18. PREDICTING EXTENDED ICU STAY FOLLOWING CORONARY ARTERY BYPASS GRAFTING AND ITS IMPACT ON HOSPITALIZATION AND MORTALITY

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BACKGROUND: Coronary artery bypass grafting (CABG) remains one of the most common surgical treatments for coronary artery disease (CAD), aimed at reducing symptoms and enhancing patient survival. A critical element of post-CABG care is the duration of the patient's stay in the intensive care unit (ICU), with an ideal target of fewer than 24 hours. However, a range of preoperative, intraoperative, and postoperative factors can extend ICU stays, leading to increased strain on hospital resources, poorer patient outcomes, and higher healthcare costs. This study seeks to identify the key factors that contribute to ICU stays exceeding 48 hours following CABG and CABG combined with heart valve surgery, and to analyze their association with postoperative complications and mortality rates. **METHODS:** We conducted a retrospective cohort study at King Abdullah University Hospital (KAUH), analyzing data from 1,395 patients who underwent isolated CABG or CABG combined with valve surgery between January 2004 and December 2022. The patients were categorized into two groups: Group 1, with ICU stays of 48 hours or less (n=1,082), and Group 2, with ICU stays longer than 48 hours (n=313). A comprehensive analysis of clinical, laboratory, and demographic data was performed to identify predictors of prolonged ICU stays. Statistical methods were applied to evaluate the relationship between these factors and the length of ICU stay. **RESULTS:** Our analysis revealed that patients in Group 2, who had ICU stays longer than 48 hours, were significantly older, with a mean age of 61.5 years compared to 58.7 years in Group 1 ($p<0.001$). Several preoperative conditions were strongly associated with prolonged ICU stays, including recent myocardial infarction (OR=1.69, p=0.015), chronic obstructive pulmonary disease (COPD) or asthma (OR=1.49, p=0.003), and preoperative renal impairment (OR=1.89, p=0.002). Intraoperative factors also significantly influenced ICU stay duration, with emergency or urgent surgeries (OR=2.19, $p<0.001$) and extended ventilator support during surgery (OR=5.92, $p<0.001$) being the most critical predictors**.** Postoperative complications emerged as significant determinants of ICU stay length. The development of renal impairment post-surgery (OR=6.78, $p<0.001$) and the occurrence of pneumonia or sepsis (OR=8.92, $p<0.001$) were strongly correlated with prolonged ICU stays and were also linked to higher mortality rates. **CONCLUSION:** This study highlights the significant role of preoperative comorbidities, intraoperative events, and postoperative complications in prolonging ICU stays after CABG. Extended ICU stays are associated with an increased risk of severe postoperative complications and higher mortality, emphasizing the need for improved surgical and postoperative care protocols. By targeting the identified risk factors, healthcare providers can potentially reduce ICU durations, enhance patient outcomes, and alleviate the burden on healthcare systems. These findings underscore the importance of optimizing ICU resource utilization in the context of cardiac surgery.

Table. Demographic and Clinical Characteristics of Patients Stratified by ICU Stay Duration Following CABG Surgery.

Characteristics	Total (1395)	ICU>2 (313)	ICU<2 (1082)	P-value
Age, mean (SD)	59.3 (9.98)	61.5 (10.4)	58.7 (9.77)	< .001*
≥70 (years)	222 (15.9 %)	71 (22.7 %)	151 (14.0 %)	< .001
Sex: Male	1081(77.5 %)	249 (79.6 %)	832(76.9 %)	0.321
BMI	26.4 (4.90)	26.7(4.34)	26.3(5.05)	0.158*
Underweight	46	5 (31.6 %)	41 (3.8 %)	0.056
Healthy weight	495	99 (31.6 %)	396 (36.6 %)	0.106
Overweight but not obese	581	144 (46.0 %)	437 (40.4 %)	0.076
Obese class I	186	46 (14.7 %)	140 (12.9%)	0.421
Obese class II	52	12 (3.8 %)	40 (3.7%)	0.910
Obese class III	9	1 (0.3%)	8 (0.7 %)	0.414

Key Words: Coronary artery bypass graft, Intensive care unit, Hospitalization, Mortality.