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Risks and Benefits of the Use of the Postanesthesia Care Unit as an Intensive Care Unit and Special Considerations for Anesthesia Professionals

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INTRODUCTION

The use of the postanesthesia care unit (PACU) for intensive care unit (ICU) overflow patients is a decision often made during times of high critical care bed utilization. In early Spring of 2020, the COVID-19 pandemic presented this challenge for hospitals overwhelmed with critically ill patients. The need for ICU-level care far exceeded existing capacity, and makeshift ICUs suddenly became the norm especially in U.S. geographic areas with exceedingly high concentrations of early viral outbreaks.

Some substitute ICUs were initially established in PACUs, where both physicians, nurses, and advanced practice providers are familiar with ventilator management. In the initial days of the COVID-19 pandemic, the immediate use of the PACU for ICU overflow was logical, given that elective surgeries were suspended and the capacity to accommodate overflow was readily available. General hospital floors and emergency rooms were also converted to ICUs, as the need for increased critical care units emerged. In extreme cases of bed demand, operating rooms were converted to ICUs, and the anesthesia machine was operationalized for ICU mechanical ventilation.¹ Though not an optimal solution, the rapid conversion of non-ICU units to functional ICUs was achieved with varying degrees of difficulty and success to accommodate patients requiring airway management and ventilator support. Additional modifications were made to PACUs to establish isolation rooms, such as putting up temporary partitions and building anterooms with HEPA filtration. While not universal, some operating rooms were converted from positive airflow

pressure to negative pressure, which may reduce viral contamination.

When overflow patients hit regular floor beds, even more modifications were required to provide ICU-quality care. Fortunately, with the support of organizations such as the Army Corps of Engineers and local, state, and federal authorities, hospitals withstood the initial surges of COVID, and were left better equipped and experienced to handle future crises. These governmental associations contributed specialized medical equipment and clinical/logistic manpower, including nurses and physicians, while also setting up triage tents to manage emergency room overflows.

PRE-PANDEMIC USE OF PACUs AS ICU OVERFLOW

Even before the pandemic, PACU beds have been utilized as overflow ICU space as hospital surgical volume and patient acuity increased.² For instance, the PACU has been utilized for overflow patients when the surgical intensive care unit (SICU) was filled to capacity.² In its traditional functionality as an overflow ICU, two types of critical care patients may be admitted to the PACU—those admitted directly from the operating room due to lack of SICU bed availability (overflow patients), and those brought to the PACU from SICU to free a bed for a more critically ill patient (e.g., patients on intra-aortic balloon pump or continuous renal replacement therapy).

The primary responsibility of a PACU is to provide an optimal standard of care for postanesthesia patients and to ensure that the surgical schedule is maintained by providing capacity for the operating room.³ Thus, prior literature

has advocated strongly against the use of the PACU as a solution to the shortage of critical care beds.³ This is due to potential bed shortages in the PACU that may affect operating room functionality. In 2000, the American Society of PeriAnesthesia Nurses, American Association of Colleges of Nursing, and American Society of Anesthesiologists issued a joint statement regarding ICU overflow in the PACU, advocating for a multidisciplinary approach to address proper utilization of ICU beds and minimize the need for overflow locations.³ Recent literature has advocated for utilization of PACUs as ICUs after careful consideration of the impact on three distinct groups—ICU overflow patients, postoperative patients regularly admitted to the PACU, and perioperative nursing personnel.⁴

The PACU has nonetheless emerged as a safe and effective alternative for critically ill patients as more surgical procedures moved to outpatient centers, and hospitals filled with more acute cases.⁵ Without building additional units to accommodate ICU-level patients, hospital administrators have often sought to utilize the PACU for overflow, given the available space, advanced monitors, and essential equipment, as well as staff trained in the care of high-acuity patients.⁵

ADVANTAGES OF USING PACU AS ICU

There are numerous potential benefits to using a PACU as an overflow ICU when required by clinical conditions. The PACU is in close geographic proximity to the operating room, facilitating use of the unit as overflow for a surgical ICU for patients in the immediate postoperative period. Often it is faster and less complicated to transfer a patient requiring surgical ICU-level care to the PACU than a potentially more distant, nonsurgical ICU. PACU nursing staff are also highly trained and skilled to manage one or more patients that are intubated, on ventilators, or require specialized care (e.g., vasopressor infusions, continuous veno-veno hemofiltration (CVVH), intra-aortic balloon pumps (IABP), and pulmonary artery catheter management). A retrospective case analysis of patients who were treated in the PACU overnight following aortic surgery demonstrated no excess mortality or morbidity in patients when compared with those treated in the ICU.⁶



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DISADVANTAGES OF USING PACU AS ICU

There are several reasons why routinely using a PACU for critical care patients can be detrimental to both patients and the functionality of the operating room. ICU physicians and advanced practice providers may not be readily available to the PACU, and PACU nurses may not be familiar or appropriately trained to manage all nuances of ICU care, especially if the patient would normally be admitted to a specialty ICU. The admission history and documentation workflow for an ICU patient may also differ significantly from that of a postoperative PACU patient.

PACU-critically ill patients may also use space and staff that are subsequently needed for postsurgical patients, and therefore, operating room efficiency and safety to other patients may be negatively impacted. This can lead to delayed or cancelled surgery and a decrease in clinician and patient satisfaction.

PACU nursing expectations and abilities to adapt to a dramatic shift in patient care activities may also be a stressor that affects patient care.⁷ PACU nurses describe distress and a sense of giving substandard care when interviewed as part of a clinical study to assess nursing attitudes regarding care of ICU patients in the PACU.⁸ Given the complexity of ICU patients, it is likely that PACU length of stay would be longer than the typical postoperative patient. Patients and their families may also be confused as to who is primarily managing patient care in the PACU. PACU care is often delivered by anesthesia professionals⁹ in collaboration with the surgical team. ICU patients are often primarily cared for by a critical care physician and a specialized multidisciplinary team—personnel that are often not consistently present in a PACU. This may lead to con-

fusion when a family member or loved one is in the PACU, but covered by a physician team from a critical care unit.

DIFFERENCES IN PACU VS. ICU INFRASTRUCTURE

The infrastructure of the PACU is fundamentally different than that of an ICU. ICUs may have space, beds, seating, and amenities for patients’ families, while PACUs typically do not have these resources. PACUs have the potential to expose ambulatory patients to the sickest ICU patients. Finally, PACUs don’t typically have the resources inpatient units do such as on-unit staffed satellite pharmacies, social/pastoral service points, and patient movement/positioning equipment.^{9,10}

RECOMMENDATIONS

Before utilizing the PACU for ICU patients, each institution must weigh the potential advantages and disadvantages, and consider each factor in the context of maximizing patient safety and efficient utilization of resources (Table 1). It is imperative that each institution evaluate its available capacity and resources, and reassess its needs daily. Once there is an adequate understanding of a hospital’s capacity and needs, then hospital staff can move towards developing a plan for efficient deployment of resources and to consider the use of excess capacity in such units as the PACU.

Anesthesia professionals should be involved with discussions on how to best utilize the resources of a PACU, given our importance in managing these units and our need to ensure patient safety and operating room efficiency. Although routine use of PACUs for ICU-level care in patients needing short-term postoperative ventilation is common in the U.S., the use of the PACU for routine ICU overflow is a practice

that requires delineation of staff responsibilities and shifting of available resources.

Anesthesia professionals must ensure that this process occurs, in a manner that avoids negatively impacting the operating room or surgical schedule and maintains patient safety. There must be clear lines of communication to ensure that management of ICU patients is directed by the most well-trained clinical staff regardless of the patient’s physical location. Appropriate levels of training for all nurses who will be expected to take care of these patients is paramount. Physical resources such as IV pumps, ventilators, and monitoring equipment should be readily available. Support staff, including respiratory therapists, nursing assistants, and transporters, may also benefit this patient population, when treated in the PACU.

CONCLUSION

The utilization of the PACU as an ICU may relieve the stress of facilities management, hospital administrators, and critical care physicians in times of ICU bed shortage. But, there are potential risks that may affect patients, physicians, nurses, advanced practice providers, and ancillary staff. Though emergency conditions may render its use necessary at times, careful thought and planning of PACU care for ICU patients should involve anesthesia professionals to potentially mitigate the adverse consequences to patients and operating room efficiency by deploying this valuable resource in a unique manner.

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Table 1. Potential Advantages and Disadvantages to the Use of the PACU for Patients in Critical Condition.

Advantages	Disadvantages
Proximity to the operating room	Decrease in nursing availability for OR cases
Highly trained nursing staff	Use of physical space reserved for OR cases
Available respiratory therapists and ventilators	Limited availability of nursing to cover more than one patient
Advanced equipment readily available	Potential misuse by services which prefer patients near OR
Use of an under-utilized critical care unit	Potential cause for cancellation or delay of surgical cases
	Unclear delineation of physician responsibility for patients
	Potential need for additional training/continuing education for nurses
	Differences in documentation required for patients

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