Chapter 13
Aerosolized Antiinfective Agents
Study Guide and Application Exercise

1. Read chapter

2. Review objectives (p.219)

3. Review key terms and definitions (p.219)

4. Add “tetragenic,” “mutagenic” and “negative pressure isolation” to Key Terms (p.219)

*Tetragenic* - any agent that can disturb the normal development of an embryo or fetus and may cause a birth defect in the child.

*Mutagenic* - In genetics, mutagenic refers to the changes of genetic material (usually DNA) caused by a physical or chemical agent (e.g., drug). It may increase the chances of mutation.

*Negative pressure room* in a hospital is used to contain and remove airborne contaminants within the room. Harmful airborne pathogens include aerosol particles of certain drugs, bacteria, viruses, fungi, yeasts, molds, pollens, gases.

5. List the 6 drugs (generic and brand names) covered in this chapter.

6. Review Table 13-1. List the clinical use of these aerosolized (one is DPI) drugs.

Note that NebuPent (via nebulizer) is also given with TMP-SMX (via oral, injection or intravenously) for the *treatment* of acute Pneumocystis jiroveci pneumonia (PJP). PJP is also called *Pneumocystis carinii pneumonia* (PCP)

TMP-SMX = Trimethoprim-Sulfamethoxazole; also called co-trimoxazole
Brand names of TMP-SMX include Bactrim, Bactrim IV and Cotrim (80 mg trimethoprim and 400 mg sulfamethoxazole)

*Aerosolized Pentamidine* (NebuPent) (p.220-224)

7. What is the primary indication for aerosolized pentamidine?
8. The nebulizer (e.g., Respirgard II or AeroTech II) must generate particle size in the range of ________ microns in order to maximize alveolar deposition and minimize airway deposition and related complications.

9. Describe the dosage, frequency of use and administration of pentamidine. The reconstituted pentamidine may be kept for 48 hours in original vial at room temperature and protected from light. A nebulizer treatment takes 30 to 45 min.

10. What are the nebulizer design requirements for delivery of pentamidine (NebuPent)? Explain the reasons for the special design and setup.

11. The exact mode of action of pentamidine is ______ and it has ______ (single; multiple) effect(s) on Pneumocystis carinii.

12. List 3 side effects with aerosol administration of pentamidine.

13. Explain the reason for pre-treating a patient with a SABA before aerosolized pentamidine.
14. List the methods to reduce or prevent environmental contamination by nebulized / aerosolized pentamidine.

15. Why should the patients receiving pentamidine / co-trimoxazole be screened for active pulmonary tuberculosis?

Ribavirin (Virazole) (p.224-227)

16. What are the indications for aerosolized ribavirin (Virazole)?

17. Aerosolized ribavirin is most commonly used to treat _______ in infants and children. Treatment should be reserved for _____ (chronic and mild; acute and severe) infections.

18. Describe the dosage and method of administration for aerosolized ribavirin.

Total reconstituted dosage = 6,000 mg / 300 mL (after dilution)
This entire dose is divided into 3 treatments per day at 2,000 mg / 100 mL each treatment

SPAG II setup (part 1) https://www.youtube.com/watch?v=JQWAI2bjnvs
SPAG II setup (part 2) https://www.youtube.com/watch?v=r2clv608ITA
SPAG II setup (part 2) https://www.youtube.com/watch?v=4PWsjGOQJeY

19. The driving pressure on the SPAG II unit is _______ psig. The flow to the drying chamber is _______ L/min and to the nebulizer is _______ L/min.

20. What are the common clinical side effects of aerosolized ribavirin?

21. Describe the environmental contamination with aerosolized ribavirin.

Palivizumab (Synagis) (p.227-228)

22. Name the class of drug and clinical use of palivizumab (Synagis).

23. How is Synagis administered? Dosage and frequency?

24. Significant risk factors for bronchopulmonary dysplasia (BPD) include prolonged mechanical ventilation, use of high FIO2, infection, and prematurity. Palivizumab (Synagis) is used for these infants because they are more likely to develop RSV.
Aerosolized Tobramycin (TOBI) (p.228-230)

25. Why is aerosolized tobramycin a better alternative to intravenous route of delivery?

26. List the clinical use of tobramycin.

27. Describe the dosage and administration of tobramycin.

PARI LC Plus reusable breath-enhanced nebulizer
https://www.youtube.com/watch?v=7juh82mpoj4

28. List the mode of action and side effects of tobramycin.

29. Should aerosolized tobramycin be mixed with other aerosolized drugs?

Aerosolized Aztreonam (Cayston) (p.230-231)

30. List the clinical use of aztreonam.

31. Aztreonam is suitable for children over 7-year-old and those infected with *Burkholderia cepacia*. (True/False)

32. Describe the dosage and administration of aztreonam.

33. List the mode of action and precautions in use of aztreonam.

34. Should aerosolized aztreonam be mixed with other aerosolized antibiotics?

35. Setting up the Altera nebulizer
https://www.youtube.com/watch?v=s8oYm8WrAOw

36. Disinfecting the Altera nebulizer
https://www.youtube.com/watch?v=YX2WJySfVng

Inhaled Zanamivir (Relenza) (p.231-233)

37. List the clinical use of zanamivir.

38. Relenza is administered via a(n) _______ (SVN, DPI, MDI)
39. Describe the dosage and administration zanamivir.

40. List the mode of action and adverse effects of zanamivir.

41. Administration technique for zanamivir (Relenza) Diskhaler
https://www.youtube.com/watch?v=sQ10a0ToSPo

Summary of main drugs covered in this chapter

<table>
<thead>
<tr>
<th>Drug</th>
<th>Indication/Use</th>
<th>Frequency</th>
<th>Neb System</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pentamidine (NebuPent)</td>
<td>Prevent PCP</td>
<td>300 mg Once q4 weeks</td>
<td>RespGard II</td>
</tr>
<tr>
<td></td>
<td>Treat PCP with TMP-SMX</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ribavirin (Virazole)</td>
<td>Treat acute RSV</td>
<td>Diluted 600 mg in 300 mL 200 mg/100 mL TID</td>
<td>SPAG-2 26 psig 6 and 6 L/min</td>
</tr>
<tr>
<td>Palivizumab (Synagia)</td>
<td>Prevent and treat RSV in infants with BDP</td>
<td>15 mg/kg intramuscular once per month</td>
<td>n/a</td>
</tr>
<tr>
<td>Tobamycin (TOBI, Bethkis)</td>
<td>Manage CF Pseudomonas</td>
<td>300 mg / 5 mL BID 28 days on/off</td>
<td>PARI LC Plus</td>
</tr>
<tr>
<td>Aztreonam (Cayston)</td>
<td>Manage CF Pseudomonas ≥ 7 y.o. Preteat with SABA</td>
<td>75 mg / 3 mL TID 28 days on/off</td>
<td>Altera Neb</td>
</tr>
<tr>
<td>Zanamivir (Relenza)</td>
<td>Treat influenza ≥ 5 y.o.</td>
<td>10 mg / 2 Inhalations BID for 5 days</td>
<td>DPI (see also Table 13-2 for other antiviral drugs)</td>
</tr>
</tbody>
</table>

42. Review “Clinical Scenario” (p.235) and describe the clinical significance of: WBC 13.5 x 10^3/mm^3, Pulse oximetry 89% on room air, PFT results.

43. Does the patient have large and small airway obstruction? air trapping? Explain your rationale.