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Wound Identification and Basic Care in a Homeless Population

Persons experiencing homelessness are three to six times more likely to be suffering from serious illness or injury. Factors that increase this population’s risk for acute and chronic wounds include communal bathing and eating, lack of facilities for washing and toileting, unsafe and unsanitary shelters, exposure to crime and trauma, inadequate nutrition, no place for bed rest, no place to store medications, excessive smoking and drinking, little or no income, and absence of family and other support to help in times of illness.

Traditionally, wound care is simple. Keep the wound clean and try to eliminate the cause. Because people experiencing homelessness are less likely to have access to the materials necessary to keep their wounds clean and to prevent the issue in the future, this protocol will list some basic wound care options for commonly seen wounds, that could be used in a clinic dealing with persons experiencing homelessness.

Injection Wounds

Injection wounds are typically found in intravenous drug users (IVDU’s) who suffer harm when administering drugs subcutaneously, intravenously, or intramuscularly. As a result, skin-related problems are often the primary health concern. The skin acts as a protective barrier to the human body, but becomes compromised in the area where intravenous injections occur. Possible negative consequences include infections of skin such as abscesses and cellulitis, pain, and venous ulcers. IVDU’s preferably inject drugs intravenously because it leads to a faster response, yet all three types of administration lead to clinical issues due to the dangers and risks of the nature of injection (i.e. contamination of equipment). The most common health complication, an abscess, occurs at the site of injection, where damage to the skin and tissue of the site allow the local spread of bacteria. Pain may be acute or chronic, depending on whether or not the pain is caused by abscesses from injection wounds or by chronic venous insufficiency.

Chronic venous insufficiency (CVI) is defined as the dysfunction of vein valves. CVI develops in IVDU’s who inject drugs over a long period of time, putting patients at further risk for developing a deep vein thrombosis or venous ulcers, and is a particular problem for injections in the groin, legs, and feet. Additional discussion of venous stasis ulcers is given below.

Injection wounds must be assessed with regards to size, location, depth, color, drainage, odor, pain, and infection, among other factors. It is important to note that injections may cause deep tissue trauma in addition to any superficial appearance of a wound. Previous studies have shown that there is a progression of injection sites used by IVDU’s; beyond the popular forearm site, IVDU’s may use their hand, foot, neck, leg, and groin as alternative locations for injection.

Treatments must consider type, size, depth, and drainage. Under anesthetic, abscesses are treated through incision and drainage, followed by prescribed antibiotics. CVI may lead to edema and skin changes which can be treated by leg elevation and compression dressings/support stockings. Gauze is the most common dressing and should be moistened with saline or antibiotics.

Injection-related risk behavior is associated with homelessness. Self-management of injection wounds is not always sufficient for treatment as many patients employ behaviors that increase the likelihood of harm, including the manipulation of wounds, negligent care, or acquiring antibiotics without a prescription. Advice for preventing and treating injection wounds

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is complicated because IVDU’s typically inject drugs as a conscious choice. When injecting drugs, IVDU’s must ensure they have clean equipment (needles) in order to avoid infections and should consider the potential negative repercussions of injections. Consultation with medical professionals to treat consequent wounds from injections is highly recommended. Increased education about the health risks of drug injections is warranted for homeless populations that are more susceptible to relapse of drug use.
Patients with insufficiently controlled diabetes often present with neuropathy and/or vasculopathy of the extremities, particularly the feet. Prolonged lack of blood flow and nervous input can lead to ulceration that, if left untreated, can develop severe infection and necrosis necessitating hospitalization and amputation. This is particularly common among populations experiencing homelessness, because they often lack the resources or ability to properly manage their disease. Initial assessment and diagnosis of a diabetic foot ulcer should be performed by a medical professional. If an undiagnosed diabetic ulcer is suspected, patients should be referred immediately to their primary care physician for immediate evaluation. In order to identify a potential ulcer in the clinic, several steps should be taken.

First, confirm that the patient has a diagnosis of diabetes and check their glucose level if possible. Next, question the patient about management of their disease and determine risk factors for foot ulcers including poorly controlled glucose levels, smoking, alcohol use, time spent walking and/or standing, quality of footwear, and access to healthcare. Portable HbA1c testing kits can be used to test for long term management of the disease. To check pedal pulses, check the dorsalis pedis on dorsum of foot between metatarsals 1 and 2 and the posterior tibial pulse behind the medial malleolus. Check capillary filling time in the digits by pressing on the toes until the skin becomes pale and count the seconds until color returns after releasing pressure on the toes. A time longer than 5 seconds is considered prolonged. Lastly, look for areas of redness and heat around the potential ulcer.

Depending on the severity of the ulcer, a physician may prescribe antibiotics, perform debridement (removal of necrotic tissue to prevent spread of infection), lance and drain abscessed tissue, and assign specific dressings. Patients previously diagnosed and being treated for a diabetic foot ulcer may appear in the clinic with any of the following dressings or treatments: hydrogels, foams, calcium alginites, absorbent polymers, growth factors, skin replacements. Again, depending on the severity of the ulcer, these dressings may require a nurse or physician in order to be changed, however the dressings of some less severe ulcers may be changed by the patient themselves.

If the patient has dressings and requires assistance, consider these important tips for proper application. Avoid bandaging over toes, which can prevent proper blood flow to the extremities already experiencing decreased supply. Instead, layer gauze over the toes and anchor to the foot with tape. Avoid creases and making the bandage too bulky, being particularly careful around weight-bearing areas. Be mindful of fragile skin that may tear from strong adhesive tapes. If available, cleanse the area with a saline solution before re-bandaging, which can reduce

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possibility of infection. Avoid tight bandaging, particularly around the toes and minimize space between the wound and the bandage. Be mindful of the patient’s footwear and how it will accommodate the bandage.¹¹

All patients at risk for diabetic foot ulcers should be counseled on preventative actions they can take to maintain foot health. With a population experiencing homelessness, regular approaches to treatment and care may not be feasible.¹² Regardless, all patients should be encouraged to: reduce and/or cease tobacco and other drug use; seek out regular foot exams by a medical professional; perform daily self-evaluations of foot health – patients can be taught to check their own pedal pulses and watch out for signs of ulceration; report any injuries, however minor, to their doctor; reduce time spent standing or walking; elevate feet to at or above heart level when at rest; keep socks and shoes dry and remove them at night when possible; wash and thoroughly dry socks as often as possible – patients should be provided with resources as to where they can obtain fresh socks for free; closely monitor glucose levels and seek treatment for their diabetes; better manage their diet if possible – save portions of meals for later if access to food is limited.

Burns

Burn injuries occur frequently among homeless populations, usually as a result of exposure to an open flame or heated metal while cooking or attempting to keep warm.\(^\text{13}\) Additionally, burns as a result of violence among the homeless occur at a rate of six times higher than that of the general population, and patients brought into the ER due to these injuries have been positively correlated with higher consumption of alcohol and illicit drugs.\(^\text{14}\) Lastly, homeless populations are at a high risk of acquiring sun burns and overheating. Depending on location, someone on the street might have trouble finding adequate shelter during the warm summer months, and can be exposed to more sunlight than is healthy, as well as run the risk of overheating while carrying their belongings with them.\(^\text{15}\)

Treatment of burns is dependent mostly on the severity of the burn. If a patient comes to the clinic with a first or less severe second degree burn, treatment usually follows the following protocol. First, try to gently remove any restrictive clothing or accessories around the region of the burn, as the injury might swell up and become constricted.\(^\text{16}\) Keep the burn covered with a cool, damp towel or piece of cloth. The moisture keeps the material from sticking to the wound, thus preventing damage when it is removed. Avoid immersing the wound in cold water, as this can lead to a loss of heat and lowered blood pressure in the region. Also, if the wound area is significantly large, avoid cool water or moisture because it could lead to hypothermia if the patient is returning to a cold environment. If available, apply an antibiotic ointment, silvadene cream or aloe vera gel to the area of the burn, to both help keep the wound cool and help to prevent infection. If the patient is going to the hospital, avoid applying any ointment to the wound as it may interfere with the physicians ability to assess the wound. In those instances, a clean dry dressing is sufficient to offer comfort to the patient. If available, loosely wrap the wound in a nonstick dressing to form a barrier against dirt and clothing which may irritate the burn while it is healing. Make sure that any bandaging is done loose enough that it does not constrict the site should it swell, and that any material used is designed to avoid sticking, as this could cause tearing of the wound when removed. Advise the patient against rupturing any blisters that might develop as the burn heals, as this can make for an easy site of infection, as well as cause irritation and scarring. If the patient’s burn is due to an incident involving heated metal, recommend that they seek out a tetanus booster shot if possible. If the patient presents with a burn larger than three inches in diameter or a wound that covers a sensitive area or joint,


such as the hands, feet, face or groin, recommend seeking further medical assistance at a local hospital or burn center. Severe second degree and third degree burns can cause damage much deeper than the skin, sometimes down to the bone, and the superficial care available in a free clinic is likely unable to treat these injuries.

Giving advice for preventing future burns is difficult, as these wounds are very rarely self-inflicted and occur as accidents. General advice one can give to a patient is to avoid sleeping or resting too long next to an open fire or hot surface, such as a steam grate. While the heat provided by these is welcomed on cold nights, it is possible to burn oneself while sleeping and not wake up quick enough to prevent the damage. Additionally, if the patient admits to substance use, caution against cooking while under the influence, as they could lose their balance and make contact with whatever surface or fire they are using to cook. Lastly, as mentioned above, homeless populations present with higher cases of burns caused by violence between parties. Advise the patient to avoid situations where another person poses a threat to them, especially around open fires or hot surfaces. These provide the possible assailant with an easily accessed weapon in the form of forcing the victim to make contact with the flame/surface.

Frostbite

Frostbite is defined as the acute freezing of tissues and crystallization of fluids as consequence of prolonged exposure to freezing temperatures.\(^{18,19}\) Frostbite is caused by cutaneous vasoconstriction through which blood flow is diverted away from anatomic structures such as the hands, feet, ears, nose and lips. The severity of injury is related to both the skin-surface temperature gradient and duration of exposure. Mortality may occur if injured tissue becomes infected or from concurrent hypothermia. Frostbite is of higher incidence among African Americans and those experiencing homelessness, with predisposition factors including inadequate shelter, diabetes, thyroid disease, alcohol consumption, psychiatric illness, and drug use.\(^{20,21,22,23}\) Detroit’s homeless population should be considered at increased risk for frostbite and its identification in a clinical setting is essential for proper treatment and positive patient outcomes.

Initial symptomatology includes localized numbness, coldness, stinging, burning, and throbbing, complete loss of sensation of the affected area, loss of fine muscle dexterity, and severe joint pain. More favorable prognostic indicators include more superficial site of injury, sensation to pinprick, and healthy-appearing skin. Poor prognostic indicators include absence of edema, hemorrhagic blisters, persistent cyanosis, and frozen appearance of tissue.

Rapid rewarming is considered the single most effective therapy for frostbite.\(^ {24}\) Treatment may also involve medical and surgical measures, and therefore patients with suspected frostbite must receive immediate and advanced medical attention to minimize the extent of injury. Burn units such as those at Detroit Receiving Hospital and Henry Ford Medical Center are likely the best option for aggressive treatment.\(^ {25}\)

When encountering frostbite in the field, first and foremost remove the patient from the cold. Replace wet and constrictive clothing with dry loose clothing. Remove any jewelry from the affected area and dress the extremity in a manner that minimizes mechanical trauma. Sterile non-adherent dressings may be applied. The initial appearance of frostbite does not accurately

predict the eventual extent and depth of tissue damage, and therefore every case must be treated as an emergency.

Forced-air rewarming with portable units can be used effectively to warm victims of frostbite in the field and during transport to a specialized medical center. However, rewarming should be avoided if it cannot be maintained. Partial thawing and refreezing releases multiple inflammatory agents that cause more harm than good. Mechanical trauma (massaging or rubbing) and rewarming at higher temperatures and for longer periods of time are detrimental to preserving viable tissue and should be avoided. Direct dry heating using fire or a heater can lead to burns secondary to loss of temperature sensation and so should also be avoided. Walking on frozen frostbitten areas and risking tissue chipping and fracture is considered better than thawing and refreezing.

As tissue is rewarmed, reperfusion injury becomes prominent. Edema typically appears within several hours and may last for several days. Severe throbbing, hyperemia, and paresthesias often occur and may last for several weeks. Clear blister formation suggests more superficial injuries whereas the hemorrhagic blister formation suggests involvement of deeper tissues and a poorer prognosis. Deep frostbite injuries of the tendons, muscles, and/or bones are often associated with necrosis and self-amputation.

Healing can take 6-12 months with long-term sequelae including cold sensitivity, paresthesias and sensory deficits, peeling or cracking skin, loss of fingernails or toenails, hyperhidrosis or anhidrosis, muscle atrophy, premature closure of epiphyses, decreased mineralization of bone, joint stiffness, tremor, phantom pain of amputated extremities, and abnormal color changes indicative of vasospasm.

Patients should be informed that the frostbitten area may be more sensitive to cold, with associated burning and tingling. Individuals who have sustained a cold-related injury are at a greater risk of developing a subsequent cold-related injury and therefore should be counseled about their increased susceptibility and appropriate strategies to avoid it. They should also be given general advice on preparing for cold weather exposure.

Wound infection is observed in 30% of frostbite patients, often caused by Staphylococcus aureus. Evidence of secondary infection includes increased pain, swelling, erythema, fever, red streaking, and purulent discharge. Patients with evidence of secondary infection should be referred for immediate medical care.

Long-term prevention of frostbite should be discussed with patients and includes keeping hands and feet dry, using mittens instead of gloves, wearing multiple layers of clothing, wearing at least 2 pairs of socks, avoiding tight or restrictive clothing, avoiding perspiration by using

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adequately ventilated clothing, increasing fluid and calorie intake in cold weather, avoiding alcohol and tobacco as they promote peripheral vasoconstriction, maintaining a current tetanus immunization, keeping toenails and fingernails trimmed, avoiding rubbing of affected areas, seeking shelter from wind and cold, covering the face and head, avoiding wet clothing, and avoiding prolonged periods in the same position.
Venous Stasis Ulcers

Venous stasis ulcers are wounds that occur due to improper functioning of the venous valves, usually those of the lower leg. Vascular insufficiency results from walking, standing, or sitting in an upright position for extended periods of time. Buildup of fluid in the lower legs causes lack of circulation, which can lead to breakdown of the skin and tissues and eventually, an ulcer. Because persons suffering with homelessness often sleep upright, blood flow to the legs is impaired, causing swelling that can lead the skin to burst open and create sores. These wounds are usually recurrent.

On physical examination, these ulcers are generally irregularly shaped, shallow, and located over bony prominences, for example, the shin. Open ulcers are can persist for weeks to years and severe complications include cellulitis, osteomyelitis, and malignant change.

Traditional treatment options for venous stasis ulcers includes bed rest with elevation of the injured area, debridement, and compression stockings. Compression stockings serve to force blood and lymphatic fluid back to the center of the body, rather than remaining in the lower legs. In a homeless population, these options may not be possible. Bed rest with elevation can be very difficult for a person experiencing homelessness because they may be on the move, without access to a consistent place to wash the wound and rest. In addition, compression stocking can be hard to put on, difficult to dry, and expensive to purchase.

Cheap debridement options for this population include applying wet-to-dry saline dressing and doing in office irrigation. In addition, applying pressure bandages, teaching the patient how to apply pressure bandages, and sending them off with a few days of supplies is another possible treatment option. Because removing the cause of these ulcers usually requires management of the patient’s chronic conditions (often hypertension), referring the patient to a family practitioner who would be able to see them on a regular basis would also be beneficial. When used with compression therapy, aspirin (300 mg per day) has shown to be effective. Sending the patient out of office with a supply of aspirin could also be helpful. If the clinic can afford it, having disposable compression stockings is another suggestion. Another option is a Unna boot. An Unna Boot is a special gauze (usually 4 inches wide and 10 yards long) bandage, which can be used for the treatment of venous stasis ulcers and other venous insufficiencies of the leg. The gauze is impregnated with a thick, creamy mixture of zinc oxide and calamine to

promote healing. It may also contain acacia, glycerin, castor oil, and white petrolatum. If an Unna boot is applied, it will need to be replaced once a week.

Below is a brief protocol for in office cleaning and dressing of venous stasis ulcers. Wearing gloves, gently clean the wound with a clean, soft washcloth with only soap and sterile saline. Rinse the wound with water and pat dry. Check the wound for swelling, increased or spreading redness, or a foul odor. With a new pair of sterile gloves on, soak sterile gauze with sterile saline. Squeeze the gauze until there is no saline dripping from it. Pack the wound with the wet gauze. Cover the wound with sterile dry gauze. To hold the gauze in place, either wrap with rolled gauze or an ACE bandage, or use paper tape to tape the edges of the gauze to the skin.
Methicillin-resistant *Staphylococcus aureus* (MRSA) is a type of bacteria that is resistant to a type of antibiotic called Methicillin and several other antibiotics. It is commonly carried on the skin or inside the nose of healthy people and causes minor skin infections that may look like a pimple or boil and can be red, swollen, and painful or have pus or some drainage. More serious infections can cause skin and soft tissue infections, bloodstream infections and pneumonia.³⁴

MRSA infections often spread from direct skin-to-skin contact or contact with objects that have come in contact with an infected site. However, there’s a rule of 5Cs that increases the likelihood of obtaining MRSA: Crowding, frequent skin-to-skin Contact, Compromised skin (i.e., cuts or abrasions), Contaminated items and surfaces, and lack of Cleanliness. Detroit’s homeless population would be at a greater risk to contracting any *Staphylococcus* infection, especially MRSA, because the rugged living conditions in Michigan often lead to many cuts and abrasions on their hands and feet. This, in conjunction with a lack of shelter, puts homeless patients at high risk for MRSA infections.

MRSA can be treated by several means. In cases where the abscess is accompanied by cellulitis, the infection will require antibiotics. In some cases, MRSA infections can be treated by draining the abscess or boil without prescribing antibiotics. Only a healthcare provider should drain the abscess. Other forms of staph and MRSA require the use of antibiotics to treat the skin infection. The patient should take all the medication prescribed by the physician, even if they feel better to ensure to eradicate the whole infection and prevent resistance build up to that specific antibiotic.

While there are means to treat MRSA, there are also many means to prevent the spread of MRSA. The first measure is to cover the wound with a clean, dry bandage. Secondly, consistently wash your hands with soap daily and ensure that family and others in close contact also wash their hands with soap or use an alcohol-based hand sanitizer. Thirdly, one should avoid sharing personal items such as uniforms, washcloths, razors or other items that can be shared with others. These items could be a possible source of infection to spread from one person to another.³⁵

While these are the traditional means to treat the skin infection and prevent the spread of infection, not all homeless individuals have access to proper healthcare and may not be health conscious as their main focus is obtaining their next meal and finding appropriate shelter for the day and night. There are still several options we can use to help this population including applying clean, dry bandages over their skin infection and wounds and teaching them how to apply bandages on their own. In addition, we can give them several supplies of alcohol-based hand sanitizer and remind them to apply the hand sanitizer every time they change their bandage or whenever they deem their hands dirty. We could also refer them to their primary care.

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physician or the Emergency Department to drain their abscess because they shouldn’t be draining their abscess on their own. Lastly, we should remind them to not share any personable items that could come in possible contact with wounds such as razors, washcloths, and uniforms.36

The following is a protocol for applying a bandage over a MRSA skin infection. First, wash hands with soap and water and then put on disposable gloves. Second, remove the old dressing and then put the old dressing in a plastic bag. Now, take off the gloves, and put them in the plastic bag, too. Then, rewash and dry your hands and put on a new, clean pair of disposable gloves. Finally, apply the new dressing. If the sore is leaking, extra dressings will be required to keep the drainage from leaking out. Take off the second pair of gloves and put them in the plastic bag. Seal or tie the bag, and throw it away in your regular trash.37

Closing

In closing, caring for infections and other conditions of the skin is a challenging and difficult problem. Hopefully this article will make you more comfortable with diagnosing and treating these conditions.

36 “MRSA and the Workplace.” Centers for Disease Control and Prevention, 14 July 2016.