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Prognostic factors for mortality among severely injured patients admitted to intensive care in two referral hospitals in Douala, Cameroon: a multicentre prospective cohort study

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Abstract

Background

Severe trauma remains a major cause of preventable death worldwide, with a disproportionate burden in low- and middle-income countries, where limitations in prehospital care, critical care capacity, diagnostic resources, and access to definitive treatment may adversely affect outcomes. Evidence on prognostic factors among severely injured patients requiring intensive care remains limited in sub-Saharan Africa. This study aimed to identify independent factors associated with mortality among adults with severe trauma admitted to two referral intensive care units (ICUs) in Douala, Cameroon.

Methods

We conducted a prospective multicentre cohort study in the ICUs of Douala General Hospital and Laquintinie Hospital, Cameroon, from January to May 2025. Adults aged ≥ 18 years with severe trauma, defined as an Injury Severity Score (ISS) > 15, were consecutively enrolled and followed until ICU discharge or death. Survival probabilities were estimated using the Kaplan–Meier method and compared using the log-rank test. Cox proportional hazards regression was used to identify factors independently associated with mortality. Associations are reported as adjusted hazard ratios (aHRs) with 95% confidence intervals (CIs).

Results

A total of 62 patients were included, of whom 50 (80.6%) died during ICU stay. The estimated survival probability at 30 days was 17.4%. Survival differed across ICU admission-delay categories, although the overall difference was not statistically significant (log-rank p = 0.061). In multivariable Cox regression, admission to the ICU 1–3 h after hospital admission was associated with a higher hazard of death compared with admission within 3–6 h (aHR 2.21, 95% CI 1.05–4.67; p = 0.037). The absence of normal blood pressure at ICU admission (aHR 2.21, 95% CI 1.19–4.10; p = 0.012), absence of sedation (aHR 2.35, 95% CI 1.20–4.61; p = 0.013), and absence of blood transfusion (aHR 3.02, 95% CI 1.23–7.39; p = 0.016) were also independently associated with an increased hazard of death. Glasgow Coma Scale score was not independently associated with mortality after adjustment (aHR 0.96, 95% CI 0.87–1.06; p = 0.407).

Conclusions

Mortality among severely injured patients admitted to the two referral ICUs was very high. Haemodynamic instability at admission and the absence of sedation or blood transfusion were independently associated with mortality. These findings highlight the need to strengthen early

haemodynamic assessment and resuscitation, neurocritical care, and access to blood products for severely injured patients in resource-limited settings. Larger multicentre studies are needed to confirm these associations and to clarify the relationship between ICU admission timing and mortality.

1. Introduction

Severe trauma remains a major public health concern and is one of the leading causes of death and disability worldwide, particularly among young adults. More than 90% of trauma-related deaths occur in low- and middle-income countries, where limitations in emergency and critical care systems substantially reduce the likelihood of survival [1–3]. Despite advances in resuscitation strategies and trauma care systems, mortality remains high among critically injured patients admitted to intensive care units (ICUs), mainly because of severe traumatic brain injury, haemorrhagic shock, and early multiple-organ dysfunction [1–3].

Early identification of patients at high risk of death is essential to optimize triage, guide therapeutic decision-making, and improve clinical outcomes. Several factors have been associated with mortality in patients with severe trauma, including neurological impairment assessed using the Glasgow Coma Scale (GCS), haemodynamic instability, the anatomical extent of injury, and prognostic scores such as the Injury Severity Score (ISS), Revised Trauma Score (RTS), and Trauma and Injury Severity Score (TRISS). Early physiological markers, including the Shock Index and selected metabolic abnormalities, have also shown prognostic value [4–10].

However, prognostic factors identified in high-income settings may not be directly applicable to African healthcare contexts. In sub-Saharan Africa, delays in patient transfer, limited prehospital emergency medical services, restricted access to diagnostic imaging, limited neurosurgical capacity, and shortages of ICU beds may substantially influence outcomes after severe trauma [11–18]. In Cameroon, recent studies have highlighted the effects of prehospital factors, access to diagnostic imaging, and the organization of trauma care on mortality, underscoring persistent weaknesses across the trauma care pathway [11–18]. In addition, multicentre African audits suggest that a substantial proportion of trauma-related deaths may be preventable through improvements in care delivered during the first hours after injury [19].

Despite this growing body of evidence, studies specifically examining prognostic factors among severely injured patients admitted to ICUs remain scarce in Cameroon. A better understanding of the determinants of mortality in this setting is therefore needed to inform context-specific management strategies, optimize the allocation of scarce critical care resources, and ultimately improve patient outcomes.

This study aimed to identify independent prognostic factors for mortality among patients with severe trauma admitted to the ICUs of two referral hospitals in Douala, Cameroon.

2. Methods

2.1 Study design, setting, and study period

We conducted a multicentre analytical prospective cohort study in the medical-surgical intensive care units (ICUs) of Douala General Hospital (DGH) and Laquintinie Hospital of Douala (LHD), two tertiary referral hospitals providing emergency, surgical, and critical care services for severely injured patients in Cameroon.

The overall study period extended from November 2024 to June 2025. Participant recruitment and prospective follow-up were conducted from 1 January to 31 May 2025. Patients were followed from ICU admission until death, ICU discharge, or a maximum follow-up period of 30 days, whichever occurred first.

2.2 Study population

The source population comprised all patients admitted with severe trauma to the ICUs of the two participating hospitals during the recruitment period.

Patients were eligible for inclusion if they were aged 18 years or older, had severe trauma defined as an Injury Severity Score (ISS) > 15, and were admitted to one of the participating ICUs. Written informed consent was obtained from the patient whenever their clinical condition allowed. When patients were unable to provide consent, written informed consent was obtained from their legal representative or accompanying relative.

Patients who died within the first six hours following ICU admission and those who had already been hospitalized in either of the participating ICUs during the 24 hours preceding enrolment were excluded.

2.3 Sample size and sampling strategy

An exhaustive consecutive recruitment strategy was used throughout the study period to minimize the risk of selection bias. No probability sampling procedure was applied.

Among the 534 patients admitted to the two ICUs during the study period, 62 fulfilled the eligibility criteria and were included in the final analysis. All included patients were prospectively followed until the occurrence of the primary outcome, ICU discharge, or completion of the 30-day follow-up period. No participant was lost to follow-up.

2.4 Data collection

Data were prospectively collected using a standardized data collection form developed and validated before the start of the study.

Prior to data collection, the investigator received training from a trauma specialist in injury coding using the Abbreviated Injury Scale (AIS) and in the calculation of major trauma severity scores, including the

Injury Severity Score (ISS), Revised Trauma Score (RTS), and Trauma and Injury Severity Score (TRISS), to ensure consistency and reproducibility of assessments.

After verification of eligibility criteria and informed consent, data were collected from interviews with patients or accompanying relatives, clinical examinations, medical records, monitoring charts, treatment prescriptions, and complementary investigations.

Participants were prospectively followed throughout their ICU stay until death, ICU discharge, or the end of the 30-day follow-up period. Clinical reassessments were performed every 48 hours to update information on clinical progression, treatments administered, and complications occurring during ICU stay.

2.5 Primary outcome

The primary outcome was ICU mortality.

The event of interest was death occurring during the ICU stay within the 30-day follow-up period. Survival time was defined as the number of days between ICU admission and death among patients who died.

Patients who were discharged alive from the ICU before 30 days were censored at the date of ICU discharge. Patients remaining alive in the ICU at 30 days were censored at day 30.

The maximum follow-up period was therefore 30 days.

2.6 Study variables

The variables investigated included sociodemographic, clinical, therapeutic, and outcome-related characteristics.

Sociodemographic variables included age and sex.

Clinical variables assessed at ICU admission included the time from initial hospital admission to ICU admission, Glasgow Coma Scale (GCS) score, the presence of a GCS score ≤ 3, and haemodynamic parameters, including normal blood pressure, hypotension, and hypertension.

Early therapeutic variables included administration of sedation, duration of sedation, duration of osmotherapy, duration of corticosteroid therapy, and receipt of blood transfusion.

Outcome-related variables included the occurrence of pneumonia, systemic secondary brain insults, duration of ICU stay, and vital status at ICU discharge or at the end of the 30-day follow-up period.

2.7 Operational definitions

Severe trauma was defined as an Injury Severity Score (ISS) > 15.

Early ICU admission was defined as transfer to the ICU within 1–3 hours after initial hospital admission.

Haemodynamic parameters at ICU admission, including normal blood pressure, hypotension, and hypertension, were classified according to the clinical study protocol using vital signs recorded at ICU admission.

Pneumonia was defined as a pulmonary infection diagnosed during the ICU stay according to the clinical, biological, and radiological criteria routinely used in the participating units.

Systemic secondary brain insults were defined as systemic events capable of aggravating a primary brain injury.

Survival was defined as being alive at ICU discharge or at completion of the 30-day follow-up period, whereas mortality was defined as death occurring during the ICU stay within the 30-day observation period.

2.8 Statistical analysis

Data were entered using CSPro version 7.7 and analysed using R version 4.1.2 (R Foundation for Statistical Computing, Vienna, Austria).

Continuous variables were summarized as mean ± standard deviation or median with interquartile range, according to their distribution. Categorical variables were summarized as frequencies and percentages.

Survival probabilities were estimated using the Kaplan–Meier method and compared across groups using the log-rank test.

Variables associated with survival in bivariate analysis at a significance level of $p < 0.05$ were entered into a Cox proportional hazards regression model to identify independent prognostic factors for mortality. Variables considered clinically relevant were also included where appropriate.

Results were reported as hazard ratios (HRs) and adjusted hazard ratios (aHRs), with corresponding 95% confidence intervals (95% CIs).

The proportional hazards assumption was assessed before interpretation of the final Cox regression model.

Complete-case analyses were performed. No missing data were reported for the primary outcome. Statistical significance was set at a two-sided p-value < 0.05.

2.9 Quality assurance and bias control

Several measures were implemented to strengthen the internal validity of the study.

Prospective data collection helped reduce recall bias and improve completeness of the information recorded. A standardized data collection form was used in both study sites to harmonize data collection procedures.

Prior training of the investigator in AIS injury coding and calculation of the ISS, RTS, and TRISS scores helped improve the consistency and reproducibility of trauma severity assessments.

Exhaustive consecutive recruitment of eligible patients was used to reduce the risk of selection bias. Furthermore, prospective follow-up of all included participants until death, ICU discharge, or completion of the 30-day follow-up period prevented loss to follow-up for the primary outcome.

2.10 Ethical considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki and applicable national requirements for research involving human participants.

The study protocol was approved by the Institutional Ethics Committee of the University of Douala (No. 4787/CEI-UDo/03/2025/T). Administrative authorizations were obtained from Douala General Hospital (No. 10/AR/MINSANTE/HGD/DM/01/25) and Laquintinie Hospital of Douala (No. 46/AR/MINSANTE/DHL).

Written informed consent was obtained from each participant before enrolment whenever their clinical condition allowed. For patients unable to provide consent because of their clinical condition, consent was obtained from their legal representative.

All study data were anonymized before analysis and used exclusively for scientific purposes in accordance with confidentiality requirements.

3. Results

3.1 Overall characteristics and survival outcomes

A total of 62 patients with severe trauma were included in the study. At the end of follow-up, 50 patients (80.6%) had died and 12 (19.4%) had survived. The mean survival time was 4.5 days, and the estimated cumulative 30-day survival probability was 17.4%. Survivors had a longer mean ICU length of stay than non-survivors (7.66 vs. 4.58 days) (Table 1).

Table 1
Overall survival indicators among patients with severe trauma

Indicator	Value n (%)
Total number of patients	62
Survivors, n (%)	12 (19.4)
Deaths, n (%)	50 (80.6)
Mean survival time, days	4.5
30-day survival probability, %	17.4
Mean ICU length of stay among survivors, days	7.66
Mean ICU length of stay among non-survivors, days	4.58

3.2 Bivariate analysis of factors associated with survival

Prehospital and neurological characteristics

Survival probability varied according to the time from hospital admission to ICU admission. Among patients admitted to the ICU within less than 1 hour, survival was 16.7% (1/6), compared with 13.6% (3/22) among those admitted within 1–3 hours, 26.3% (5/19) among those admitted within 3–6 hours, and 20.0% (3/15) among those admitted after more than 6 hours.

The mean Glasgow Coma Scale (GCS) score at admission was significantly higher among survivors than among patients who died (11.83 vs. 7.84; p = 0.010). No patient with a GCS score ≤ 3 survived, whereas the survival probability was 21.1% among patients with a GCS score > 3 (p = 0.010) (Table 2).

Table 2
Bivariate analysis of prehospital and neurological factors associated with survival

Variable	Deaths, n	Survivors, n	Survival probability, %	p-value*
Time to ICU admission				0.061
< 1 h	5	1	16.7	
1–3 h	19	3	13.6	
3–6 h	14	5	26.3	
> 6 h	12	3	20.0	
GCS score, mean	7.84	11.83	—	0.010
GCS ≤ 3	5	0	0	0.010
GCS > 3	45	12	21.1	

* p-value from the log-rank test for survival comparisons where applicable.

Haemodynamic parameters

Patients with normal blood pressure at ICU admission had a higher survival probability than those without normal blood pressure (23.7% vs. 12.5%; p = 0.050). In contrast, neither hypertension (p = 0.100) nor hypotension (p = 0.400) was significantly associated with survival (Table 3).

Table 3
Bivariate analysis of haemodynamic parameters associated with survival

Variable	Deaths,n	Survivors,n	Survival probability,%	p-value
Hypertension				0.100
Yes	17	3	15.0	
No	33	9	21.4	
Normal blood pressure				0.050
Yes	29	9	23.7	
No	21	3	12.5	
Hypotension				0.400
Yes	4	0	0	
No	46	12	20.7	

Therapeutic management and complications

Sedation was associated with survival in bivariate analysis (p = 0.050). Survivors received osmotherapy for a longer mean duration than non-survivors (4.6 vs. 2.77 days; p < 0.001), as well as a longer duration of corticosteroid therapy (5 vs. 3 days; p = 0.020).

Blood transfusion was also associated with a higher survival probability (38.9% vs. 11.4%; p < 0.001). Pneumonia was more frequently observed among survivors than among non-survivors (p < 0.001) (Table 4

Table 4
Bivariate analysis of therapeutic management and complications associated with survival

Variable	Deaths	Survivors	Survival probability %	p-value
Sedation				0.050
Yes	19	5	20.8	
No	31	7	18.4	
Mean duration of sedation, days	3.78	3.6	—	0.030
Mean duration of osmotherapy, days	2.77	4.6	—	< 0.001
Mean duration of corticosteroid therapy, days	3	5	—	0.020
Blood transfusion				< 0.001
Yes	11	7	38.9	
No	39	5	11.4	
Pneumonia				< 0.001
Yes	10	5	33.3	
No	40	7	14.9	

3.3 Survival analysis according to time to ICU admission

The distribution of patients according to the time from hospital admission to ICU admission is shown in Table 5. Among the 62 patients included, 6 (9.7%) were admitted to the ICU within less than 1 hour, 22 (35.5%) within 1–3 hours, 19 (30.6%) within 3–6 hours, and 15 (24.2%) after more than 6 hours.

Kaplan–Meier curves showed apparent differences in cumulative survival probabilities across the four ICU admission-time categories. The highest survival probability was observed among patients admitted within 3–6 hours, whereas the lowest was observed among those admitted within 1–3 hours. However, the overall comparison of survival curves did not reach statistical significance (global log-rank test: $\chi^2 = 7.37$; $p = 0.061$) (Fig. 1).

3.4 Independent prognostic factors for mortality

Variables associated with survival in bivariate analysis, together with variables considered clinically relevant, were entered into a multivariable Cox proportional hazards regression model. Time to ICU admission was modelled as a categorical variable with four categories, using the 3–6-hour group as the reference category.

After adjustment for Glasgow Coma Scale score, blood pressure status at admission, sedation, and blood transfusion, patients admitted to the ICU within 1–3 hours had a significantly higher hazard of death than those admitted within 3–6 hours (aHR = 2.21; 95% CI: 1.05–4.67; p = 0.037). In contrast, no statistically significant difference was observed for patients admitted within less than 1 hour (aHR = 1.06; 95% CI: 0.33–3.34; p = 0.925) or after more than 6 hours (aHR = 1.13; 95% CI: 0.48–2.69; p = 0.779).

Absence of normal blood pressure at admission was independently associated with a higher hazard of death (aHR = 2.21; 95% CI: 1.19–4.10; p = 0.012). Similarly, absence of sedation (aHR = 2.35; 95% CI: 1.20–4.61; p = 0.013) and absence of blood transfusion (aHR = 3.02; 95% CI: 1.23–7.39; p = 0.016) remained independently associated with mortality.

By contrast, Glasgow Coma Scale score was no longer significantly associated with mortality after adjustment (aHR = 0.96; 95% CI: 0.87–1.06; p = 0.407) (Table 6).

Table 5
Multivariable Cox proportional hazards model of prognostic factors for mortality

Variable	Adjusted HR	95% CI	p-value
ICU admission < 1 h	1.06	0.33–3.34	0.925
ICU admission 1–3 h	2.21	1.05–4.67	0.037
ICU admission 3–6 h	Reference	—	—
ICU admission > 6 h	1.13	0.48–2.69	0.779
Absence of normal blood pressure	2.21	1.19–4.10	0.012
Absence of sedation	2.35	1.20–4.61	0.013
Absence of blood transfusion	3.02	1.23–7.39	0.016
Glasgow Coma Scale score	0.96	0.87–1.06	0.407

4. Discussion

Principal findings

This multicentre prospective study aimed to identify prognostic factors for mortality among patients with severe trauma admitted to the ICUs of two referral hospitals in Douala, Cameroon. Mortality was particularly high, with more than four out of five patients dying during their ICU stay. In bivariate analyses, time to ICU admission, Glasgow Coma Scale score, blood pressure status at admission, sedation, blood transfusion, duration of osmotherapy, duration of corticosteroid therapy, and pneumonia were associated with survival. After adjustment in the Cox proportional hazards model, time to ICU admission, absence of normal blood pressure at admission, absence of sedation, and absence of blood transfusion remained independently associated with mortality.

Observed mortality and comparison with previous studies

The mortality rate observed in our cohort (80.6%) was substantially higher than that reported in most studies of trauma patients admitted to intensive care, including studies conducted in low- and middle-income countries. A recent systematic review showed that, despite progressive improvements in trauma resuscitation strategies, mortality among patients with polytrauma remains strongly influenced by the initial severity of injury, particularly severe traumatic brain injury and haemorrhagic shock [1]. In resource-limited settings, mortality is further affected by weaknesses in prehospital systems, delays in transfer, and limited access to diagnostic imaging, specialised surgery, and critical care services [2]. The high mortality observed in our study likely reflects the combined effects of these structural constraints and the severity of illness among patients referred to the two tertiary hospitals.

Independent prognostic factors for mortality

Time to ICU admission

After adjustment for the main prognostic variables, patients admitted to the ICU within 1–3 hours had a significantly higher hazard of death than those admitted within 3–6 hours. This finding should not, however, be interpreted as evidence that earlier ICU admission is harmful.

In observational trauma studies, time to transfer may partly reflect the underlying severity of the patient's condition. Patients with greater neurological or haemodynamic instability may be prioritised for rapid transfer to the ICU and, at the same time, have a higher baseline risk of death. The absence of a statistically significant overall difference between the four Kaplan–Meier survival curves (global log-rank test, $p = 0.061$) further suggests that the observed differences across admission-time categories may reflect heterogeneity in initial clinical severity rather than an independent detrimental effect of earlier ICU admission.

Studies incorporating more detailed indicators of prehospital and initial injury severity are needed to clarify this relationship.

Blood pressure at admission

Absence of normal blood pressure at ICU admission was independently associated with mortality. This finding is consistent with the literature identifying haemodynamic instability as a major determinant of death after severe trauma. Inadequate tissue perfusion may contribute to secondary ischaemic injury, aggravation of traumatic brain injury, and multiple-organ dysfunction. Current trauma management principles therefore emphasise rapid restoration and maintenance of adequate systemic perfusion to reduce secondary injury and improve clinical outcomes [1, 3].

Sedation

Absence of sedation was also independently associated with an increased hazard of death. Sedation is an important component of the management of selected critically injured patients, particularly those with severe traumatic brain injury or those requiring mechanical ventilation, because it can help control cerebral metabolic demand, intracranial pressure, and secondary cerebral insults.

Nevertheless, this association should be interpreted cautiously because of the observational design of the study. Receipt of sedation may also reflect access to critical care resources and a more structured neurocritical care pathway rather than a direct independent protective effect of sedation itself.

Blood transfusion

Absence of blood transfusion showed the strongest association with mortality in the multivariable model. This finding is biologically plausible in the context of severe trauma, in which haemorrhagic shock is a major potentially preventable cause of death. Contemporary damage-control resuscitation strategies emphasise early correction of hypovolaemia and trauma-associated coagulopathy to limit tissue hypoxia and subsequent organ dysfunction.

In resource-limited settings, difficulties in obtaining blood products rapidly may delay appropriate haemorrhage management and could contribute to the excess mortality observed among severely injured patients.

Factors associated with survival only in bivariate analysis

Glasgow Coma Scale score was strongly associated with survival in bivariate analysis, and no patient with a GCS score ≤ 3 survived. However, this association was no longer statistically significant after adjustment for the other variables included in the multivariable model. This finding suggests that part of the prognostic effect of neurological severity may overlap with other indicators of clinical severity, particularly haemodynamic status and treatment-related factors.

The durations of osmotherapy and corticosteroid therapy were also longer among survivors. These associations require cautious interpretation because patients who died early necessarily had less time to receive these treatments. The observed differences may therefore reflect a time-at-risk or survival-related bias rather than a direct therapeutic benefit.

Pneumonia was likewise more frequently observed among survivors than among non-survivors. Although apparently paradoxical, this finding is compatible with survivor bias. Patients who survive longer remain exposed for a longer period to the risk of developing nosocomial infections, whereas patients who die early may not survive long enough to develop this complication. Pneumonia should therefore not be interpreted as having a protective effect.

Clinical implications

Our findings highlight the importance of early, structured management of severe trauma in resource-limited settings. Beyond the issue of transfer time itself, rapid haemodynamic stabilisation, timely access to blood transfusion, and appropriate neurocritical care may represent important targets for improving outcomes.

Strengthening prehospital trauma systems, expanding critical care capacity, improving the availability of blood products, and implementing standardised trauma management protocols may contribute to reducing mortality among severely injured patients in Cameroon.

Strengths and limitations

This study has several strengths. To our knowledge, it is among the first multicentre prospective cohort studies conducted in Cameroon to specifically examine prognostic factors for mortality among patients with severe trauma admitted to intensive care. Prospective data collection, consecutive enrolment of eligible patients, complete follow-up, and the use of time-to-event analysis with Cox proportional hazards regression strengthen the methodological robustness of the study.

Several limitations should nevertheless be acknowledged. First, the relatively small sample size reduced the precision of the estimates and the statistical power of some comparisons. Second, the observational design precludes causal inference and leaves the possibility of residual confounding despite multivariable adjustment. Third, some potentially important prognostic variables were not available, including detailed information on prehospital management, comorbidities, and selected biological parameters. Their absence may have limited the explanatory capacity of the final model.

In addition, the exclusion of patients who died within the first six hours after ICU admission should be considered when interpreting the mortality estimates and prognostic associations, as the most rapidly fatal cases were not represented in the analytic cohort.

Conclusion of the discussion

This study found a very high mortality rate among patients with severe trauma admitted to the ICUs of two referral hospitals in Douala. After multivariable adjustment, time to ICU admission, absence of normal blood pressure at admission, absence of sedation, and absence of blood transfusion were independently associated with mortality.

These findings suggest that strengthening the early management of severe trauma, particularly haemodynamic stabilisation, timely access to blood products, and the organisation of critical and neurocritical care, may contribute to improving outcomes in resource-limited settings. The association between ICU admission timing and mortality should be interpreted cautiously and warrants confirmation in larger studies incorporating more comprehensive measures of initial injury severity and prehospital care.

5. Conclusion

Severe trauma among patients admitted to the ICUs of the two referral hospitals in Douala was associated with a particularly high mortality rate. After adjustment, time to ICU admission, absence of normal blood pressure at admission, absence of sedation, and absence of blood transfusion were independently associated with an increased hazard of death.

These findings highlight the importance of optimizing the early management of severely injured patients, particularly through prompt haemodynamic stabilization, timely access to blood products, and strengthening of critical care capacity. Larger multicentre studies are needed to confirm these findings and to inform strategies aimed at improving trauma care in resource-limited settings.

Declarations

Ethics approval and consent to participate

This study was conducted in accordance with the principles of the Declaration of Helsinki and applicable national regulations governing research involving human participants. The study protocol was approved by the Institutional Ethics Committee of the University of Douala (No. 4787/CEI-UDo/03/2025/T).

Consent for publication

Not applicable. This study does not contain any individual-level data, photographs, or other information that could identify participants.

Competing interests

The authors declare that they have no competing interests.

Authors' information

The full institutional affiliations of the authors are provided on the title page of the manuscript.

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Availability of data and materials

The datasets used and analysed during the current study are available from the corresponding author on reasonable request, subject to approval by the relevant institutional authorities and compliance with applicable confidentiality requirements.

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Figures

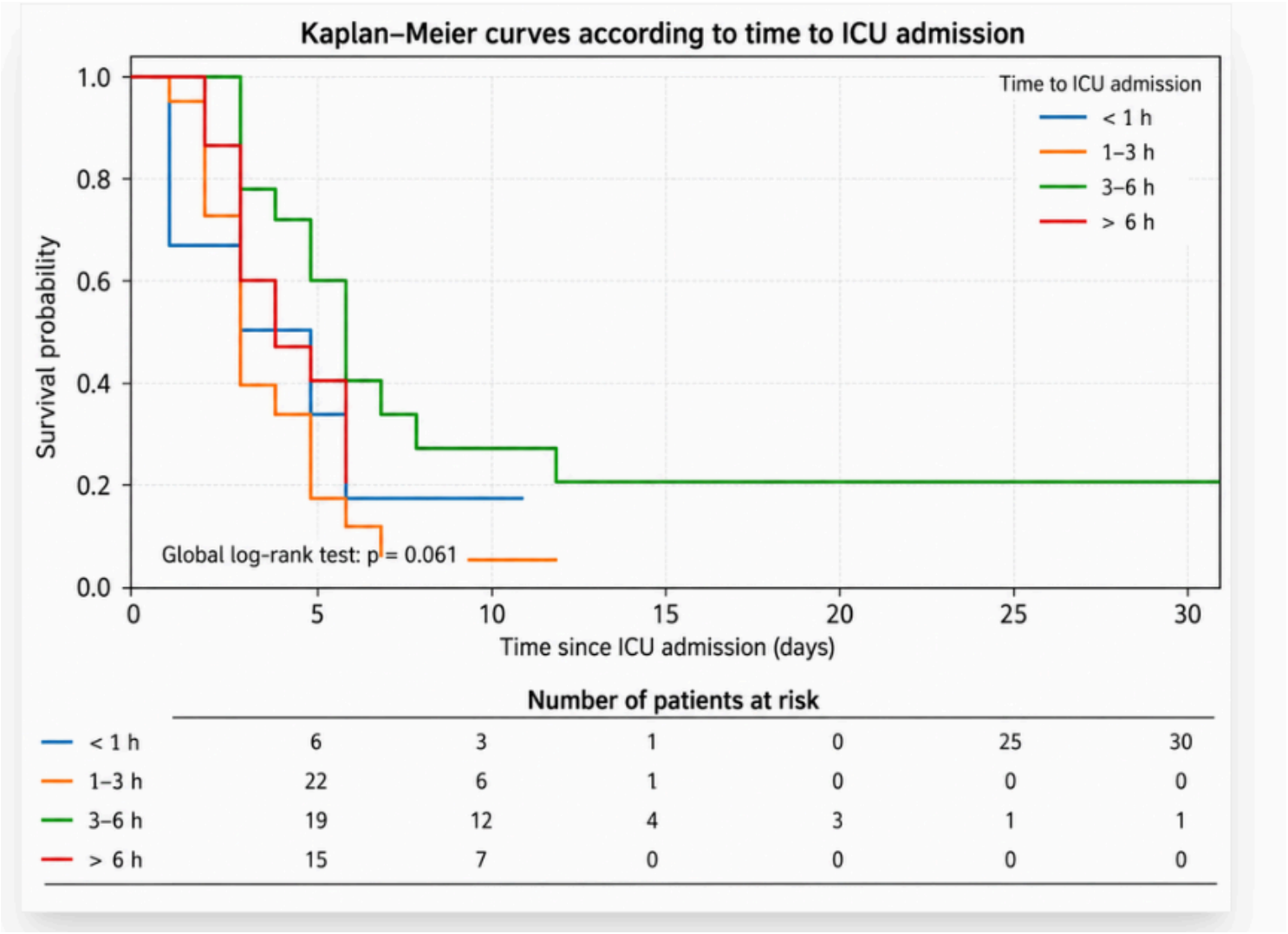


Figure 1

Kaplan–Meier survival curves according to time to ICU admission