

Pressure Ulcers eCourse

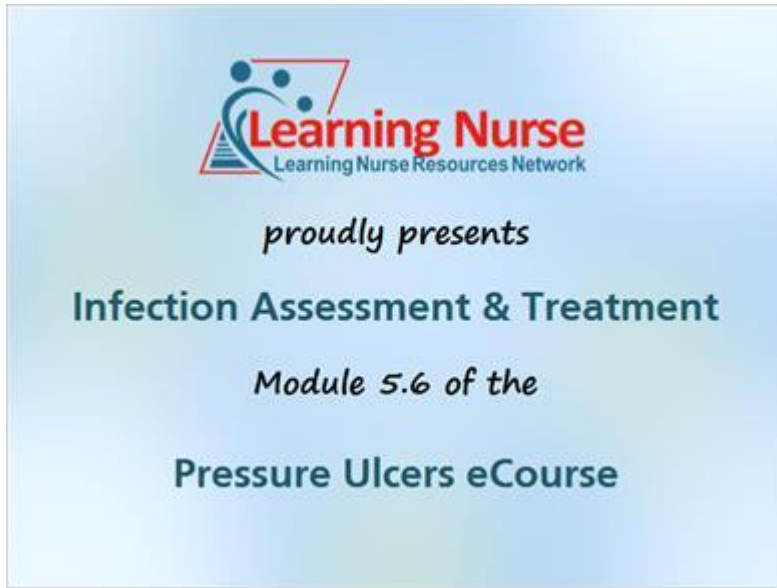
Module 5.6: Infection Assessment and Treatment Handout

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Infection Assessment and Treatment

1. Infections

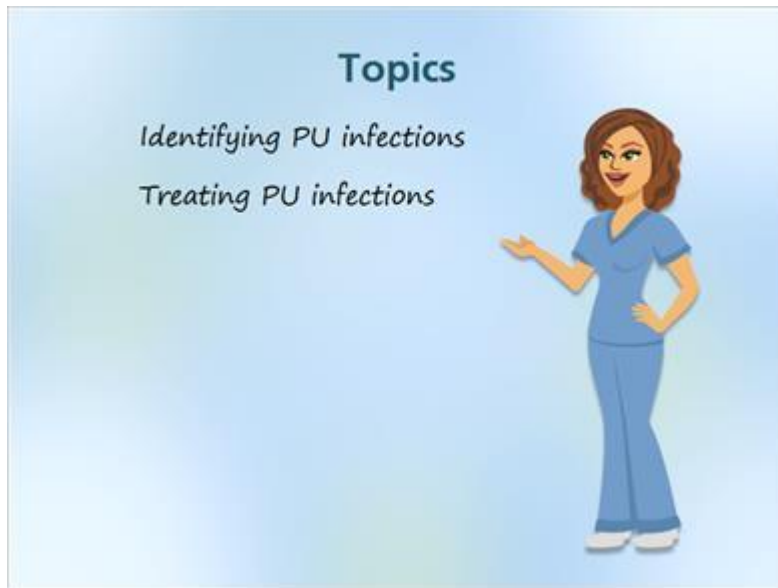
1.1 Section Title



Narration

No narration, only music.

1.2 Topics



Narration

JILL: Hi ... I'm Jill and with me is Mark. Welcome to Module 5.6 of this Pressure Ulcer course.

MARK: I see that our topic today is infections in pressure ulcers. I assume that we are going to learn how to identify the signs and symptoms of wound bed infection, as well as options for treating these infections.

JILL: You got it!

1.3 Wound Infection



Narration

JILL: Wound infection results from an overgrowth of micro-organisms. But not all open wounds with micro-organisms are infected. Most are merely colonized. The bacteria that infect the wound bed are due to either the total number present, or the virulence of the bacteria strain.

Mark, what do you think are the symptoms of an infected wound?

MARK: Let's see. I would think that the symptoms include: fever, edema, erythema, local pain and tenderness, and induration of the wound edge and adjacent tissues.

JILL: Yes, that is correct.

1.4 Wound Infection 2



Narration

JILL: However, we should keep in mind that patients who are elderly or systemically immunocompromised may not present with the typical signs and symptoms of fever, chills and tachycardia. Especially with the elderly, the only clinical signs of a systemic infection might be a change in mental or functional status.

A person with wound exudate that is copious, malodorous, and prolonged should be evaluated further for infection, cellulitis, abscess, or progressive degeneration.

Assessment of wound infection involves assessment of the patient's overall condition, observation of the wound and surrounding tissues, and wound cultures to determine colony counts. Clinical signs of inflammation are often mistaken for infection.

MARK: So how do you know whether it is infection or simply inflammation?

JILL: We will cover that shortly.

1.5 Wound Infection 3

Wound Infection

- Prolongs the inflammatory stage*
- Induces additional tissue destruction*
- Delays collagen synthesis*
- Prevents epithelialization*



Narration

JILL: But before we do, let's look at how bacterial burden and wound infection negatively impact wound healing. Wound infection prolongs the inflammatory stage; induces additional tissue destruction; delays collagen synthesis; and prevents epithelialization.

MARK: This is why we need to identify and treat any wound infections promptly.

JILL: Right.

1.6 Colonization/Infection



Colonization vs. Infection

Colonization:

- *bacteria in wound bed, no affect*

Critical colonization:

- *more than 100,000/gram*
- *no improvement after 14 days*

Infection:

- *invasion of soft tissues*

Narration

JILL: Now back to your question. Pressure ulcers are ischemic tissue and more susceptible to the development of infection. This is due to lack of normal nutrition, oxygen, immune cell antibodies and antibiotics. All Stage II to IV pressure ulcers should be considered colonized with bacteria. Proper cleansing and debridement will prevent bacterial colonization from proceeding to the point of clinical infection. A contaminated wound may heal, but an infected one will not!

MARK: So at what point are there too many bacteria?

JILL: Critical colonization is defined as more than 100,000 organisms per gram of tissue. At this level, the bacteria are negatively impacting the wound bed. Treatment is required to eradicate the bacteria to return the wound bed to a normal physiological level of healing.

In addition to bacterial counts, you should suspect bacterial burden if a clean wound shows no improvement after 14 days of topical therapy.

MARK: When bacterial counts gets too high, they invade the soft tissues of the wound resulting in an infection.

1.7 Infection Risks

Risk of Infection

High risk of infection:

- necrotic tissue or foreign body
- present for a long time
- large in size or deep
- repetitively contaminated



Narration

JILL: Let's discuss the risk factors associated with wound infections. Mark?

MARK: Okay. The risk of getting infected is high when the pressure ulcer wound: has necrotic tissue or a foreign body; the wound has been present for a long time; the wound is large in size or deep; and if the wound is likely to be repetitively contaminated.

JILL: Great, thanks.

1.8 Infection Risks 2

Risk of Infection

High risk of infection in patients with:

- *diabetes mellitus*
- *protein-calorie under-nutrition*
- *hypoxia or poor tissue perfusion*
- *autoimmune disease*
- *immunosuppression*

A photograph showing a person's hand holding a small, handheld electronic device, likely a glucose meter, used for monitoring blood sugar levels. The device has a small screen and several buttons.

Narration

JILL: In addition to the specific wound-associated risks, there are certain types of patients that are more likely to get infections in their pressure ulcers.

MARK: Who are these?

JILL: Patients with compromised host defense associated with: diabetes, protein-calorie under-nutrition, hypoxia or poor tissue perfusion, autoimmune disease, and immuno-suppression.

MARK: I see.

1.9 Infection Risks 3



Narration

JILL: We should suspect a local infection in pressure ulcers when there are no signs of healing for 2 weeks, or clinical signs of local infection along with the following symptoms.

MARK: And the associated signs and symptoms we are looking for include: friable granulation tissue; foul odor; increased pain in the ulcer; increased heat in the surrounding tissue; increased drainage or change in the nature of drainage; and increased necrotic tissue, pocketing or bridging.

JILL: Yes. Those are the signs we look for when we suspect an infection.

1.10 Diagnosis

Diagnosis of Infection

Acute infection may be present if:

- erythema extending from ulcer edge
- induration
- pain, warmth or purulent drainage



Narration

JILL: We should consider a diagnosis of spreading acute infection if the pressure ulcer has the following signs: erythema extending from the ulcer edge; induration; or new or increasing pain, warmth or purulent drainage.

1.11 Diagnosis 2

Diagnosis of Infection

Acute infection may be present if: (continued)

- crepitus, fluctuance or discoloration
- systemic signs of infection
- change in functional status

A photograph showing a healthcare professional in a light blue uniform assisting an elderly woman in a wheelchair. The professional is leaning over the wheelchair, and the woman is looking towards the professional. The background is a plain, light blue color.

Narration

JILL: Other symptoms of acute infections are: crepitus, fluctuance or discoloration in the surrounding skin; systemic signs of infection; and, change in functional status in the elderly.

MARK: Wow. That is quite of list of symptoms. Is there any way we can confirm an infection?

JILL: Yes, there is.

1.12 Diagnosis 3

Diagnosis of Infection

Tissue biopsy or quantitative swab technique

Infection if the culture indicates:

- bioburden of $>10^5$ CFU/g
- beta hemolytic streptococci

In the elderly:

- anorexia
- confusion / delirium
- changes in physical function



Narration

JILL: To confirm an infection in a pressure ulcer we need to do a tissue biopsy or quantitative swab and send it to the lab for analysis.

MARK: What lab results will confirm an infection?

JILL: We should consider a diagnosis of pressure ulcer infection if the culture indicates: bacterial bioburden of more than 100,000 CFU per gram of tissue; and if there is a presence of beta hemolytic streptococci bacteria.

Remember that in the elderly, there are likely not going to be the usual clinical symptoms of infection. Instead, they may present with anorexia, confusion and delirium, or changes in physical function.

MARK: I see. That is a lot of information to know about assessing infections. Is there any more?

JILL: No, that is the end of the assessment phase. We will now discuss how to manage and treat infections.

1.13 Infection Management

Management of Infection

Maximize body's response:

- medical conditions
- nutrition, glucose, blood flow, etc.

Prevent contamination of pressure ulcer:

- ulcers near anus
- fecal containment
- diverting colostomy

Reduce bacterial load



Narration

JILL: The first step in dealing with infections is to maximize the body's ability to fight them. This means addressing any underlying medical conditions. Other things that would help include: improving nutrition; tight control of glucose; improvement of arterial blood flow; and reduction of immuno-suppressive agents if possible. What else can we do Mark?

MARK: Well, another important strategy is to prevent contamination of the pressure ulcer. Pressure ulcers near the anus are very prone to contamination with stool. If this is a problem, then we need to consider use of a fecal containment device, or a diverting colostomy to keep stool out of the wound bed and promote healing.

JILL: And the third step is to reduce the bacterial load in the pressure ulcer. Cleansing and debridement of the wound bed is important to remove loose debris, planktonic bacteria, adherent slough, biofilm and eschar.

1.14 Antiseptics

Management of Infection

Wound antiseptics:

- iodine, chlorhexidene
- acetic acid, silver compounds
- hydrogen peroxide, sodium hypochlorite

Topical antiseptic cautions:

- limited period of time
- proper dilution
- toxicity and reactions



Narration

JILL: Antiseptics are agents that destroy or inhibit the growth and development of micro-organisms in or on living tissue. Antiseptics have multiple targets that include bacterial, fungi, viruses, protozoa and even prions. Antiseptics commonly used in wounds include iodine compounds, chlorhexidine, acetic acid, silver compounds, hydrogen peroxide and sodium hypochlorite.

MARK: Therefore these antiseptics can be used to lower bacterial counts and fight infection.

JILL: Yes. We should consider using topical antiseptics that are properly diluted and appropriate for pressure ulcers. Some cautions apply. Antiseptics should be used for a limited period of time. They must be diluted. Cytotoxicity may occur, especially at higher concentrations. Several antiseptics at lower concentrations are not cytotoxic and retain antibacterial activity. Sodium hypochlorite and hydrogen peroxide should only be used when suitable alternatives are not available. Hydrogen peroxide can cause air emboli in wounds with sinus tracts. Acetic acid is good for wounds with pseudomonas infection.

1.15 Antiseptics 2

Management of Infection

Use topical *antiseptics* for pressure ulcers:

- not expected to heal
- critically colonized
- reduce bacteria bioburden
- reduce inflammation



Narration

JILL: We should consider use of topical antiseptics for pressure ulcers that are not expected to heal and are critically colonized.

MARK: Why?

JILL: To reduce bacteria bioburden and reduce inflammation.

MARK: Of course!

1.16 Silver and Honey

Management of Infection

Topical antimicrobial silver or medical-grade honey for:

- multiple organisms
- offer wide antimicrobial coverage
- not allergic to honey, bee products or bee stings



Narration

JILL: We should consider the use of topical antimicrobial silver or medical-grade honey for pressure ulcers with multiple organisms.

MARK: How about some medical-grade peanut butter to go with the honey? (laughs)

JILL: Err, no Mark. These products offer a wide antimicrobial coverage. However, there is a risk with the honey. Why?

MARK: I would think that we need to be careful that the patient is not allergic to honey, bee products or bee stings.

JILL: Yes, that's right.

1.17 Antibiotic Risks

Management of Infection

Limit use of topical antibiotics:

- risk for antibiotic resistant organisms
- inadequate penetration
- skin irritation
- systemic absorption
- hypersensitivity reactions



Narration

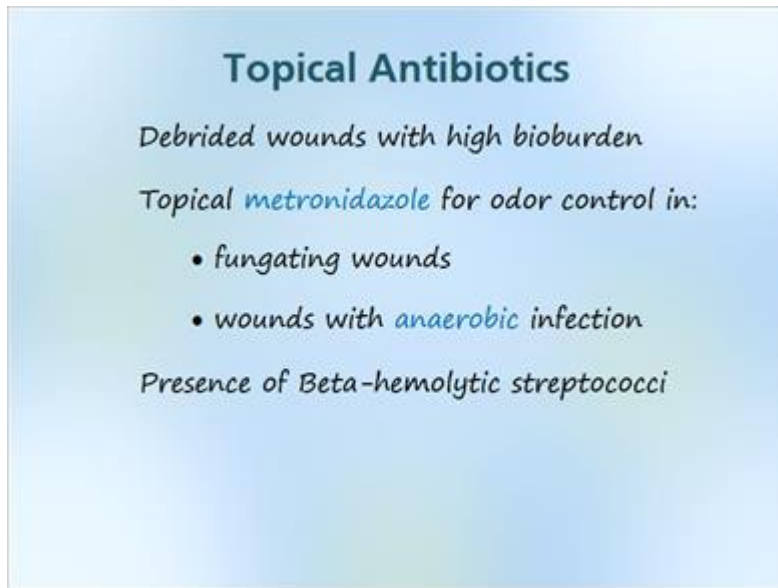
JILL: When using topical antibiotics, we need to limit their use except in special situations.

Mark, why do you think we need to do so?

MARK: The first reason that comes to mind is to reduce the risk of creating and dealing with antibiotic-resistant organisms. The other risks I can think of are: inadequate penetration, skin irritation, systemic absorption, and hypersensitivity reactions.

JILL: Yes, that is correct. Those are all good reasons why topical antibiotics should be limited in their use.

1.18 Topical Antibiotics



Topical Antibiotics

Debrided wounds with high bioburden

Topical metronidazole for odor control in:

- *fumigating wounds*
- *wounds with anaerobic infection*

Presence of Beta-hemolytic streptococci

Narration

JILL: Short courses of silver sulfadiazine, topical antibiotic solutions, or topical metronidazole can be useful in wounds that have been debrided and cleansed, yet have a high bacterial load. Topical metronidazole might be useful for treatment of malodor in fumigating wounds or wounds with anaerobic infection. These antibiotics may be used in treating wound with the presence of Beta-hemolytic streptococci.

MARK: So far we have talked about topical antiseptics and antibiotics for treating pressure ulcer infections. What about general antibiotics that are normally given for bacterial infections?

1.19 Systemic Antibiotics

Systemic Antibiotics

Individuals with systemic infection:

- blood culture
- cellulitis
- fasciitis
- osteomyelitis
- SIRS
- sepsis



Narration

JILL: An important question! Pressure ulcers are known to cause sepsis and death. Therefore we need to use systemic antibiotics for individuals with clinical evidence of systemic infection. We need to take a blood culture to determine what type of infection it is.

MARK: For what types of conditions should we consider administering systemic antibiotics?

JILL: The main ones are cellulitis, fasciitis, osteomyelitis, systemic inflammatory response syndrome (SIRS), and sepsis. If systemic antibiotics are warranted, the choice should be based on confirmed antibiotic susceptibilities of the suspected or known pathogens. For life threatening infections, antibiotics should be started based on local antimicrobial susceptibility patterns, and then re-evaluated when the final culture results are available.

MARK: Makes sense.

1.20 Local Abscesses

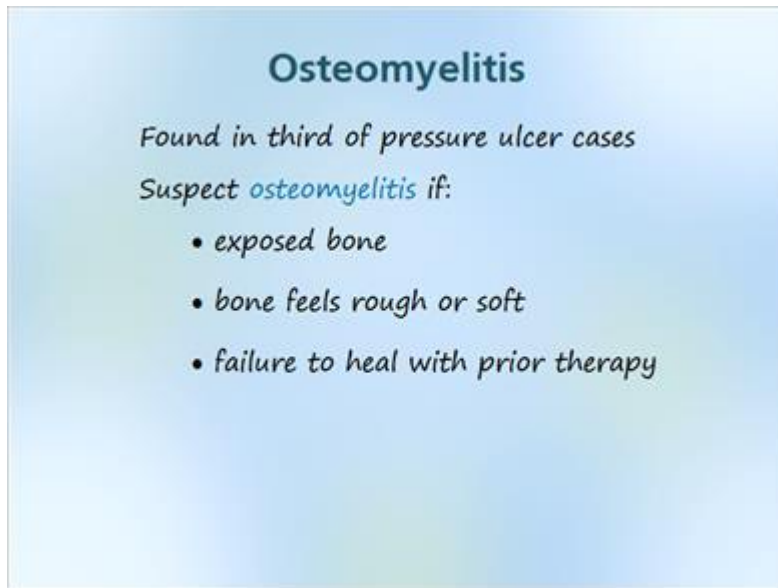


Narration

JILL: Any abscesses should be incised and drained to prevent local or systemic spread of infection.

MARK: Sounds reasonable.

1.21 Osteomyelitis



Osteomyelitis

Found in third of pressure ulcer cases

Suspect osteomyelitis if:

- *exposed bone*
- *bone feels rough or soft*
- *failure to heal with prior therapy*

Narration

JILL: Osteomyelitis has been reported in about of third of individuals with pressure ulcers. You should suspect osteomyelitis if the bone is exposed, the bone feels rough or mushy, or there is a failure to heal with prior therapy.

MARK: I assume that we can run lab tests to confirm osteomyelitis.

JILL: Yes we can.

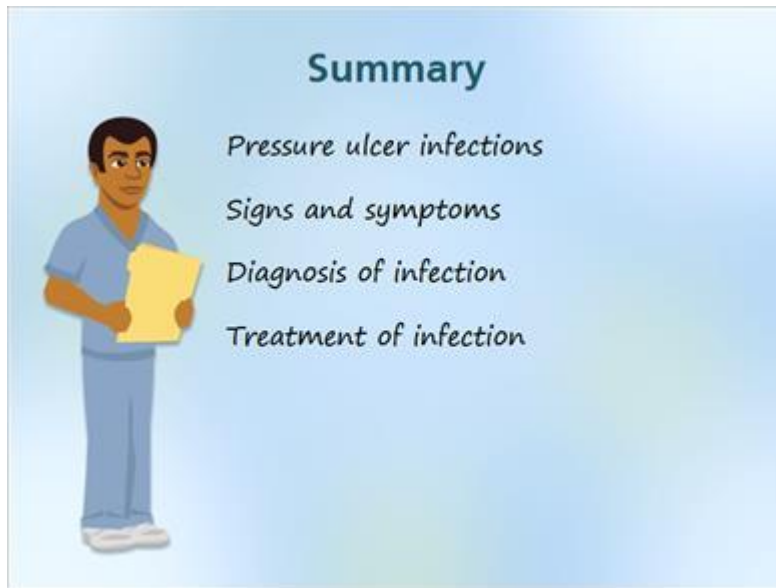
1.22 Osteomyelitis 2



Narration

JILL: Work up for osteomyelitis can include: x-rays, elevated white counts, elevated EST, bone scans, MRI and bone biopsy. The work done will depend on the clinical situation and what is available in the care setting.

1.23 Summary



Narration

JILL: This brings us to the conclusion of this module on assessing and treating infections. Would you please summarize Mark?

MARK: Okay. We began our presentation with the importance of checking for infections in pressure ulcers, and the various signs and symptoms that we should be looking for. We then examined the various ways to accurately diagnose the type and extent of infection. We concluded our presentation discussing ways to treat the infected pressure ulcers which are topical antiseptics and antibiotics. Systemic antibiotics should only be used in patients with general infections that require them. Did I miss anything?

JILL: Nope, great as usual. I'm Jill here with Mark saying goodbye until the next time.

MARK: See you later.

1.24 The End



Narration

No narration, only music.