Chapter 10
Surfactant Agents
Study Guide and Application Exercise

1. Read chapter

2. Review objectives (p.172)

3. Review key terms and definitions (p.172)

4. Given the equation: $P = \frac{2ST}{r}$ ($P = \text{pressure or work of breathing, } ST = \text{surface tension of alveoli, } r = \text{radius of alveolus}$), what is the relationship between $P$ and $ST$ if $r$ remains unchanged?

5. See #4. What is the relationship between $P$ and $r$ if $ST$ remains unchanged?

6. Surfactant deficient leads to lung collapse (decrease in radius of alveolar units). How does the reduction in radius affect the opening pressure of the alveoli?

7. What are the two primary indications for surfactant replacement in premature neonates?

8. Differ “prophylactic” and “rescue” treatments in surfactant replacement therapy.

9. What are the 4 primary signs and symptoms of respiratory distress syndrome (RDS)?

10. Figure 10-2 (p.173), the $V_T$ and Pressure graph represents the _______ (compliance, air flow resistance) change during a complete respiratory cycle.

11. Figure 10-2 (p.173). Interpret the changes after surfactant replacement.

12. Table 10-1 (p.174). Lucinactant (Surfaxin) has been discontinued in 2015. Surfaxin was the only synthetic formulation which had been approved by the FDA in 2012. Lucinactant (Aerosurf) is being investigated as an aerosol-delivery product (currently all surfactants are administered via the endotracheal tube).

13. The majority component of exogenous (artifical) surfactant is _______ (lipids, proteins).

14. Natural surfactant is synthesized or produced by the alveolar type _______ (I, II) cells.

15. Describe the production and regulation of surfactant secretion. (p.176)
16. Describe the indications, dosage, and administration technique for Beractant (Survanta), Calfactant (Infasurf), and Poractant (Curosurf). (p.177-179)

17. Review the table below on dosage characteristics of current exogenous surfactants.

<table>
<thead>
<tr>
<th>Surfactant</th>
<th>Vial</th>
<th>Dosage</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beractant (Survanta)</td>
<td>8-mL at 25 mg/mL (200 mg/vial)</td>
<td>4 mL/Kg q6h up to 4 doses</td>
<td>4 divided aliquots</td>
</tr>
<tr>
<td>Calfactant (Infasurf)</td>
<td>3-mL at 35 mg/mL (105 mg/vial)</td>
<td>3 mL/Kg q6h up to 4 doses</td>
<td>2 divided aliquots via side port</td>
</tr>
<tr>
<td></td>
<td>6-mL at 35 mg/mL (210 mg/vial)</td>
<td></td>
<td>4 divided aliquots via catheter</td>
</tr>
<tr>
<td>Poractant (Curosurf)</td>
<td>1.5-mL at 53 mg/mL (80 mg/vial)</td>
<td>Initial 2.5 mL/Kg Up to 2 additional doses at 1.25 mL/Kg q12h</td>
<td>2 divided aliquots</td>
</tr>
<tr>
<td></td>
<td>3-mL at 53 mg/mL (160 mg/vial)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lucinactant (Surfaxin)</td>
<td>8.5 mL at 30 mg/mL (255 mg/vial)</td>
<td>5.8 mL/Kg q6h up to 4 doses</td>
<td>4 divided aliquots</td>
</tr>
</tbody>
</table>

18. Describe the mode of action and clinical outcome of surfactant replacement therapy.

19. Describe the hazards and complications of surfactant replacement therapy.

20. During endotracheal suctioning, bradycardia is associated with vagal stimulation (vagus nerves along the airway) and arrhythmias are associated with hypoxia (due to prolonged suctioning).

21. Retinopathy of prematurity (ROP) is associated with prolonged exposure to excessive PaO2 (not FIO2).

22. Premeeis = respiratory distress syndrome. They *often* require prophylatic or rescue surfactant replacement.

23. Post-term neonates = meconium production and aspiration. They *seldomly* require surfactant replacement therapy.

24. Review the surfactant replacement therapy video (Survant dosing technique).

25. Does the neonate in “Clinical Scenario” (p.181) require rescue or prophylatic surfactant replacement therapy?