

# Fungal Infections in Solid Organ Transplant Recipients

Program Three

## Post Test

**Part A.** Multiple-choice questions: There may be more than one correct answer for each question. Please circle correct answers below and complete the CME Request and Evaluation forms on the reverse side.

- Which of the following organisms is the most common cause of post-transplant infection in all solid organ transplant recipients?
  - Aspergillus* spp.
  - Candida* spp.
  - Cryptococcus neoformans*
  - Histoplasma* spp.
- Infection with which type of organism in the post-transplant period is associated with the highest mortality?
  - Bacterial
  - Viral
  - Fungal
  - Zygomycetes
- Candida* infection is most common during which post-transplantation period?
  - Pre-transplantation
  - 0-1 month
  - 1-6 months
  - After 6 months
- Which factors affect the net state of immunosuppression in solid organ transplant patients?
  - Type and duration of immunosuppressive therapy
  - Previous and concomitant viral infections
  - Events related to surgery
  - Underlying illness (e.g. diabetes, lupus, etc.)
  - All of the above
- Prior infection with which virus is associated with increased risk of fungal infection after solid organ transplantation?
  - Human immunodeficiency virus (HIV)
  - Hepatitis virus C (HVC)
  - Cytomegalovirus (CMV)
  - Human papilloma virus (HPV)
- In liver and lung transplant patients, it is advisable to use minimal immunosuppressive therapy early in the transplant period because:
  - Fungal infections in these patients are not seen until a later period
  - Organ rejection does not occur until a later period
  - Immunosuppressive therapy may interfere with wound healing
  - Using maximal therapy may increase the risk of viral infections
- Current guidelines suggest that patients who are seronegative for CMV and receive an organ from a seropositive donor be managed in which of the following manners:
  - Patient should be administered prophylactic doses of ganciclovir or valganciclovir
  - Patient should receive minimal immunosuppressive therapy post-transplant
  - Patient should not receive the infected donor organ
  - No management decision is required, patient can safely receive the donor organ
- The use of immunomodulatory agents (e.g. G-CSF, IFN-gamma) to support immune function in post-transplant patients is associated with which of the following?
  - Increased risk of neutropenia
  - Increased risk of rejection of the transplanted organ
  - Increased risk of opportunistic infections
  - None of the above

9. Which of the following measures can help reduce the risk of fungal infections in post-transplant patients?
  - a) Minimal use of immunosuppression when appropriate
  - b) Careful organ selection, ensuring appropriate prophylactic measures in patients receiving viral-infected organs
  - c) Careful monitoring and management of potential infectious foci (e.g. drains, hematomas, fluid collections)
  - d) Judicious use of antibiotics
  - e) All of the above
  
10. *Aspergillus* is acquired primarily by:
  - a) Worker-to-patient contact
  - b) Inhalation of air-borne conidia
  - c) Contaminated organs
  - d) Blood transfusion received during transplant surgery
  
11. Invasive aspergillosis has the highest mortality rate in which population of transplant patients?
  - a) Heart and lung transplant patients
  - b) Liver and lung transplant patients
  - c) Kidney and pancreas transplant patients
  - d) Kidney and lung transplant patients
  
12. Which of the following is true of post-transplant patients with suspected pulmonary aspergillosis?
  - a) They may present with fever, cough, pleuritic pain, and hemoptysis
  - b) Up to 75% may have a normal chest X-ray
  - c) Chest X-ray may show a “halo” sign, and this is tantamount for pulmonary aspergillosis
  - d) All of the above are true
  - e) Both a and c are true
  
13. Which of the following is true of *Cryptococcus* infection in solid organ transplant patients?
  - a) It is more common in this patient population than in patients receiving hematopoietic stem cell transplantation
  - b) It most often presents after dissemination to the central nervous system, with symptoms of meningitis and/or focal lesions detected by MRI
  - c) Pulmonary disease is often asymptomatic, delaying its detection prior to CNS invasion
  - d) Lumbar puncture is the most important diagnostic test in these patients
  - e) All of the above are true
  
14. Current guidelines for the treatment of cryptococcal CNS infection in solid organ transplant recipients include:
  - a) Amphotericin B plus 5-flucytosine for two weeks for induction therapy followed by consolidation therapy with oral fluconazole
  - b) Amphotericin B given IV for two weeks
  - c) Voriconazole given IV for two weeks followed by oral itraconazole indefinitely
  - d) No treatment unless disseminated disease is suspected
  
15. An important consideration in patients with solid organ transplants and treatment with the azole class of antifungals is that:
  - a) The azoles are renally-metabolized and thus contribute to significant nephrotoxicity
  - b) The azoles are bone-marrow suppressive and increase the risk of fungal infections
  - c) Infusion reactions are a common occurrence and pre-medication of patients is required prior to administration
  - d) The azoles inhibit the cytochrome P450 system and thus interfere with the metabolism of important immunosuppressive agents
  
16. For which of the following indications is the use of caspofungin approved by the FDA?
  - a) Sinus infection with *Mucor* spp.
  - b) Aspergillosis which is refractory to conventional therapy
  - c) First line treatment of oral candidiasis
  - d) Histoplasma infection

**Part B. True/False Questions**

17. *Candida glabrata* the most common fungal pathogen causing infections in post-transplant patients.

- a) True
- b) False

18. Most *Candida* infections originate from endogenous sources within the patient.

- a) True
- b) False

19. Bronchopulmonary infection is commonly seen in patients from whom *Candida* spp. is isolated in sputum cultures.

- a) True
- b) False

20. Treatment for zygomycosis should include amphotericin B plus flucytosine for potentiation of fungal killing.

- a) True
- b) False

**CME Credit Hours Request Form  
(U.S. Physicians only)**

**Please print clearly**

Name: \_\_\_\_\_

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## Evaluation Form

Please take the time to evaluate this material, your answers and suggestions are confidential.  
Please mail or fax the completed evaluation form to the address indicated below.

### PART 1: Tell us about you

1. What is your primary specialty or occupation? (check one)

- |   |   |                                     |
|---|---|-------------------------------------|
| <input type="checkbox"/> Medical Oncology | <input type="checkbox"/> Radiation oncology | <input type="checkbox"/> Surgery    |
| <input type="checkbox"/> Pathology        | <input type="checkbox"/> Pharmacology       | <input type="checkbox"/> Other_____ |
| <input type="checkbox"/> Nursing          | <input type="checkbox"/> Counseling         |                                     |

2. What is your main activity? (check one)

- |                                       |  |   |
|---------------------------------------|--|---|
| <input type="checkbox"/> Patient care | <input type="checkbox"/> Clinical research | <input type="checkbox"/> Administrative |
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3. How many years have you been active in this area? (check one)

- |                                    |                                      |
|------------------------------------|--------------------------------------|
| <input type="checkbox"/> <5 years  | <input type="checkbox"/> 5-10 years  |
| <input type="checkbox"/> >20 years | <input type="checkbox"/> 11-19 years |

### PART 2: Tell us about how you experienced this educational program

4. This program had a number of education objectives to what extent were these objectives met?

(please circle the number that best reflects your view: -2 = poor, +2 = outstanding)

- |   |    |    |   |    |    |
|---|----|----|---|----|----|
| • Provide an overview of common fungal pathogens causing clinically significant infections in solid organ transplant patients.  | -2 | -1 | 0 | +1 | +2 |
| • Discuss the relationship between the infecting fungal organism and type of organ transplanted and time after transplantation. | -2 | -1 | 0 | +1 | +2 |
| • Understand current modalities and rationales for treatment of fungal infections in solid organ transplant patients.           | -2 | -1 | 0 | +1 | +2 |

5. As a result of this program, do you feel that you:

- |   |     |    |
|---|-----|----|
| • Have increased your professional knowledge?   | Yes | No |
| • Will change your disease management approach? | Yes | No |
| • Will start new trials or research?            | Yes | No |

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6. Please provide general comments about this educational program or suggestions for future materials.

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