Pulmonary atelectasis and retained secretions

Critical thinking averts serious consequences.

By Amy Shay, PhD, RN, APRN-CNS

GARY LEVIN is a 74-year-old man on the medical-surgical unit 3 days after a partial gastrectomy for stomach cancer. He has a 40 pack-year smoking history. Mr. Levin's initial postoperative recovery was slowed by vomiting and pain.*

History and assessment hints

Lisa, Mr. Levin's nurse, completes her initial assessment: BP 138/78 mmHg, HR 80 beats/minute (bpm), RR 20 breaths/minute, oxygen saturation (O_2 sat) 92% on 2 L/minute by nasal cannula, and temperature 100° F (37.8° C). Mr. Levin rates his pain level as 2 on a scale of 0 to 10, "as long as I don't try to move." When Lisa auscultates Mr. Levin's lungs, she hears rhonchi over the upper lobes and diminished breath sounds in the bases. Mr. Levin's incision is intact with no signs of infection. He is passing flatus and taking fluids by mouth.

Lisa elevates the head of the bed to 40 degrees to help improve his O_2 sat. Mr. Levin admits that he's not using the incentive spirometry (IS) device. He has shallow breathing, pain on deep inspiration, and a weak, ineffective cough. Lisa administers hydrocodone/acetaminophen 5 mg/325 mg by mouth for pain.

Call for help

When Lisa answers Mr. Levin's call light 45 minutes later, he says, "I can't breathe very well." He's pale and restless, his respirations are shallow at 30 breaths/minute, his O_2 sat is 89%, his BP is 166/90 mmHg, his HR is 110 bpm, and his breath sounds are diminished. Lisa suspects worsening postoperative atelectasis and retained secretions. She notifies the rapid response team (RRT). Lisa raises Mr. Levin's bed to 90 degrees and applies 40% humidified oxygen by mask. She begins continuous pulse oximetry, places Mr. Levin on a cardiac monitor, and readies suctioning equipment.

On the scene

The RRT physician agrees with Lisa's suspicions and orders a portable chest X-ray. The team explains to Mr. Levin the importance of expanding his lungs and clearing his airway, but he can't clear the secretions. Nasotracheal suctioning removes thick, tenacious mucus. Vigorous coughing during suctioning loosens more secretions, which Mr. Levin can now expectorate on his own. His vital signs return to baseline, and his O_2 sat is 96%.

Outcome

Lisa updates Mr. Levin's surgeon, who orders a follow-up chest X-ray, pulmonary hygiene with IS and positive expiratory pressure therapy, continuous pulse oximetry, and humidified oxygen titration to maintain O_2 sat at 92% or greater. The activity order is changed from "up as tolerated" to "daily ambulation in hall." The rest of Mr. Levin's hospital stay is uneventful.

Education and follow-up

Atelectasis can trigger a cascade of events linked to postoperative respiratory failure in hospitalized older adults. Risk factors include advanced age, obesity, upper-abdominal or thoracic surgery, smoking history, reduced mobility, sedation, neuromuscular disorders, chronic lung disease, and pain with deep breathing.

Initial signs of atelectasis include minor increases in RR and BP, low-grade fever, restlessness, and a downward trend in O_2 sat. Breath sounds will be diminished over the affected lung fields, and crackles may be heard at the end of inspiration as collapsed alveoli snap open.

Preventing atelectasis includes enhancing lung expansion and airway clearance and should begin with preoperative patient education about pain control, mobility, and deep-breathing exercises with directed cough. Postoperative pain control, early ambulation, and cough and deep-breathing exercises (or IS) will reduce the likelihood of retained secretions that can cause mucous plugs and airway obstruction. Systemic hydration and adequate airway humidification help prevent thickened mucus.

Lisa's critical thinking avoided possible emergent bronchoscopy for removal of secretions or possible respiratory arrest. ★

*Names are fictitious.

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