CLINICAL MANAGEMENT extra

Nonviral Injection-Related Injuries in Persons Who Inject Drugs: Skin and Soft Tissue Infection, Vascular Damage, and Wounds

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Barbara Pieper, PhD, RN, CWOCN, ACNS-BC, FAAN • Professor and Interim Associate Dean of Faculty Affairs • College of Nursing • Wayne State University • Detroit, Michigan

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GENERAL PURPOSE:

To explore skin and soft-tissue infections and vascular damage in persons who inject drugs and relate these changes to wound development and care.

TARGET AUDIENCE:

This continuing education activity is intended for physicians, physician assistants, nurse practitioners, and nurses with an interest in skin and wound care.

LEARNING OBJECTIVES/OUTCOMES:

After participating in this educational activity, the participant should be better able to:

1. Review the issues surrounding wound infections in persons who inject drugs.
2. Describe the risk factors and manifestations of wound infections in persons who inject drugs.
3. Summarize the treatment options for wound infections in persons who inject drugs.

ABSTRACT

The number of persons who inject drugs (PWIDs) is increasing. The literature has placed a substantial focus on the association between injection drug use and the transmission of blood-borne viral infections such as HIV and hepatitis C, but there is less extant research on other injuries such as skin and soft tissue infections (SSTIs), vascular damage, and associated wounds. Both SSTIs and vascular injury can result in marked morbidity and mortality and wounds that are slow to heal, likely to reoccur, and lifelong. The aims of this article are to (1) explore SSTIs and vascular damage in PWIDs and (2) relate these changes to wound development and care. Providers must address the health and psychosocial problems of PWIDs; take physical, psychosocial, and substance use histories; and develop multifocal plans of care. Finally, care must be provided in a nonjudgmental manner.

KEYWORDS: abscess, chronic venous insufficiency, peripheral arterial disease, persons who inject drugs, PWID, skin, soft tissue infection, substance use, vascular, wounds

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INTRODUCTION

In the US, the number of persons who inject drugs (PWIDs) is about 2.6% of the population 13 years or older, or more than 6.6 million persons in 2011.[1] Heroin tends to be the most common injected drug, and its use has increased across most demographic groups in the US, from 1.6 per 1,000 persons older than 12 years between 2002 and 2004 to 2.6 per 1,000 between 2011 and 2013.[2] According to the National Survey on Drug Use and Health for 2016, about 948,000 Americans reported using heroin in the past year. The increased use has been largely seen among young adults 18 to 25 years old.[3]

The literature has placed a substantial focus on the association between injection drug use and the transmission of blood-borne viral infections (ie, HIV and hepatitis C), but there is less extant research on nonviral injection-related injuries such as skin and soft tissue infections (SSTIs) and vascular damage, which can result in marked morbidity and mortality.[4]

The aims of this continuing education article are to (1) explore SSTIs and vascular damage in PWIDs and (2) relate these changes to wound development and care. Some of the key aspects of care for these conditions are summarized in the Table.

SKIN AND SOFT TISSUE INFECTIONS

Common SSTIs include cellulitis (Figure 1) and skin abscesses (Figure 2),[5] and SSTI is common in PWIDs. In one needle exchange program (N = 152), 17.8% (n = 27) had an active abscess and 19.7% (n = 30) had a chronic wound.[6] The upper extremities were the most common place for an abscess, and the lower extremities were most common for chronic wounds. In a study of active (injected in the past 30 days) PWIDs (N = 201) recruited in San Francisco between 2011 and 2013, Dahlman and colleagues[7] noted the self-reported prevalence of lifetime SSTIs was about 70%. These infections can lead to serious morbidity and costly emergency room visits and hospitalizations. By assessing billing records through chart abstraction for 349 PWIDs in Florida, SSTIs were reported in 64% (n = 223); the total cost to the hospital for services rendered to treat injection drug use-related infections for a year was approximately $11.4 million.[8] According to the Hospital Episode Statistics for England 1997–2016, about 6% (n = 63,671) of SSTIs and vascular infections are injection related.[9] The most common causes were cutaneous abscess, phlebitis, and cellulitis. The number of injection-related admissions increased 33% per year from 1997 and 1998 through 2003 and 2004.[9]

Two terms are important to aid in the understanding of SSTIs in PWIDs: skin popping and speedballing. Skin popping is extravasal (intramuscular or subcutaneous) injection into confined tissue compartments. When injected into a vascular space, drugs are quickly diluted. This dilution effect does not occur when drugs are injected into skin or muscle.[10] Subcutaneous and intramuscular injections also bypass exposure to the bloodborne immunologic response, which may increase the risk of infection.[11]

Speedballing is injecting heroin in combination with a vasoconstrictor such as cocaine or methamphetamine. This decreases local blood flow to the injection site and exacerbates ischemia.[11] The addition of crack cocaine to heroin is rationalized as providing a "better high."[12] The use of crack cocaine in speedballing has been associated with the deterioration of injection sites.[12] In general, speedballing is associated with an increased risk of infection.[13]

If venous access is difficult because of vein sclerosis and/or poor injection technique, accidental subcutaneous and intramuscular injections may occur; these are called missed hits.[14] Hope and colleagues[14] interviewed 329 PWIDs in England and reported only three intended to inject subcutaneous or intramuscular tissue. Accidentally missing a vein occurred in 56% (n = 181) of participants. For persons who aimed to inject intravenously, redness, swelling, and tenderness at the injection site were reported by 49% (n = 70) who did not miss hits versus 72% (n = 131) of those with a missed hit; abscesses were reported by 36% (n = 52) versus 51% (n = 93); and open wounds were reported by 9.7% (n = 14) versus 18% (n = 33), respectively.[14]

Nonetheless, some PWIDs intentionally inject subcutaneously or intramuscularly or are forced to do so because of lack of other access. This can lead to local muscle inflammation and necrosis.[11] After interviewing 51 active PWIDs in Denver, Colorado, Phillips and Stein[13] reported that bacterial skin infections were significantly more likely to occur when someone injected drugs intramuscularly

Table.

SUMMARY OF ISSUES AND CARE CONSIDERATIONS FOR NONVIRAL INJECTION-RELATED INJURIES IN PWID

Issue	Care Considerations
General	• Assess patient history regarding general health issues, mental health, psychosocial issues, and substance use • Be honest and nonjudgmental • Assist with transportation, food programs/soup kitchens, housing, shelters, etc • Know available drug treatment programs and encourage treatment • Teach about risk factors for injection and how to avoid infection, venous disease, and arterial disease • Educate regarding safe injection practices • Examine clinic for flexibility in clinic appointments/hours
SSTI	• Assess for infection in terms of appearance • Consider the possible need to prescribe antibiotics • Consult infectious disease guideline on antibiotic selection • Drain abscesses and determine appropriate wound care protocol • Discuss safe injection practices (needle exchange programs, cleaning skin and hand washing, no shared equipment, etc) • If lower extremity infection is present, elevate legs to decrease edema
Venous damage; CVI	• Know clinical manifestations of CVI • Institute compression therapy to the lower extremities as soon as CVI changes are noted • Assist with treatment of deep vein thrombosis (appointments to anticoagulation clinic and medications) • Teach patients about the importance of leg elevation and to avoid sleeping in a chair • Discourage injecting in the legs • Encourage activity and ankle exercise/movement • Assess balance and gait and risk of falls • Assess wound care (issues with drainage and odor, frequency of care, types of dressings, chronicity of wounds) • Review pain assessment and treatment (medication and nonmedication) • Assess nutrition (under and over nutrition) in terms of wounds and wound healing • Lymphedema may also be present from contamination of the lymphatic system
Peripheral arterial disease	• Discourage injecting in an artery • Assess patient for modifiable risk factors for arterial disease (diabetes mellitus, hypertension, cigarette use) • Discourage cigarette use and encourage smoking cessation programs • Conduct an arterial foot assessment (distal pulses, ankle brachial index) • Refer the patient for vascular surgery if needed

Abbreviations: CVI, chronic venous insufficiency; PWID, persons who inject drugs; SSTI, skin and soft tissue infection.

(odds ratio [OR], 1.57; 95% confidence interval [CI], 0.90–2.69; $P = .09$) rather than in a vein and were more frequent with heroin injection (OR, 1.08; 95% CI, 1.01–1.16; $P = .02$).[13] Persons who skin popped were more likely to have an abscess or cellulitis than those who only injected intravenously.[15] The development of an abscess from skin popping can result in an ulcer called a shooter's patch.[10]

Serious infections have increased since 2012 in PWIDs.[9] Risk factors for redness, swelling, and tenderness included an arrest or overdose in the past year, frequent injections, or multiple injection sites; these signs and symptoms were less common in those who injected in the groin or always cleaned mixing containers.[16] Other research has reported that femoral vein injections are associated with higher risk of SSTIs, possibly because of the heavy bacterial load in the groin and genital area.[7] According to another study,[9] infection is correlated with loss of venous access, missed veins when injecting, older PWIDs, and heavily colonized injection sites. Dahlman and colleagues[7] examined behavioral factors related to skin and equipment hygiene and tissue-damaging injection practices associated with SSTIs among PWIDs (N = 201). The prevalence of SSTIs was 11% (n = 22) in the preceding 30 days and 29% (n = 58) in the past year. Factors significantly ($P \leq .05$) associated with recent SSTIs included injecting nonpowdered drugs (OR, 3.57;

Figure 1.
CELLULITIS OF THE KNEE

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95% CI, 1.23–10.35; P = .01); needle licking before injecting (OR, 3.36, CI 1.28–8.81; P = .01); injecting with a syringe/needle used by someone else (OR, 7.97, 95%, CI 2.46–25.83; P < .001); being injected by another person (OR, 2.63; 95% CI, 1.02–6.78; P = .04); infrequent or improper skin cleansing before injection (OR, 2.47; 95% CI, 1.009–6.10; P = .04); and frequent injections.

In a qualitative study using semistructured, in-depth interviews (N = 19) at a syringe exchange program, risk factors for SSTIs included dirty works (used equipment), not injecting into a vein, rushing, and failure to properly prepare injection materials or clean the injection site.[17] An abscess was more common in those who overdosed in the past year, injected daily, had multiple injection sites, injected in the legs, and less common when the injection site was always swabbed. Injection site wounds were more common among women, those injecting daily, those with multiple injection sites, and those for whom their main source of income was illicit.[16,18,19]

The largest relative increase in injection-related admissions between 2012 and 2016 was among 45- to 55-year-olds, at 18% per year.[9] Lewer et al[9] noted older PWIDs may lose venous access, miss veins more often when trying to inject, use less accessible and more heavily colonized injection sites, and have worse immunity and poorer underlying health. Other variables associated with infection at any age were increased frequency of injecting, used needles, injecting in the neck, subcutaneous and intramuscular injecting, injecting prescribed drugs (crushed tablets and liquids), and lack of skin cleaning and handwashing.[8,13,18]

In summary, risk factors for infection and abscesses in PWIDs are numerous and vary based on injection practices and sites, age and sex of the PWIDs, and substances injected.

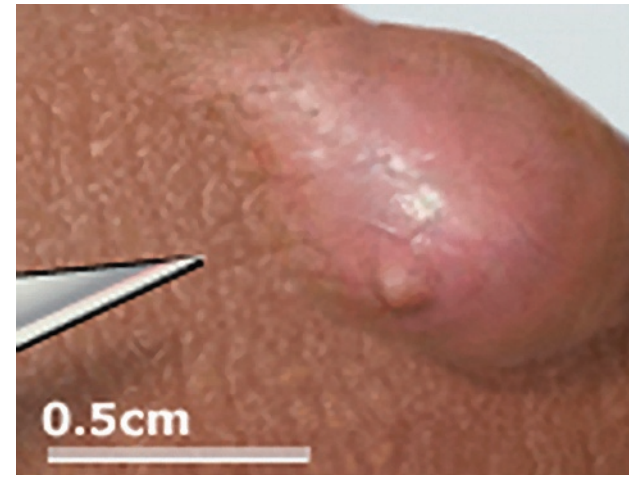
Care Considerations for SSTIs

Many SSTIs have variable presentations; diagnosis is predominantly based on clinical features. Predisposing factors associated with lower limb cellulitis include older age, obesity, venous insufficiency, and edema. Major dermatologic features of cellulitis of the leg included redness, edema, pain, and warmth; many of these individuals were afebrile.[20]

Cellulitis and abscesses are the two types of bacterial SSTIs that are predominately seen in the emergency department.[21] *Staphylococcus aureus* (60% methicillin-resistant) was the predominant pathogen.[21,22] In a CDC report released in 2018, PWIDs were 16.2 times more likely to develop invasive methicillin-resistant *S aureus* infections than other individuals, increasing from 4.1% in 2011 and 9.2% in 2016.[23] For patients who lick their needles (to make an old needle more slippery, check the quality of the drug, clean the needle, etc), oral flora may be present.[22] Other causes included *Staphylococcus pneumoniae*, gram-negative bacteria, *Clostridium* species, and fungi.[22] Hirschmann and Raugi[20] reported 75% to 90% of cases of leg cellulitis were caused by various streptococci because they reside in the interdigital toe spaces.

Seeking care for SSTIs is an issue for PWIDs. Harris et al[17] examined how 19 PWIDs made decisions to seek or delay medical treatment for SSTIs. They reported PWIDs had a basic understanding

Figure 2.
ABSCESS



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of SSTIs and risk factors. Most waited to seek care because of stigma. Self-reported treatments included increasing drug use for pain and lancing/draining their own abscesses. For patients diagnosed with SSTIs in a medical record review (N = 49), Pirozzi and colleagues[24] reported that most (n = 42 [85.7%]) underwent surgical debridement; 12% (n = 6) left the hospital against medical advice; and 73% (n = 36) did not return for scheduled outpatient follow-up visits. Clinicians will find that PWIDs have many reasons for not keeping clinic appointments such as a lack of transportation, forgetfulness, a lack of financial resources, incarceration, and so on.[25]

In a retrospective study of patient visits for community-acquired SSTIs in three urban emergency departments, antibiotics were prescribed to 86.1% (n = 806) of the 936 emergency department patients with suspected community-acquired SSTIs.[21] Hurley et al[26] have identified issues such as antibiotic resistance in the treatment of uncomplicated skin infections with antibiotics. The use of broad-spectrum Gram-negative antibiotics is questioned because most uncomplicated skin infections are caused by Gram-positive pathogens. Combination antibiotic therapy for uncomplicated skin infection and cutaneous abscesses that are drained should be avoided.

Further, treatment with antibiotics for 5 to 6 days seemed to be as effective as 10 days. The Infectious Diseases Society of America has clinical practice guidelines for methicillin-resistant *S aureus* infections in adults.[27] Consideration of comorbidities is important; antibiotic therapy is recommended for abscesses associated with severe or extensive disease or rapid progression in presence of cellulitis. The guidelines should be consulted for antibiotic selection. A clinical decision should weigh whether the infection in PWIDs is uncomplicated and if the guideline can be used.

Other treatment strategies for SSTIs include lower extremity elevation to decrease the edema and inflammatory components. Anti-inflammatory medications (such as ibuprofen) may help the inflammation to resolve.[20] Weight loss and treating tinea pedis between the toes may help. Effective interventions include syringe service/exchange programs for access to sterile equipment and safe disposal, education on safer injection practices, and educating patients about the early warning signs of serious infections. In a study to examine risk associated with SSTIs in 143 PWIDs, Phillips and colleagues[28] noted the social environment of PWIDs, lack of needle/syringe exchange, and limited access to healthcare and housing negatively affect the success of interventions. In that study, PWIDs reported both good care (felt provider was honest and gave care) and negative experiences (felt labeled, painful incision and drainage, felt need to withdraw, etc).

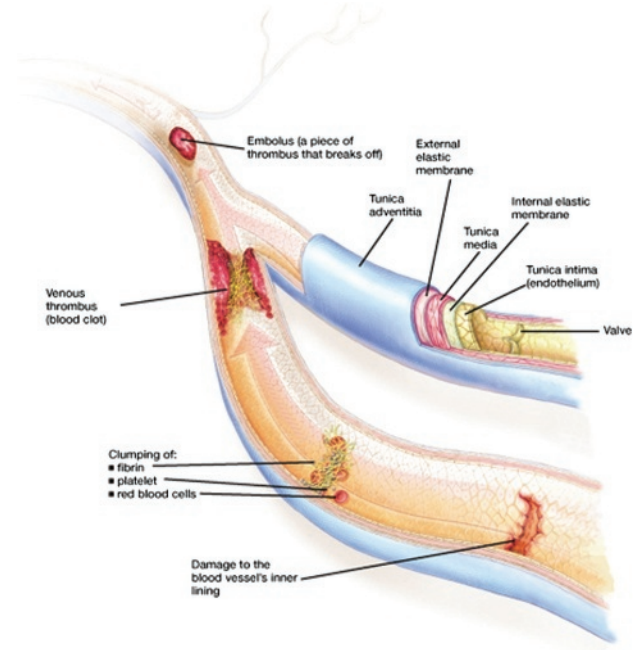
Based on a study of a hypothetical supervised injection facility in Baltimore, by having PWIDs inject in the presence of medical staff, supervised injection facilities can prevent hospital days for SSTIs and save roughly $930,000 annually.[29] Although there are many regulations in the US about supervised injection facilities, it is possible that increasing their number could reduce SSTIs. Further study is warranted.

Finally, although most people with opioid use disorder do not report attending substance use treatment,[30] encouraging patients to seek treatment is critical. Clinicians should never dismiss patients from their practice because of a substance use disorder.[31] Clinicians must be comfortable asking about and assessing for substance use. They should discuss their concerns with the patient and allow the patient an opportunity to disclose their concerns.[31] If a patient indicates interest, clinicians should offer or arrange for evidence-based treatment, including medication-assisted treatment (ie, methadone or buprenorphine) and behavioral therapies[31] and offer naloxone for overdose prevention.

VENOUS VASCULAR DAMAGE

Many PWIDs are at risk of deep vein thrombosis (DVT; Figure 3). A major risk factor for DVT is injecting in the femoral vein; this risk is significant regardless of type of illicit drug used, age, gender, smoking status, and history of blood clotting disorders.[32] Damage to the veins has long been reported with clots extending

Figure 3.
FORMATION OF A VENOUS THROMBUS



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centrally within the vein lumen and causing complete or partial vein blockage.[33]

According to a recent literature review,[34] PWIDs may constitute about 50% of persons younger than 40 years with DVT; in general, 47.6% of PWIDs reported DVT. In a study about precipitating events for women with objectively confirmed DVT (n = 206), injection drug use via the femoral vein accounted for 21.4% (44 of 206) of all cases, and this percentage increased to 52.4% (44 of 84) for women younger than 40 years.[35]

A PWID may have many risk factors for developing DVT, including major surgery, organ damage caused by drug use, and so on. Drug-induced stupor, immobilization, lack of muscle activity, injuries to the lower extremity, repeated injections, vein wall lesions, venous stasis, and sociodemographic and drug risk factors also increase the risk of DVTs.[34] In their literature review, Kwiatkowska and colleagues[34] noted that there are no guidelines for the treatment of DVT in PWIDs; the direct effect of heroin, cocaine, amphetamines, and opioids on the coagulation system is not well known.[34] However, Amin and colleagues[36] reported that patients wearing compression stockings immediately following a DVT had lower vein obstruction than those who were not receiving compression, as well as less postthrombotic syndrome (ie, pain, swelling, increased leg pigmentation); providers should explore this option with patients.

Regardless of the development of DVT, individuals who inject in the groin, lower extremities, and feet are at an increased risk for vascular damage. Persons who inject drugs generally fit two groups: those who inject into the groin and lower extremities as a primary site and those who use these sites when other sites cannot be used. The use of the groin as a primary site is generally because of the larger vein and faster blood flow, providing a "better rush." In addition, it is discreet and convenient, and track marks are hidden; it can be found with a single injection versus repeated injection attempts.[37,38] Those PWIDs who have been injecting substances for a longer period tend to use the femoral vein as a last resort as they sequence through various sites.[37]

Damage to the veins of the lower extremities increases the risk of chronic venous insufficiency (CVI) and results in the most common wound of the lower extremity: a venous ulcer (Figure 4). In a cross-sectional, comparative study stratified by age, gender, ethnicity, and method of drug use (N = 713), persons who inject in the arms are 5.15 times ($P < .04$) more likely and leg injectors 54.33 times ($P < .001$) more likely to have current or healed venous ulcers than persons who do not inject drugs.[39] Venous ulcers are slow to heal; as many as 20% do not heal within 2 years of treatment.[40] Long-standing ulcers, infection, poor adherence to compression, and longer topical and systemic antibiotics are associated with worse healing.[41]

In a cross-sectional study of 204 PWIDs, the prevalence of CVI was 87.7% (n = 179), with 57.8% (n = 118) in the most advanced

Figure 4.
CLEAN VENOUS ULCER BEFORE TREATMENT

Reprinted from Sussman C, Bates-Jensen B. Wound Care: A Collaborative Practice Manual for Health Professionals. 4th ed. Philadelphia, PA: Wolters Kluwer; 2011.

stages (skin changes, healed ulcers, and open ulcers).[42] In comparison, venous ulcers affect 1% of individuals in the general population.[43] Usually, CVI from venous damage develops after 6 years of injecting, and PWIDs experience CVI changes in their third or fourth decades of life.[39]

Besides the veins, the calf muscle pump has a key role in promoting venous outflow. Normal ankle mobility and painless calf muscle action are required for the calf muscle pump to function. Limited ankle range of motion is known to contribute to venous congestion and edema in persons with CVI. Nerve and muscle damage from injecting drugs may impair the functioning of the calf muscle and ankle joint.[44–46] To control pain in their legs, PWIDs may not move their feet or ankle joints while walking, thus losing the calf pump mechanism.

Venous ulcers negatively affect daily living; there are issues of pain, drainage, odor, altered mobility, restricted functioning, isolation, and depression.[47] In interviews with 101 PWIDs, many (81.2% [n = 82]) reported having an injection-related wound, and 93.9% (n = 77) reported self-management of the wound.[48] Wound care involved cleaning (73.2% [n = 60]), use of an ointment (47.6% [n = 39]), and dressing (19.5% [n = 16]). In a community study of PWIDs (N = 152), 19.7% (n = 30) of participants had a chronic wound.[49] Adults 45 years or older were more likely to be enrolled in drug treatment and have less risky injection and hygiene behaviors than their peers and younger PWIDs without wounds.[49] Factors associated with poor wound healing include obesity, a fixed ankle joint, minimal activity, wound recurrence, a long-standing ulcer, poor adherence to compression therapy, and infection.[41,50,51]

Arterial insufficiency needs to be assessed in persons with venous disease because of the need for compression therapy. Even if the ulcer closes, venous ulcers tend to recur; in the general population, up to 70% of venous ulcers reopen after only 3 months posthealing.[52] This number is not known for PWIDs, although it is likely very high because of the potential for marked venous damage.

In a descriptive, retrospective chart review (N = 140), the average size of a venous ulcer when PWIDs sought treatment was 7 × 8.5 inches; wounds that did not heal were larger than those that closed.[53] Pain in PWIDs with ulcers was rated highest with working, walking outside, standing, and stair climbing.[54–56] In a cross-sectional, comparative study stratified by age, gender, ethnicity, and method of drug use (N = 713), the fall risk for a 45-year-old leg injector was comparable with noninjectors 65 years of age.[57,58] Balance and gait changes were critical issues affecting fall risk. Often, PWIDs with a venous ulcer have problems with sleep.[57,58]

Poor sleep in persons with venous ulcers has been related to pain, worry, and odor.[59] These individuals are also at risk of malnutrition. In a cross-sectional pilot study (N = 31), food sufficiency/security was marginal or lower for 39% (n = 12) of PWIDs with a venous ulcer; about 52% (n = 16) were at risk of malnutrition.[60] Low food sufficiency/security was associated with less motivation for activity and less walking.[60]

Lymphedema can be a problem for PWIDs because of the destruction of the lymphatic system by contaminants in injected substances. Lymphedema often is present with venous disease, called phlebolymphedema. Best practice for lymphedema includes compression bandaging, meticulous skin care, education, manual lymphatic drainage, exercise, and compression garments for maintenance.[61]

Care Considerations: Venous Disease

Early treatment for venous disease is important so that interventions are effective.[62] Physical, psychosocial, and substance use histories are critical for care planning. The practitioner should understand illicit drug, alcohol, and cigarette use in terms of substance, amount, duration, and the respective effects of these variables. The patient's lower extremities should be evaluated, especially for the clinical manifestations noted by the CEAP (Clinical, Etiologic, Anatomical, and Pathophysiological) classification for venous disease.[40] Treatment of venous insufficiency includes decreasing edema with compression products and lower extremity elevation.

Treatment can be challenging because of poor follow-up care, chaotic lifestyle, homelessness, mental changes, lack of health insurance, and lack of transportation. Patients may feel uncomfortable or judged in a clinical setting. They may seek care from an emergency department because they know they will not be turned away. They may also decide to self-treat, so every encounter about wound care should include information about self-care. If the ulcer closes, these patients need to be fitted for compression hose and taught how to use them. If treatment includes anticoagulation medications, educate patients about the assigned coagulation clinic and the prescribed medications.

Drainage and odor are common wound complaints. Patients have reported negative feelings toward odor from leg ulcers that resulted in shame, disgust, and self-loathing.[63] They were fearful others could smell the wound, and they limited social activities because of odor and drainage.[63] Patients who are employed in a job that requires a lot of standing typically cannot elevate their legs at work, making drainage difficult to control. Lower extremity elevation and wound closure help to decrease drainage and odor. Wounds with heavy drainage will need more than one compression dressing change per week.

Some providers have used negative-pressure wound therapy to reduce periwound edema, which contains inflammatory mediators and surface contaminants.[64] Jull and colleagues[65] performed a systematic review of prescribed exercise with compression versus compression alone in treating patients with venous ulcers. Exercise was associated with increased venous ulcer healing at 12 weeks, and the combination of progressive resistance exercise plus prescribed physical activity was also effective. They concluded that simple progressive resistance and aerobic exercises may be suitable for patients with venous ulcers.[65]

Pain management can be a challenge. In 2016, the CDC published the *Guideline for Prescribing Opioids for Chronic Pain*.[31] The guideline focuses on prescribing for chronic pain other than for active cancer treatment, palliative care, and at end of life. The document points out the benefits and harms of opioids and encourages nonopioid prescriptions as well as nonpharmacologic treatments. Since the guideline was published, the number of opioid prescriptions has declined.[66] When looking at diagnoses for opioid prescriptions in the general population, most were for conditions associated with pain such as back pain and diabetes. In an interview survey (N = 702), 47.7% (n = 335) of PWIDs reported pain primarily in the lower legs (27.1% [n = 190]) and back (19.7% [n = 138]).[7] Activities associated with the most pain included walking outside, standing, working, and going up and down stairs; all were rated 6 or higher on a 10-point pain scale.[54–56] Pain is a dominant theme of care among PWIDs and affects quality of life, sleep, mobility, and functioning.[47] Voon and colleagues[67] reported that self-management of pain occurred when PWIDs were refused a prescription for pain medication and were homeless. Common strategies to self-treat pain were injecting heroin and obtaining diverted prescription pain medication on the street.[67]

Providers must look carefully at pain prescriptions for PWIDs in relation to SSTIs and/or a wound. Most heroin users

have a history of nonmedical use of prescription opioid pain relievers,[2] so a major question is how to treat pain. Nonsteroidal anti-inflammatory drugs are commonly prescribed for musculoskeletal pain but are associated with increased risk of cardiovascular disease and renal complications. It is not recommended that nonsteroidal anti-inflammatory drugs be used to treat patients with hypertension, heart failure, or chronic kidney disease.[68]

Be sure to assess mental status. In a large retrospective cross-sectional study (N = 78,976) of physical and mental health in the criminal justice system, 451 participants used heroin, with 17.6% (95% CI, 12.6–22.6) having fair or poor health and 54.9% (95% CI, 48.5–61.3) having no mental illness.[69] Persons with some form of opioid or heroin disorder had significantly worse self-reported health, more chronic conditions, and higher levels of disability than those without reported opioid use. Depression is common in patients with wounds.[47] Finally, PWIDs have significantly poorer health outcomes and mental and physical comorbidities than persons who do not inject drugs.[70]

ARTERIAL VASCULAR DAMAGE

Acute limb ischemia can occur with inadvertent or occasional arterial puncture. Intense burning pain is common when the artery is injected.[12,71] Individuals may also experience gangrene or pregangrenous changes and neuromuscular deficits. Distal pulses may still be present.[71] The pathology may include chemical arteritis resulting in endothelial damage and swelling. There may also be vasospasm and embolism of foreign material added to muscle ischemia and necrosis. Good collateral circulation in the upper extremities reduces critical ischemia and amputation.[71] Angiography should be performed immediately to diagnose arterial spasm and thrombosis.[71]

Infected pseudoaneurysms are a common arterial complication caused by embolism of septic material from distant sites, direct arterial trauma, or infection spread from soft tissues near the vessel.[71] They present as pulsatile swelling (often with cellulitis) surrounding induration-infected pseudoaneurysms and may be misdiagnosed as abscesses. Late presentation includes hemorrhage from the aneurysm and hypovolemic shock. Duplex ultrasonography is often used in diagnosis, and surgery is the mainstay of treatment for infected pseudoaneurysms.

About 8.5 million people in the US are affected by peripheral arterial disease (PAD),[72] and PWIDs have the same nondrug risk factors for PAD as the general population: cigarette smoking, diabetes mellitus, history of cardiovascular disease, age older than 40 years, male sex, and sedentary lifestyle. In a cross-sectional stratified design (N = 640), Pieper and colleagues[73] found that 93.5% (n = 599) of their participants in drug treatment smoked cigarettes. An ankle brachial index of less than 0.90, indicating PAD, was identified in 16.7% (n = 107) of participants.[73] Those who ever smoked cigarettes were about five times more likely to have PAD. Female sex (OR, 2.10; 95% CI, 1.2–3.4) and years of smoking cigarettes (OR, 1.7 per 10 years' smoking; 95% CI, 1.1–2.8) were risks for PWIDs; a positive attitude toward physical activity was protective (OR, 0.63; 95% CI, 0.45–0.91).[73]

To help prevent amputation, the use of peripheral vascular revascularization has increased.[72] In a retrospective cohort study (N = 61,969), nonelective 30-day readmission after revascularization procedures for PAD was 2.7% (n = 295 of 10,924) for those with a history of illicit drug use.[71] The presence of PAD can negatively affect venous disease treatment because compression therapy is contraindicated if a patient's ankle brachial index is less than 0.5.[51]

Care Considerations: Arterial Disease

When PAD is diagnosed, clinicians must do everything they can to impact modifiable risk factors. For example, diabetes and hypertension should be adequately treated. Encourage smoking cessation. There are many treatment strategies for cigarette use, so practitioners should be available to match the patient's need with their insurance coverage. A vascular assessment and procedure may need to be done to improve arterial flow. Because patients may have both venous and arterial disease, the severity of arterial disease will affect the compression allowed for treatment of venous disease.

CONCLUSIONS

The number of PWIDs is increasing. Although there is justifiable concern about the occurrence of HIV and hepatitis C virus in PWIDs, there is less research about SSTIs and vascular disease in this population. Be sure to obtain a physical, psychosocial, and substance use history when treating PWIDs. Infections and abscesses need to be evaluated in terms of antibiotic use, incision, and drainage. Principles of venous disease and venous ulcer wound care include decreasing edema with compression dressings and stockings, lower extremity elevation, and increased activity. Venous disease is chronic; early and continuous patient education and reinforcement are crucial. Arterial insufficiency requires assessment to determine adequate blood flow for limb salvage. Chronic illnesses can interfere with wound healing.

Most important, PWIDs should be treated with respect. Providers should look at clinic schedules and how they can be flexible to accommodate the needs of this patient population. Community resources can be helpful in terms of drug treatment, nutrition, shelters, and other common issues. Remember, PWIDs may have both general and substance use-related healthcare problems. ●

PRACTICE PEARLS

- The most common injection drug use-related SSTIs are cutaneous abscess, phlebitis, and cellulitis. Risk factors are numerous and include injection practices and sites, age and sex of the PWIDs, and substances injected.
- Most PWIDs are at risk of DVT. Vascular injury most commonly affects the lower extremities, especially from injecting in the femoral vein.
- Venous ulcers may develop; be a challenge to treat in terms of pain, drainage, odor, mobility, mental health, and lifestyle; and tend to reoccur.
- Because of destruction of the lymphatic system with contaminants of substances injected, lymphedema can be a problem.
- Acute limb ischemia can occur with arterial puncture causing intense, burning pain, gangrene or pregangrenous changes, and neuromuscular deficit. Peripheral arterial disease may also develop from the presence of typical risk factors.
- Most important, PWIDs should be treated with respect and should never be turned away when seeking treatment.

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