Diabetic Neuropathy (DN)

(From Health Stream)

Key Points:

- Description
  - DN is nerve damage outside of the brain and spinal cord.
  - Causes – DM is the most common. Other sources are nerve compression, medications, nutritional deficiencies, and exposure to chemicals. The exact cause is NOT known, but elevated BS's may be a contributing factor.
  - Treatments
    - BS control
    - Weight loss
    - Increase activity
    - Medications
    - Stop smoking
  - There are 3 categories of Neuropathy
    - Sensory – Information transporting nerves from the brain to other body parts.
    - Autonomic – Involuntary acting nerves that control the heart, stomach, intestines, and bladder.
    - Motor – Electrical transporting nerves signaling fingers and ambulation.
- Facts
  - 50% of diabetics will develop DN within 25 years of being diabetic.
  - DN can be painful or asymptomatic.

- A1C>7 may indicate development of DN.

- S/S
  - Tingling
  - Burning
  - Numbness
  - Loss of muscle tone (causing balance issues)
  - Sensitivity to touch

Goals are to achieve and maintain treatment goals as above and to keep the DM from deteriorating. All patients that have DM should be screened for DN. Instruct patients on daily foot exams. Encourage follow up visits to their doctor managing their diabetes.

Augusta HEALTH

EDUCATIONAL PROGRAM ATTENDANCE ROSTER

Course Title: Diabetic Neuropathy

Date: 8-4-2021 **Length:** _____ **Time:** 0730 **No. Sessions:** _____

Location: WHC Huddle **Presenter and Department:** Tina Pitzer / WHC

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How Wounds Heal & How You Can Help

(From Health Stream)

Key Points:

The skin is the largest organ of the body. As you would seek care for another organ, the skin needs special care when there is a break in skin integrity. A wound can lead to infection.

The skin protects us from microorganisms, stabilizes body temperature, houses 25% of our blood supply, and provides other forms of protection for us.

- **Phases of Healing**
    - Inflammatory Phase occurs 1 to 5 days after injury. The body narrows blood vessels to decrease bleeding to the area. WBC's are sent to the area to kill bacteria. Periwound redness is expected.
    - Proliferative Phase is the next couple days to 3 weeks. Fibroblasts grow to make the wound contract and angiogenesis occurs.
    - Remodeling Phase lasts from 3 weeks to 2 years. Fibroblasts continue to contract the wound. When the wound is completely healed, it will have only 80% tensile strength
- **Wound types**
    - Acute (new) vs. chronic (greater than 4 weeks)
    - Simple (minor) vs. complex (major)
    - Surgical and tumors (can be large, have large exudate, and malodor)
    - Arterial (arms, legs, top of feet) and venous (ankles)
    - Pressure injuries (cells are "sandwiched" between a bone and a surface decreasing blood flow. The cells at the bone die first, so it occurs deep before it is seen at the skin's surface.)
    - Burns
    - Skin tears
- **Stages of PI's**
    - Stage 1 – pink or red, may itch or be tender

- Stage 2 – blistered or open wound
- Stage 3 – Extends deeper into the skin, crater-like
- Stage 4 – Fat, muscle, bone, tunneling, or undermining are involved

- **How are wounds treated**
  - Keep the wound clean
  - Keep the wound moist
  - Protect the area from further injury
  - Good nutrition with protein, carbohydrates, water, and vitamins
    - **Further treatments**
      - Dressings
      - Topical medications
      - Ultrasound
      - Pressure reducing surfaces
      - Antibiotics, if indicated
      - Wound VAC
      - Hyperbaric oxygen treatments
      - Growth factors (Regranex)
      - Debridements
      - Skin grafts and skin substitutes

- **Things that prevent wounds from healing**
  - Age
  - Body size (too little – poor nutrition, too big – poor circulation)
  - Medications (steroids, chemotherapy)
  - Chronic disease
  - Infection

- Incontinence

The best way to prevent wounds and keep the skin healthy is to drink lots of water, eat an adequate diet, exercise, and get fresh air. We shed 600,000 skin cells every hour! 5 million Americans have wounds. The average bed sore takes one year to heal and up to $25,000 to treat.

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Infection and Bioburden in the Chronic Wound

(From Health Stream)

Important Distinction: Closed wound vs. Healed wound. A closed wound is when intact, new skin is covering the subcutaneous structures below. A healed wound is at the end of the maturation (or remodeling) phase which takes up to 2 years. (This is why the DFU's re-open right away because initially it only has 3-5% tensile strength, not 80% that it would have in 2 years!)

Microbiology:

- **Variances of wound microorganisms**
    - **Contaminated – all** wounds have bacteria present, no clinical issues at this time, vigilance is required. A wound is not infected just because bacteria are present in the wound bed!
    - **Colonization** – microorganisms are present in increasing numbers, vigilance is required to monitor for overt infection.
    - **Critical colonization**, aka "localized infection" – Microorganisms have multiplied, tissues are now damaged, infection is present. The wound is stalled. Edema, odor, purulent exudate, and induration may be present. Intervention is now required.
    - **Systemic infection** – Satellite wounds, erythema extending > 2cm beyond the periwound, fever, chills, crepitus, and warmth may be present. Intervention is required.
- **Biofilms**
    - Definition – A complex carbohydrate matrix that envelops around the bacteria that shields the bacteria. Can be different colors.
    - Present in 50-60% of wounds, sticking to the surfaces
    - Biofilm may prolong inflammation, impair grown of granulation and epithelial tissue
    - Biofilm can fully re-grow within 48 hours of debridement which is why serial debridements are important.

Identification and Management of Infections:

- **Classic s/s of infection include:** erythema, pain, edema, warmth to the area, fever, chills. Patients with neuropathy, diabetes, and sensory impairments may not present with the usual s/s, this is important to keep in mind.
- **Two acronyms are used** to keep in mind regarding identifying infections. Any 3 symptoms (in either NERDS or STONEES) may be indicative of wound infection.
    - **NERDS (treat topically)**
        - **N** = Non-healing
        - **E** = Exudate
        - **R** = Red
        - **D** = Debris
        - **S** = Smell
    - **STONEES (treat systemically)**
        - **S** = Size
        - **T** = Temperature
        - **O** = Os (probes)
        - **N** = New breakdown
        - **E** = Edema/Erythema
        - **E** = Exudate
        - **S** = Smell
- **Indicators** that biofilm may be present when you cannot see it visibly include: too much moisture, the granulation quality is poor, recurrent infections, negative cultures even though infection is suspected, and delayed wound healing.
- **Cultures** should be done when: the wound shows signs of spreading infection, an infected wound is not responding to treatment. Wound swabbing is the most common culture done either by using the Z-technique or the Levine technique.

Management of Wound Infections:

- **Modify patient factors**
  - Treat co-morbidities
  - Enhance nutritional support
  - Determine underlying factors
- **Reduce bacterial load**
  - Remove dead tissue from the wound bed (many different debridement types can be used)
  - Wound cleansing removes debris and microorganisms from the surface
  - Antimicrobial Therapy (many different types)
    - Silver
    - Iodine
    - Honey
    - Methylene blue/gentian violet
    - PHMB (polyhexamethyl biguanide) related to chlorhexidine
  - Numerous dressing options

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