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FACTORS ASSOCIATED WITH MORBIDITY IN ICU

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The beginnings of caring for critically ill patients date back to Florence Nightingale's work during the Crimean War in 1854, but the subspecialty of critical care medicine is relatively young. Many factors are hypothesized to contribute to the relatively high incidence and associated morbidity of medication errors in the ICU. The patients themselves are the most complex and critically ill in the hospital setting [1]. Critical care areas present a particular challenge with regard to medication errors. They are a dynamic environment with critically ill patients who often require rapid adaptation of ongoing management. ICUs can be error-prone settings, where even otherwise minor adverse events can lead to serious disability. By virtue of being sicker, older, and having more comorbidity, these patients are less resilient to errors. Because they require a higher intensity of care provision and may receive more medications, they may be at greater risk of iatrogenic harm. Pharmacokinetics of medications can also be altered in critically ill patients, principally through changes in volume of distribution and drug clearance. Large volume resuscitations, positive pressure ventilation, surgical procedures, systemic inflammatory response, and changes in protein binding, all common in ICU patients, affect the pharmacokinetics of many drugs. In addition, these patients are usually unable to help facilitate their own care, a problem aggravated by the volume of transfers to and from ICUs. Medication safety in ICUs might also be compromised because of the risks associated with the use of multiple medications per patient and the use of high-risk drugs associated with potentially severe adverse events [2]. Drugs used in the ICU are more likely to be potent, require dose calculations, have medication interactions, and be continuous infusions (which have a greater potential for error). Many medications may be used for off-label indications in the ICU setting, similar to the non-ICU inpatient and outpatient settings. The combination of these elements makes patients in critical care areas particularly vulnerable to medication errors and their potentially dire consequences. Patients admitted to ICU with chronic obstructive pulmonary disease (COPD) often have multiple comorbidities and present with acute respiratory failure as a result of an infective exacerbation or at the end stage of their disease [3]. Atrial fibrillation (AF) is the most common arrhythmia encountered in the ICU. Preexisting AF is highly prevalent among older patients with chronic conditions who are at risk for critical illness, whereas new-onset AF can be triggered by accelerated atrial remodeling and arrhythmogenic triggers encountered during critical illness. The acute loss of atrial systole and onset of rapid ventricular rates that characterize new-onset AF often lead to decreased cardiac output and hemodynamic compromise. Thus, new-onset AF is both a marker of disease severity as well as a likely contributor to poor outcomes, similar to other manifestations of organ dysfunction during critical illness [4]. Evaluating immediate hemodynamic effects of new-onset AF during critical illness is an important component of rapid clinical assessment aimed at identifying patients in need of urgent direct current cardioversion, treatment of reversible inciting factors, and identification of patients who may benefit from pharmacologic rate or rhythm control. In addition to acute hemodynamic effects, new-onset AF during critical illness is associated with both short- and long-term increases in the risk of stroke, heart failure, and death, with AF recurrence rates of approximately 50% within 1 year following hospital discharge. In general ICU patients, incidence of new-onset AF was more than 11% with a high impact on morbidity and mortality, particularly associated with the

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presence of ARF. Variables that have been commonly linked to an increased risk for in-hospital mortality in mechanically ventilated patients include age, comorbidities, SAPS (Simplified Acute Physiology Score) III, severe adult respiratory distress syndrome (ARDS), deep sedation, duration of mechanical ventilation (MV) and ICU complications [5]. However, there is a wide variation in the prognostic variables between studies, which may be related to differences in the characteristics of patient cohorts, clinical variables recorded, and the geographical setting of different studies.Patients in ICU are usually at high risk of mortality not only from their critical illness but also from secondary complication such as nosocomial infection. Nosocomial pneumonia, a common ICU infection, affects around 40% of all critically ill patients, where more than 85% of it is associated with mechanical ventilation. The mortality rate for VAP (hospital-acquired/nosocomial pneumonia) develops more than 48–72 h after endotracheal intubation) ranges between 27% to 76%. *Pseudomonas* or *Acinetobacter pneumonia*is associated with higher mortality rates than those associated with other organisms [6].Delirium is a multifactorial entity, and its understanding continues to evolve. Delirium has been associated with increased morbidity, mortality, length of stay, and cost for hospitalized patients, especially for patients in the ICU. 25% to 89% ICU patients are reported to be affected by delirium [7]. While medication management clearly plays a role in delirium management, there are a variety of nonpharmacologic interventions, pharmacologic minimization strategies, and protocols that have been recently described.There has been an increase in the number of patients undergoing open heart operation with the prolongation of life expectancy and medical advances. It has been reported that approximately 19%–45% of the cases may go through prolonged intensive care after open heart operation [8]. In some studies, advanced age, female gender, reduced left ventricular function, arrhythmia, inotropic agent support and intra-aortic balloon pump requirements have been identified as risk factors for prolonged intensive care.Cardiac arrest following neurosurgery (craniotomy and spine surgery) is a devastating complication associated with significant postoperative morbidity and mortality.Critically ill children with obesity have higher risk of mortality and length of hospital stay compared to children without obesity. In critically ill patients awaiting transfer from the ED to the medical ICU, electronic ICU care was associated with decreased mortality and lower ICU resource utilization.From a clinical perspective, dysphagia is well-known to be associated with an increased risk of aspiration and aspiration-induced pneumonia, delayed resumption of oral intake/malnutrition, decreased QoL, prolonged ICU and hospital length of stay, and increased morbidity and mortality [9]. Adult medical ICU patients with improvements in daily protein intake during hospitalization who survive hospitalization have decreased odds of mortality in the 3 months following hospital discharge. Diabetes mellitus may have adverse effect on ICU patients causing organ failure and complications [10].However, how DM intrinsically affects the ICU mortality, is still open for discussion.

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