CODING CORNER

- subsequent SpO2 of 93% on oxygen at 3 L/min (32%), equivalent to pO2 of 68 mm Hg, P/F ratio = 212 (significant worsening).
- 5 hours later, oxygen is increased to 4 L/min (36%) to maintain SpO2 of 93%. P/F ratio = 188 (extreme respiratory failure progressing rapidly toward respiratory arrest).

SUPPLEMENTAL OXYGEN ADMINISTRATION AND FIO2

Supplemental oxygen is usually administered either by mask or by nasal cannula. A Venturi mask (Ventimask) delivers a controlled flow of oxygen at a specific fixed concentration (FIO2): 24%, 28%, 31%, 35%, 40%, and 50%. The non-rebreather mask is designed to deliver approximately 100% oxygen. Providing 40% or more supplemental oxygen implies that the physician is treating acute respiratory failure since only a patient with acute respiratory failure would need that much oxygen.

A nasal cannula provides oxygen at variable flow rates in liters of oxygen per minute. The actual FIO2 delivered by nasal cannula is somewhat variable and less reliable than with a mask, but it can be roughly estimated as shown in Table 2. These FIO2 levels can be used to calculate the P/F ratio when oxygen is being administered by nasal cannula. Although patients sometimes are given up to 10 L/min, this is no more effective than 6 L/min because an FIO2 greater than 44% cannot be achieved by nasal cannula.

ACUTE-ON-CHRONIC RESPIRATORY FAILURE

The diagnosis of acute-on-chronic respiratory failure is in order whenever a patient experiences an acute exacerbation or decompensation of chronic respiratory failure. It is recognized by any of the following: worsening symptoms, greater hypoxemia or respiratory acidosis (hypercapnic respiratory failure).

Exercise caution when using the acute hypoxemic criteria (pO2/SpO2 and P/F ratio) in patients with chronic respiratory failure. For these patients, the pO2/SpO2 criterion should be applied, not on room air, but while receiving their usual supplemental oxygen flow. Why? Because such patients often have a baseline pO2 less than 60 mm Hg and their supplemental oxygen flow rate is intended to maintain a pO2 greater than 60 mm Hg (SpO2 91% or more). A pO2 or SpO2 lower than this while breathing oxygen at the usual rate obviously indicates an acute decline in the expected pO2.

In the stable, compensated state of chronic respiratory failure requiring supplemental oxygen, the expected P/F ratio would be less than 300 since it equates to a pO2 less than 60 mm Hg on room air. The P/F ratio does remain a valuable clinical tool in these patients, allowing physicians to prospectively monitor the degree of hypoxemia to detect early progression of respiratory failure and intensify treatment.

POSTPROCEDURAL RESPIRATORY FAILURE

The diagnosis of respiratory failure following surgery has profound regulatory and quality of care implications. If identified as “postop,” “due to” or “complicating” a procedure, respiratory failure is classified as one of the most severe, life-threatening reportable surgical complications a patient can have. The diagnosis of respiratory failure following surgery often results in a huge payment increase to the hospital—sometimes $20,000 to $30,000 or even more. If improperly diagnosed without firm clinical grounds, it may become the basis for regulatory audits, sanctions or even legal action.

To have the diagnosis, the patient must have acute pulmonary dysfunction requiring non-routine aggressive measures. A patient who requires a short period of ventilatory support during surgical recovery does not have acute respiratory failure, and a code for it should not be assigned on the claim. The same is true for any duration of mechanical ventilation that is usual or expected following the type of surgery performed, unless there truly is underlying acute pulmonary dysfunction.

A further difficulty arises because coding rules inexplicably call for coding of post-op respiratory failure as a complication of care even when terms that may seem clinically innocuous are used in the postop setting, such as pulmonary insufficiency (acute or not) and acute respiratory insufficiency. These terms should not be used in the postoperative setting unless the patient actually has acute respiratory failure.

If the patient has acute respiratory failure following surgery, but it is primarily the result of, or related to, a pre-existing medical condition like chronic obstructive pulmonary disease, congestive heart failure or a neuromuscular disorder, the physician should clearly document this connection to avoid the incorrect attribution of respiratory failure to the surgical procedure itself. If correctly documented in this way, respiratory failure will not be considered a surgical complication.

In summary, the P/F ratio is a valuable diagnostic, prognostic and clinical management tool; P/F ratio less than 300 is consistent with the diagnosis of acute respiratory failure. SpO2 can be used to estimate the arterial pO2 when ABGs are not available. An acute exacerbation of chronic respiratory failure represents acute-on-chronic respiratory failure; acute hypoxemic criteria (pO2/SpO2 and P/F ratio) must be applied with caution in these patients. Consider carefully the implications of diagnosing “postop” respiratory failure, and clarify any relationship to pre-existing conditions when present.

Table 2. Conversion of nasal cannula flow rate to FIO2

<table>
<thead>
<tr>
<th>Flow Rate</th>
<th>FIO2</th>
<th>Flow Rate</th>
<th>FIO2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 L/min</td>
<td>24%</td>
<td>4 L/min</td>
<td>36%</td>
</tr>
<tr>
<td>2 L/min</td>
<td>28%</td>
<td>5 L/min</td>
<td>40%</td>
</tr>
<tr>
<td>3 L/min</td>
<td>32%</td>
<td>6 L/min</td>
<td>44%</td>
</tr>
</tbody>
</table>

Dr. Pinson is a certified coding specialist and cofounder of HCQ Consulting (www.hcqconsulting.com) in Houston. This content is adapted with permission from HCQ Consulting.