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## SCIENTIFIC ARTICLE

# Predictors of in-hospital mortality in patients undergoing elective surgery in a university hospital: a prospective cohort



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### KEYWORDS

Perioperative care;  
Non-elective  
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Postoperative  
complications;  
Hospital mortality

### Abstract

**Introduction:** Morbidity and mortality associated with urgent or emergency surgeries are high compared to elective procedures. Perioperative risk scores identify the non-elective character as an independent factor of complications and death. The present study aims to characterize the population undergoing non-elective surgeries at the Hospital de Clínicas de Porto Alegre and identify the clinical and surgical factors associated with death within 30 days postoperatively. **Methodology:** A prospective cohort study of 187 patients undergoing elective surgeries between April and May 2014 at the Hospital de Clínicas, Porto Alegre. Patient-related data, pre-operative risk situations, and surgical information were evaluated. Death in 30 days was the primary outcome measured.

**Results:** The mean age of the sample was 48.5 years, and 84.4% of the subjects had comorbidities. The primary endpoint was observed in 14.4% of the cases, with exploratory laparotomy being the procedure with the highest mortality (47.7%). After multivariate logistic regression, age (odds ratio [OR] 1.0360,  $p < 0.05$ ), anemia (OR 3.961,  $p < 0.05$ ), acute or chronic renal insufficiency (OR 6.075,  $p < 0.05$ ), sepsis (OR 7.027,  $p < 0.05$ ), and patient-related risk factors for mortality, in addition to the large surgery category (OR 7.502,  $p < 0.05$ ) were identified.

**Conclusion:** The high mortality rate found may reflect the high complexity of the institution's patients. Knowing the profile of the patients assisted helps in the definition of management priorities, suggesting the need to create specific care lines for groups identified as high risk in order to reduce perioperative complications and deaths.

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**PALAVRAS-CHAVE**

Cuidado  
perioperatório;  
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pós-operatórias;  
Mortalidade  
hospitalar

**Preditores de mortalidade intra-hospitalar em pacientes submetidos a cirurgias não eletivas em um hospital universitário: uma coorte prospectiva****Resumo**

**Introdução:** Quando comparada a procedimentos eletivos, a morbimortalidade associada às cirurgias de urgência ou emergência é alta. Escores de risco perioperatório identificam o caráter não eletivo como fator independente de complicações e morte. O presente estudo objetiva caracterizar a população submetida a cirurgias não eletivas no Hospital de Clínicas de Porto Alegre e identificar fatores clínicos e cirúrgicos associados à morte em 30 dias no pós-operatório. **Metodologia:** Coorte prospectiva de 187 pacientes submetidos a cirurgias não eletivas entre abril e maio de 2014 no Hospital de Clínicas de Porto Alegre. Avaliaram-se dados relacionados ao paciente, situações de risco pré-operatórias e informações do âmbito cirúrgico. Mensurou-se óbito em 30 dias como desfecho primário.

**Resultados:** A média de idade da amostra foi 48,5 anos; 84,4% dos indivíduos apresentavam comorbidades. O desfecho primário foi observado em 14,4% dos casos, laparotomia exploradora foi o procedimento com maior mortalidade (47,7%). Após regressão logística multivariada, identificaram-se idade (*odds ratio* [OR] 1.0360,  $p < 0,05$ ), anemia (OR 3.961,  $p < 0,05$ ), insuficiência renal aguda ou crônica agudizada (OR 6.075,  $p < 0,05$ ) e sepse (OR 7.027,  $p < 0,05$ ) como os fatores de risco relacionados ao paciente significativos para mortalidade, além da categoria cirurgia de grande porte (OR 7.502,  $p < 0,05$ ).

**Conclusão:** A elevada taxa de mortalidade encontrada pode refletir a alta complexidade dos pacientes da instituição. O conhecimento do perfil dos pacientes atendidos auxilia na definição de prioridades de gerenciamento, sugere a necessidade de criação de linhas de cuidado específicas para grupos identificados como de alto risco, a fim de reduzir complicações e óbitos no perioperatório.

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**Introduction**

According to data from the World Health Organization (WHO), more than 234 million surgical procedures are performed annually.<sup>1</sup> In developed countries, surgical mortality is estimated to oscillate between 0.4% and 0.8% and complications occur in 3–17% of cases<sup>2</sup>; these figures are even higher in developing countries.<sup>3</sup> When evaluating only non-elective procedures, these rates increase and, although there is a shortage of work in this context, mortality is reported about 10 times higher.<sup>4,5</sup> This can be explained both by the lack of time to perform a satisfactory preoperative evaluation and consequent improvement of the risk situations and by the profile of the patients admitted in this context.

A number of challenges are present when performing non-elective surgical procedures, the difficulty of balancing the demand between elective and emergency surgeries, improving the flow of bed occupancy, and providing quality patient care are the main ones. In order to solve them, the creation of institutional protocols appears as an adequate way of ordering the management without affecting the quality of care.<sup>2</sup>

In the creation of such protocols, a systematic review of the literature points to baseline clinical conditions as the most relevant factor for increasing mortality.<sup>3</sup> In the light of this, how best to stratify the risk of patients undergoing non-elective procedures was assessed.<sup>4,6</sup> However, current

tools to assess perioperative risk are not validated for different populations, they may not reflect the Brazilian reality, since each institution has unique characteristics with its own demand and resources, which need to be considered when implanting a model of care.

In that sense, the Service of Anesthesia and Perioperative Medicine of the Hospital de Clínicas de Porto Alegre (SAMPE/HCPA) developed and validated with national data the SAMPE model of Perioperative Mortality Prediction. This score is composed of four variables that are easily collected in the preoperative period: age, classification according to the American Society of Anesthesiologists (ASA), size of the procedure, and type of surgery (urgent or elective).<sup>7</sup>

In order to improve the flow and quality of patient care in our institution and considering that urgent and emergency surgeries were identified as independent predictors of mortality, the present study aims to characterize the population undergoing non-elective surgeries at HCPA and to identify clinical factors and surgical complications associated with death within 30 days postoperatively.

**Method**

A prospective cohort study that evaluated patients undergoing surgeries in the emergency room of the Hospital de Clínicas de Porto Alegre (HCPA) surgical block. HCPA is a university quaternary institution of reference in the south of the country, linked to the Federal University of Rio Grande

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