add the absence of certain paraclinical balance sheets during permanence and guards (Serum electrolytes, blood gases, scanner...). Thus, no therapeutic adaptation using these reports, was possible at night. Finally paramedical staff is very insufficient during permanence and guards, which are provided by only two nurses for 14 beds and without a caregiver. However, the French language intensive care federation recommends at least two nurses for five patients and one care assistant for four patients in intensive care [7]. The resulting workload does not allow for proper monitoring of patients during custody. The nurses limit thus to the administration of the treatments recorded in the file.

Our results are comparable to those of Barnett *et al* in the United States, who found excess mortality for weekend

patients compared to other days (OR = 1.09, 95% IC: 1.04 -1.15) [8]. Bell *et al* in Canada also had similar results (p <0.001 for abdominal aortic aneurysm rupture, p = 0.04 for acute epiglottitis, and p = 0.009 for pulmonary embolism) [6]. It was the same for other authors [3,9,10]. In these studies, as in ours, there was no resuscitator on site permanently. However other Studies found no difference in mortality between working and non- working hours. This is the case of 3 French studies [2, 5,11] and one American study [12]. This contrast can be explained by a difference in the organization of the services in which these studies were conducted as compared to ours.

Indeed, it was noted in the French studies, the permanent presence of resuscitators at any time of the day. This provision is also a legal requirement in France [3] and is associated with a better prognosis [13,14]. As for the American study, beyond the organizational aspect, the majority of the study population was not covered by a surgical emergency as in ours, surgery increases the risk of mortality. Moreover, the analysis of the subgroup of patients received in a surgical emergency context showed a higher mortality on weekends (6.4%) compared to working days (3.5%) (OR = 1, 23, 95% IC: 1.03 to 1.48) [12].

Conclusion

This study revealed an excess mortality (at least twice as much mortality) for admissions outside working hours in resuscitation department of Souro Sanou teaching Hospital. These results are suggestive of a problem of monitoring patients during non-working hours. Therefore, paramedical personnel should be reinforced and the presence of a physician should be considered during these periods.

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