Pneumonia

CIC Review: 10/25/2022

Utah Department of Health & Human Services

Question #1

Betty is a 56 year old female that is admitted to the inpatient pulmonology unit with a diagnosis of acute pneumonia. She is currently undergoing intravenous chemotherapy at an outpatient clinic and her last treatment was 12 days ago. During her admission assessment she reports that she developed pain in her chest followed by difficulty breathing and a productive cough that started 4 days ago and has progressively worsened over the last 48 hours. Betty's pneumonia can be classified as:

A) Community-acquired pneumonia (CAP)
B) Healthcare-associated pneumonia (HCAP)
C) Hospital-acquired pneumonia (HAP)
D) Ventilator-associated pneumonia (VAP)

Answer/Rationale #1

B) Healthcare-associated pneumonia (HCAP)

Rational

Is a community acquired infection (CAP) that occurs in patients with any of the following special epidemiological characteristics: (1) hospitalized in an acute care hospital for 2 or more days within 90 days of the current infection; (2) resided in a nursing home or long-term care facility; **(3) received recent intravenous antibiotic therapy, chemotherapy, or wound care within the past 30 days of current infection**; or (4) attended a hospital or hemodialysis clinic.

Additional education: These patients are considered to be at risk for colonization by bacteria similar to hospitalized patients and consequently are at risk for infection by potentially multidrug-resistant organisms (MDROs).

APIC Text: Pneumonia: Basic principles section (See notes for full APIC text source)

Question #2

A microbiological workup for treatment of pneumonia requires culture and sensitivity and can take 1-3 days for results. In the interim, national guidelines have been developed by the American Thoracic Society (ATS) and the Infectious Diseases Society of America (IDSA) to assist physician with decisions on antibiotic selection during Empirical therapy. A risk factor for *S. aureus* CAP includes all of the following **except**:

A) Prior quinolone therapy
B) Chronic steroid use
C) Prior influenza infection
D) End-stage renal disease

Answer/Rationale #2

B) Chronic steroid use

Rational

Risk factors for *S. aureus* CAP include end-stage renal disease, injection drug abuse, prior influenza, and prior antibiotic therapy (especially with quinolones).

Frequent or chronic steroid use is a risk factor for infection with *Pseudomonas* species. Other risk factors for this species include: prior antibiotic use and structural lung disease (ie bronchiectasis).

Question #3

The current community-acquired pneumonia (CAP) national quality measures used in the United States include all of the following except:

A. Antibiotic timing (within 6 hours of arrival)
B. Antibiotic selection
C. Blood cultures performed in the Emergency Department after antibiotics were administered
D. Ensure that all patients are screened for pneumococcal vaccination

Answer/Rationale #3

C. Blood cultures performed in the Emergency Department after antibiotics were administered.

Rationale: Blood cultures taken before antibiotics are administered will give the most accurate samples of the state of the patient. The core quality measures are a set of standards defined by The Joint Commission (TJC) and the Centers for Medicare & Medicaid Services (CMS) to create core measures for disease management for CAP. Quality assessment indicators for CAP that are founded on healthcare structures, processes, and outcomes have been recommended as potential audit tools to evaluate the delivery of care.The measures create consistent evidence-based practice in facilities caring for CAP patients. The CMS measures hospitals' adherence to the measures and publishes the results. A summary of TJC/CMS national quality measures for CAP is as follows:

- Blood cultures obtained within 24 hours (before or after) of arrival to the hospital
- Blood cultures performed in the emergency department before antibiotics were administered
- Antibiotic timing
- Antibiotic selection
- Pneumococcal vaccination
- Influenza vaccination
- Smoking cessation counseling

Reference: APIC Text, 5th edition, Chapter 37 - Pneumonia

Question #4

Measures that can be practiced for prevention of aspiration include all of the following except:

A. Stress-ulcer prophylaxis
B. Oropharyngeal cleaning and decontamination with an aseptic agent (e.g., chlorhexidine)
C. Orotracheal intubation, unless contraindicated, rather than nasotracheal intubation
D. The head of the bed elevated at an angle of 15 to 30 degrees

Answer/Rationale #4

D. The head of the bed should be angled at 15 to 30 degrees. (An angle of 30 to 45 degrees is correct).)

The following precautions should be practiced for prevention of aspiration:

- Use of noninvasive ventilation, when possible, to reduce the need for and duration of endotracheal intubation. This refers to all modalities that assist ventilation without the use of an endotracheal tube.
- Perform orotracheal intubation unless contraindicated. Nasotracheal intubation has been associated with higher incidence of nosocomial sinusitis, making the patient more prone to development of pneumonia through aspiration of infected secretions.
- The head of the bed should be elevated at an angle of 30 to 45 degrees.
- Oropharyngeal cleaning and decontamination should be performed with an aseptic agent (e.g., chlorhexidine).
- Stress ulcer prophylaxis may be provided with proton-pump inhibitors, histamine-2 receptor antagonist, or sucralfate.

Reference: APIC Text, 5th edition, Chapter 37 - Pneumonia

Question #5

The Institute for Healthcare Improvement (IHI) ventilator associated pneumonia (VAP) prevention bundle includes all except the following:

A. Daily sedation vacations to assess extubation readiness
B. DVT prophylaxis
C. Daily oral care with chlorhexidine
D. Prophylactic antibiotic therapy

Answer/Rationale #5

D. Prophylactic antibiotic therapy

Rationale:

It is not recommended to give antibiotics to as prophylaxis for pneumonia. The VAP bundle includes:

- Elevation of head of bed
- Daily “sedation vacations” and assessment of readiness to extubate
- Peptic ulcer disease prophylaxis
- Deep venous thrombosis prophylaxis
- Daily oral care with chlorhexidine

Question #6

Which of the following would be be considered a sentinel event in a healthcare facility?

A. An ICU patient with subarachnoid hemorrhage develops ventilator associated pneumonia and sepsis.
B. An influenza outbreak occurs on a hospital post-surgical ward. A hysterectomy patient contracts Influenza A during her hospital stay and is discharged on oral Tamiflu.
C. A 94 year old man with a history of CVA was brought to the ED after his daughter found him febrile and somnolent at home. CXR is consistent with aspiration pneumonia. He is admitted and given IV antibiotics but family declines intubation or aggressive care. He dies 48 hrs after admission.
D. All of the above

Answer/Rationale #6

A. A patient with subarachnoid hemorrhage develops pneumonia 5 days after intubation and admission to the ICU.

Rationale:

A sentinel event is defined as a patient safety event that results in death, permanent harm, or severe temporary harm. Many ventilator associated pneumonia (VAP) constitute severe harm. All sentinel events require thorough root cause analysis (RCA) to identify potential risk-reduction strategies.

Question #7

Risk factors for hospital patient to develop a multidrug-resistant organism (MDRO)-related pneumonia include all except:

A. Current hospitalization of 5 days or more
B. High community rates of antibiotic resistance
C. Head of bed not elevated
D. Immunosuppressive therapy

Answer/Rationale #7

C. Head of bed not elevated

Rationale:

Elevating the head of the bed 30-45 degrees reduces the risk of pneumonia, but is not related specifically to MDRO risk. Factors that increase risk of MDROs include:

- Prolonged hospitalization
- Antimicrobial use within the past 90 days
- High hospital or community resistance rates
- Immunosuppression
- Resides in a nursing home or long-term care facility

Surgical Site Infections

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Question #1

A surgical incision for a cholecystectomy where there is no indication of infection or break in sterile technique would be classified as:

A. Class I/Clean
B. Class II/Clean-Contaminated
C. Class III Contaminated
D. Class IV/Dirty-Infected

Answer/Rationale #1

B. Class II/Clean-Contaminated

Rationale:

- Class I/Clean: uninfected operative wound with no inflammation, no involvement of respiratory, GI, or GU tract and no break in sterile technique
- Class II/Clean-Contaminated: Respiratory, GI, or GU tract is entered, but no evidence of infection or major break in sterile technique
- Class III Contaminated: Surgical wounds with major breaks in sterile technique, gross spillage from GI tract or non-purulent inflammation is encountered.
- Class IV/Dirty-Infected: Viscera are perforated, purulent inflammation, or gross fecal contamination is present

Question #2

An infection preventionist wishes to calculate the Standardized Infection Ratio (SIR) for his hospital. All of the following are true regarding SIR **except**:

A. SIR is tabulated by dividing the observed hospital SSI rate by the expected rate.
B. Only NHSN data should be used to calculate SIR
C. A SIR ratio greater than 1.0 indicates significantly higher than expected rates
D. SIR is especially important for very high-risk cases, such as acute trauma or emergency procedures

Answer/Rationale #2

D. SIR is especially important for very high-risk cases, such as acute trauma or emergency procedures

Rationale:

Very high risk cases should be excluded from SIR calculation as they may skew results and are not included in NHSN data.

Question #3

Which of the following constitutes a superficial surgical site infection?

A. Redness and a small amount of purulent drainage has formed around a suture 5 days postoperatively
B. A total knee arthroplasty incision develops redness, tenderness and purulence on and around the incision site 1 week postoperatively.
C. A stab wound that develops purulent drainage after 3 days
D. An abdominal incision that dehisces spontaneously 5 weeks postoperatively

Answer/Rationale #3

B. A total knee arthroplasty incision that is reopened 5 days postoperative due to surrounding redness, warmth, and tenderness

Rationale:

Superficial incisions involve the skin and subcutaneous tissue of a surgical wound that occur within 30 days of the surgical procedure. Abscessed sutures, pin site infections, infected stab wounds or burn infections are not considered surgical site infections.

Question #4

Which of the following are foundational principles in managing an infected surgical site (Check all that apply):

A. Open and drain the incision
B. Debride fibrinous and necrotic tissue
C. Remove foreign bodies
D. Implement antimicrobial management as needed
E. Manage the open wound

Answer/Rationale #4

All of the above

Rationale:

These are the 5 foundational principles of SSI management:

A. Open and drain the incision
B. Debride fibrinous and necrotic tissue
C. Remove foreign bodies
D. Implement antimicrobial management as needed
E. Manage the open wound

Question #5

Risk factors for the development of SSI include all of the following except:

A. Patient characteristics
B. Type of surgical procedure
C. Surgeon
D. Use of pre-operative antibiotics

Answer/Rationale #5

D. Use of pre-operative antibiotics

Rationale:

In many procedures, preoperative antibiotic prophylaxis may reduce SSI risk. Not all surgical procedures require preoperative antimicrobial use. Prophylaxis should be administered only when indicated, based on published clinical guidelines.

Question #6

Strategies to prevent Surgical Site Infections include all of the following except:

A. Preoperative showering
B. Smoking cessation
C. Maintaining glycemic control
D. Shave hair at the incision site prior to surgery

Answer/Rationale #6

D. Shave hair at the incision site prior to surgery

Rationale:

Hair removal prior to surgery should be kept at a minimum. Hair should be removed by use of clippers or a depilatory cream.

Question #7

ASA score is one factor used to determine surgical risk. What does ASA stand for?

A. American Surgical Association
B. American Society of Anesthesiologists
C. Association for Surgical Advancement
D. Agency for Surgical Asepsis

Answer/Rationale #7

B - The American Society of Anesthesiologists

The ASA score utilizes a scale of 1 to 5:

Class I = A normal healthy individual

Class II = Mild systemic disease resulting in no functional limitations

Class III = Severe systemic disease that limits activity but is not incapacitating

Class IV = Severe systemic disease that is a constant threat to life

Class V = Moribund patient not likely to survive 24 hours

Question #8

Betty is a physically active 87 year old in need of a total hip replacement. She has been an insulin dependent diabetic for the past 50 years. She also has battled rheumatoid arthritis for 20 years and takes methotrexate. In addition, Betty has sleep apnea related to her morbid obesity. What steps should be taken to reduce her risk of a postoperative surgical site infection? Select all that apply.

A. Medical clearance from her primary care provider
B. Preoperative lab evaluations
C. Nutritional counseling
D. Physical therapy evaluation prior to surgery
E. Admit to the hospital 2 to 3 days prior to the surgery to evaluate pulmonary function and start antibiotic therapy

Answer/Rationale #8

Correct answer - all except E

Rationale:

Prolonged hospitalization prior to a surgical procedure increases the risk of infection. Also, preoperative antibiotics should be administered as close to incision time as possible. Prolonged antibiotic therapy increases the risk for development of multidrug-resistant organisms or C. difficile, especially for folks over the age of 65.