



# Care of Postanesthesia Patients

**Q** What do nurses in intensive care units need to know about the care of patients after anesthesia?

**A** Roberta Kaplow, RN, PhD, CCNS, CCRN, AOCNS, replies:

Based on the physician's preference or the intraoperative course, patients may be admitted directly from the operating room to the intensive care unit (ICU). Therefore, ICU nurses must be familiar with standards of care for patients in the immediate postoperative period, anesthetic agents, and management of potential complications. All patients admitted directly from the operating room must have standards of postoperative monitoring maintained. Constant surveillance is required.<sup>1</sup>

Cardiac output affects the degree to which an inhalation agent moves from alveoli to arterial blood. As the

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anesthetic agent reaches the tissues by the bloodstream, the more blood-rich tissue receives more of the anesthetic agent. As some inhalation agents are also fat soluble, they are absorbed in adipose tissue. Adipose tissue is not very vascular, so overweight patients have a prolonged recovery from inhalation agents.<sup>1</sup>

To help anticipate postoperative hemodynamics, ICU nurses should appreciate the effects of the agents used most often. Examples of such effects include tachycardia (from enflurane or isoflurane), hypotension (from enflurane, sevoflurane, and desflurane), decreased cardiac output (from desflurane), and decreased systemic vascular resistance (from enflurane or sevoflurane). Enflurane and halothane sensitize the heart to catecholamines.

Inhalation agents are eliminated from the body through respiration and are respiratory depressants, so nursing care of recovering patients includes administration of oxygen and deep breathing and monitoring for respiratory depression. Nursing care also entails monitoring vital signs for cardiovascular effects, preventing or treating postoperative nausea and vomiting, and pain management because inhalation anesthetics (except for nitrous oxide) have no analgesic properties.<sup>1</sup>

After administration, the recovery process of neuromuscular blocking agents is from larger to smaller muscle groups.<sup>1</sup> As neuromuscular blocking agents do not possess analgesic or amnestic properties, appropriate medications must be provided.

If nurses are caring for patients who received spinal anesthesia, sensory and motor assessments are made every 15 minutes for return of function. A dermatome diagram is used to assess sensory function. Motor blockade is assessed via attempts to move the lower extremity. Patients who received spinal anesthesia must also be evaluated for the presence of complications, including hypotension, bradycardia, nausea and vomiting, and spinal headache. Hypotension is treated with fluid replacement, vasopressors, or both. Bradycardia is treated with atropine or fluid replacement. Nausea and vomiting are typically due to hypotension and are managed with fluid replacement and possibly with antiemetics. Spinal headache is due to leakage of cerebrospinal fluid from puncture of the dura. If treatment with analgesics and hydration is not effective and the headache is severe, an epidural blood patch may be required.<sup>1</sup>

As with any ICU admission, patients are immediately attached to appropriate monitoring equipment. Hand-off communication includes discussion of the procedure performed, baseline status and history,

surgery length and type, significant intraoperative events, and intake and output including estimated blood loss.<sup>1</sup>

Once the patient is being monitored, a comprehensive assessment is performed. All relevant assessment data are collected, as defined by critical care nursing standards. Vital signs are recorded every 5 minutes for 20 minutes and then every 15 minutes and as needed. Surgery-specific data are also collected.

Once clinically indicated, the patient is assessed for signs of readiness for weaning from mechanical ventilation. Typical parameters plus sustained head lift of greater than 5 seconds and strong hand grips are considered.

Patients who underwent general anesthesia must receive humidified oxygen, usually via nasal cannula, until they are able to maintain an oxygen saturation shown by pulse oximetry of at least 93%. Patients who received an inhalation agent require the “stir-up regime.” Patients need to be “stirred-up” by elevating the head of the bed, unless contraindicated, and encouraging the patient to breathe deeply at frequent intervals. This facilitates gas exchange by moving the inhalation agent from higher concentration (patient’s lungs) to lower concentration (environment).<sup>1</sup>

Thermoregulation is essential. Hypothermia (defined as body temperature <36°C [96.8°F]) has several potentially adverse effects, including vasoconstriction, increased afterload, increased oxygen demand, or thrombus formation; angina or myocardial infarction; decreased platelet function, cardiac output, or heart rate; and dysrhythmias. Shivering causes increased oxygen demand, bleeding

times, blood viscosity, and risk for metabolic acidosis, along with hyperventilation and hypoxia. Active rewarming is required.<sup>2</sup> Body temperature should be assessed upon ICU admission and at the end of the postanesthesia period.

A patient may be discharged from anesthesia’s care when physiological criteria are met. These criteria may include airway patency, oxygen saturation, vital signs, level of consciousness, muscle strength, and pain control. A scoring system, such as the Aldrete Scoring System, can be used to evaluate the effect of sedation on the patient’s neurological, circulatory, and respiratory systems. This system uses a grading system from 0 to 2 for level of activity, level of consciousness, respiratory ability, blood pressure, and color. The modified Aldrete Scoring System evaluates oxygen saturation as shown by pulse oximetry instead of color. The patient must score 8 or higher or reach their baseline to be considered recovered from anesthesia.<sup>1</sup>

As with other ICU admissions, while a patient is recovering, it is essential for the patient’s family to be updated on the patient’s status. Nurse communication with the patient’s family at regular intervals is pivotal. Visitation is recommended.

The ICU nurse must be familiar with common complications of the immediate postoperative period and their management. Hypoventilation and hypoxemia are 2 of the most frequently reported complications. These are typically related to the anesthetic agents administered. Timely recognition of the problem by pulse oximetry and end-tidal carbon dioxide monitoring and assessment of the patient are essential. Treatment

varies depending on the cause of the problem.

Laryngospasm, commonly related to intubation, aspiration, or suctioning, may occur at any time. The patient should be encouraged to cough, as coughing may be all that is required to break a partial obstruction. Other treatments include positive pressure ventilation with a bag-valve-mask. If a laryngospasm does not respond to positive pressure ventilation within 1 minute, the patient is typically treated with administration of a short-acting neuromuscular blocking agent and reintubation.<sup>1</sup>

Noncardiogenic pulmonary edema may occur as a consequence of an acute upper airway obstruction. Protein and fluid accumulate in alveoli with no elevation in pulmonary artery occlusive pressure. Signs and symptoms include tachypnea, tachycardia, decreased oxygen saturation, crackles, and frothy sputum. Treatment includes supplemental oxygen, respiratory support, and diuretics.<sup>1</sup>

Hypotension is common in the immediate postoperative period. It typically is caused by hypovolemia from fluid losses during surgery. Other causes may include cardiac dysfunction, low systemic vascular resistance, dysrhythmias, or hypoxemia. As with other critically ill patients, initial treatment includes administration of isotonic fluid boluses and reversing the underlying cause. Administration of blood products, inotropes, or vasoconstrictors may also be necessary. The patient may be placed in modified Trendelenburg position (flat with legs elevated) to improve cardiac output and increase blood pressure.

Hypertension is another common postoperative complication. It is thought to be related to sympathetic activation and can lead to cardiac, neurological, and surgical site complications. Treatable causes include pain, anxiety, hypothermia, and hypoxia.<sup>3</sup>

Cardiac dysrhythmias may manifest postoperatively; most commonly, bradycardia, tachycardia, and premature ventricular contractions occur. Ventricular tachycardia or fibrillation may occur in patients with electrolyte imbalances, hypoxemia, or hypothermia. Guidelines of the American Heart Association should form the basis for treatment of postoperative dysrhythmias.

Malignant hyperthermia is a genetic disorder and a hypermetabolic response to select inhalation agents and succinylcholine. When patients are exposed to a triggering agent, it causes release of calcium inside muscle cells, which causes sustained muscle contraction, and increased energy utilization. When muscle cells run out of energy and die, intracellular potassium spills into the bloodstream and myoglobin is released, which can lead to cardiac arrest, renal or liver failure, coagulopathies, or brain injury.<sup>4</sup>

Signs and symptoms associated with malignant hyperthermia include muscle rigidity, tachycardia, tachypnea, elevated end-tidal carbon dioxide, cyanosis, hyperkalemia, acidosis, and hyperthermia; the latter may be a late sign. Malignant hyperthermia

typically manifests in the operating room but may develop 24 hours postoperatively.<sup>5</sup>

Malignant hyperthermia can be treated with dantrolene sodium, which inhibits release of calcium, and hyperventilation with 100% oxygen to increase minute ventilation and lower carbon dioxide levels. Dantrolene dosing continues for at least 48 hours. Other treatments include administration of sodium bicarbonate, cooling measures, and treatment of hypertension and dysrhythmias.<sup>6</sup>

Pseudocholinesterase deficiency is a rare genetic condition where the body has a deficiency in that enzyme.<sup>7</sup> Pseudocholinesterase is necessary for metabolism of succinylcholine and numerous anesthetic agents. A patient with pseudocholinesterase deficiency has prolonged paralysis and requires mechanical ventilation until the succinylcholine wears off. The patient should be reassured, and sedation and analgesics should be provided as indicated.

Pain management should begin when the patient is admitted to the ICU. Hypotension is a common sequela of epidural anesthesia. Unless contraindicated, the head of the bed should be lowered and fluid replacement should be started.

Patients in the immediate postoperative period have high levels of vulnerability and complexity and have uncertain levels of stability, resiliency, and predictability. ICU nurses caring for these patients should possess knowledge of anesthetic agents and possible complications and should be trained in the care of these vulnerable patients. **CCN**

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None reported.

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