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Mortality Factors in the Intensive Care Unit Anesthesia and Intensive Care Department, Univerity Hospital Ibn Rochd Casablanca, Morroco

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Abstract

The death is a major accident of which the assessment and analysis are needed to improve the quality of care in an ICU. The aim of our work was to study mortality, analyze the main causes and assess avoidable and non-avoidable causes, in order to target possible preventive action. Prospective study carried out in the surgical intensive care unit, including all patients who died more than 48 hours after admission. Several severity scores were tested (Apache, SOFA, IGS), but none of them showed superiority over the others, and therefore represent only estimates of the severity of multivisceral failure. This high mortality rate can be explained by several factors: age, causal pathology and associated defects, but also by nosocomial infections, which remain a major cause and which can be reversed by preventive measures, in particular the correct prescription of antibiotics.

Keywords: Mortality - Resuscitation - Severity scores - Visceral failure

Introduction

Death is a major event, and one that needs to be assessed and analyzed in the intensive care unit. Although pathophysiological processes and new therapeutic approaches are widely analyzed, comparable data are less available on causes of death, and the short- and medium-term fate of patients.

The mission of an intensive care unit is to care for patients likely to present one or more acute, life-threatening visceral failures, necessitating the use of suppletive methods. Thus, knowledge of the causes and factors of mortality will contribute not only to a better assessment of ICU patients, but also reveal a new avenue of research to improve the short- and medium-term prognosis of these patients and the risk factors for mortality.

The aim of our study is to investigate mortality, analyze the main causes and assess avoidable and non-avoidable causes, in order to take a critical look at the way the patient has been managed, and possibly target one or more preventive actions to reduce mortality.

Patients and methods

This is a prospective, descriptive and analytical study, spread over a 12-month period from January 1, 2022 to December 2022, on the causes of mortality in the IBN ROCHD surgical emergency resuscitation

service in Casablanca; deceased beyond 48h of hospitalization were retained. Patients who died before 48 hours of hospitalization were excluded from the study.

Two severity scores were calculated for each patient on the basis of clinical and biological parameters. IGS II (Simplified Severity Index) APACHE II (Acute Physiology and Chronic Health.

Visceral failure scores: SOFA (Sequential Organ Failure Assessment), MODS (Multiple Organ Dysfunction Syndrome), LODS (Logistic Organ Dysfunction Score).

Therapeutic interventions: antibiotic therapy, anticoagulants, vasoactive drugs, antiepileptic, extra-renal purification, surgical revision and artificial ventilation.

Statistical analysis was carried out using SPSS software, supplemented by Excel 2010. The various parameters were calculated and subjected to univariate and multivariate analysis, with a comparison between the surviving and deceased groups.

Results

The age of our patients ranged from 16 to 91 years, with an average age of 43.9 years. 78.9% of patients were under 65 years of age. The average length of stay for our patients was 7.8 ± 10.4 days, with extremes ranging from 2 days to 75 days.

208 patients (41.3%) were admitted for medical conditions, 167 (33.3%) for surgical conditions, and 128 (25.4%) for traumatic conditions. Hemorrhagic stroke was the most frequent cause of patients admitted to the ICU, either from the neurosurgery department or via the emergency department, accounting for around 25 cases, or 4.31% of total causes of mortality.

Traumatic surgical pathology is dominated by femur fractures, occurring mainly in young adults following high-energy trauma. Represents 12 of 30 cases of surgical trauma pathology.

23.4% of patients had at least one nosocomial infection during their stay in the ICU, with pneumonia noted in 82 patients (16.3%), urinary tract infection in 20 patients (3.9%), and nosocomial meningitis in 16 patients (3.18%). Thromboembolic complications were noted in 8 patients (1.6%).

Diagnosis	Death rate	%
AVCH	12 case	4,61%
Meningo- encephalitis	6 case	4,61%
Respiratory distress	4 case	3,07%
Choc septic shok in pneumonia	3 case	2,30%
Febril conscieous disorders	2 case	1,53%e
Pulmonary embolism	2 case	1,53%
Intoxication	2 case	1,53%
Acute Pancreatitis	1 case	0,76%
Underteminated causes		
Sepsis shok	1 case	0,76%
Sever sepsis LMNH	1 case	0,76%
Necrotizing fasciitis	1 case	0,76%
Fat Embolism	1 case	0,76%
Total	64 case	49,23%

Table 1: Medical-surgical admission diagnosis

The severity and visceral failure scores calculated for patients who died patients had the following mean values (Table 2)

Scores	Moyen	STDEV type
IGS II	21,79	14,00
APACHE II	9,54	6,45
SOFA	3,71	3,28
MODS	3,05	2,47
LODS	2,49	2,42

Table 2: Mean values of severity and visceral failure scores in deceased patients

Severity and visceral failure scores for our patients had the following mean values (Table 6): Patients' mean IGS II was higher in deceased patients, with a significant difference (35.38 ± 13.52 versus 17.04 ± 10.68, $p < 0.0001$), the same for APACHE II (16.07± 6.18 versus 7.26 ± 4.77, $p < 0.0001$).

The mean SOFA was significantly higher in deceased patients (7.42 ± 2.76) than in survivors (2.42 ± 2.32). MODS and LODS were also significantly higher, respectively: 5.39 ± 2.24 in the deceased versus 2.23 ± 1.97 in the survivors, and 4.86 ± 2.43 in the deceased versus 1.66 ± 1.79 in the survivors ($p< 0.0001$).

Scores	Survivors n= 373	Deceased n= 130	p
SOFA	2,42 ± 2,32	7,42 ± 2,76	< 0,0001
MODS	2,23 ± 1,97	5,39 ± 2,24	< 0,0001
LODS	1,66 ± 1,79	4,86 ± 2,43	< 0,0001

Table 3: Visceral failure scores for survivors and decedents

Nosocomial infections were more frequent in the deceased group, with a statistically significant difference (47.7% in the deceased versus .The same situation for thromboembolic complications (4.6% in deceased patients versus 0.53% in survivors, $p<0.0001$).

complications	Survivors n= 373	Deceased n= 130	p
Nosocomial infection	15%	47,6%	< 0,0001
Thrombo embolic	0,53%	4,6%	< 0,0001
atrogenic	1%	8,2%	< 0,0001

Table 4: Complications occurring during hospitalization in survivors and and decedents

DISSCUSION

The mortality rate in an intensive care unit has tended to decline in Western countries, and seems to have been improved by the progress made in this field.

In our context, this rate remains relatively high, despite the progress made in patient management.

Mortality depends essentially on the type of patients recruited, their physiological and demographic characteristics, the practices specific to each department, and the resources available in terms of equipment and personnel.

Various indices and scores have been developed over the last thirty years to meet the growing demand for standardization of diagnostic and therapeutic procedures.
Various indices and scores have been developed over the last thirty years to meet the growing need for standardization in diagnostic and therapeutic procedures [1] [2] [3].
The establishment of prognostic scores requires the choice of a clear judgment criterion. In intensive care, this criterion is represented by in-hospital mortality, bearing in mind that in-hospital mortality differs little from the previous 30-day mortality, which is the usual criterion for most prognostic systems [1].
In this study, the APACHE II score was significantly higher in patients who died (16.07± 6.18 versus 7.26 ± 4.77, $p < 0.0001$).Compared with other series; our patients had a lower mean APACHE II .
Observed mortality (25.8%) was higher than the mortality predicted (~10.6%) by this score. IGS 2 is the most widely used severity score in France and Europe. [5]
In our series, we found in univariate analysis that IGS II was significantly higher in patients who died (35.38 ± 13.52 versus 17.04± 10.68, $p < 0.0001$).
The observed mortality (25.8%) in our patients was higher than that predicted (~4.5%) by the mean IGS (21.79 points). This observed difference may be explained by the rate of surgical patients, who account for 33% of admissions. However, the general severity scores have all been constructed mainly from cohorts of "medical" patients, and it is plausible that the calculation places surgical patients at a disadvantage. [4]
In the series we report, visceral failure scores were significantly higher in deceased patients: 7.42 ± 2.76 versus 2.42 ± 2.32 for SOFA, 5.39 ± 2.24 versus 2.23 ± 1.97 for MODS and 4.86 ± 2.43 versus 1.66 ± 1.79 for LODS ($p< 0.0001$).
The analysis of infection rates, and especially their comparison from one service to another, is made tricky by the differences between the diagnostic techniques used and the populations studied. It is therefore not surprising to find in the abundant literature on these subject significant differences from one series to another. [6]
In our series, mortality was significantly higher in patients who had developed a nosocomial infection (54.8% versus 19.26%, $p< 0.0001$) and 26% (34/130) of deaths were related to this complication.
In a French study involving 158 intensive care units, mortality was significantly higher in patients who had acquired a nosocomial infection.

Conclusion

Mortality remains relatively high in intensive care; causes of death are mainly dominated by infectious causes. Prevention is mainly based on prevention and control of nosocomial infections, the practice of an autopsy after any unexplained deaths and the introduction of review meetings of morbi- mortality (MMR).

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