

REVIEW ARTICLE

CUTANEOUS COMPLICATIONS OF INJECTION DRUG ABUSE

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SUMMARY: Drug abuse is a worldwide problem with disastrous consequences for the patient, family and society at large. The case of injection drug abusers seems a little different as cutaneous complications may occur. Considering these complications the present article attempts to review the adverse effects of parenteral drug abuse on the skin including the common skin and soft tissue infections secondary to the drug abuse.

KEYWORDS: Abuse, Cutaneous, Drugs, Injection.

INTRODUCTION: Injection drug abuse is increasingly becoming a major health problem all over the world. It can be responsible for numerous minor to life threatening and fatal complications.¹ According to United Nations estimates in 2004, 3-5% of world population used illicit drugs. Similarly another survey done in United States in 2008 indicates that 8% of population aged 12 yrs. or older were users of illicit drugs.² India is also not far behind; this problem is becoming a significant one with numbers being added daily. Notably, the state of Punjab is gaining notoriety in this regard, where an estimated 15177 youths are enrolled under needle exchange programme.

Dermatologists and family physicians should be aware of the various cutaneous signs of injection drug abuse even before the history is elicited. Drug abuse carries a lot of social stigma; hence patients and their attendants do not volunteer this information at the initial visit. Weidman and Fellner found that 86% of subjects attending medical clinic for drug addictions had cutaneous adverse effects. With newer drugs being abused, especially different formulations (tablets are crushed and used as injectables) newer cutaneous complications are emerging.

Drugs used for abuse: The commonly used drugs for injection abuse are Heroin, Cocaine, Morphine and its derivatives, Triazolam, Flunitrazepam, and Temazepam. In developing countries Pentazocine is also abused.

Illicit drugs sold on the street are diluted(cut) several times to increase the profit margins of the dealers.^{4,5} Adulterants include Quinine, lactose, lidocaine, caffeine, inositol, dextrose, starch, talc, sucrose, procaine and other substances.⁶⁻⁹

Tablets intended for oral use may be crushed, dissolved and then injected. Narcotic is prepared for injection by mixing with water, lemon juice or other liquids. Solution is heated till it dissolves, filtered with the help of cotton wool or cigarette filters and then filled into a syringe.¹⁰⁻¹²

The process of preparing the injections is grossly unsterile and coupled with sharing of syringes, and lack of skin antisepsis is sure short recipe for secondary infections and other blood born infections.¹³⁻¹⁵ The usual injection route is intravenous and majority of addicts start injecting into cubital fossa of the non-dominant arm but any vein can get involved including dorsa of hands, digits, feet, popliteal fossa, veins of neck, groins, penis.

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In later stages when patients are not able to access the vein, drug may be injected into subcutaneous tissue (skin popping) or in the muscles (muscle popping). Some addicts start injecting into the sub cutaneous tissue quite early in the addiction to avoid tell-tale signs of repeated injections into veins like rail-road tracks.¹⁶

The injecting use of drugs usually leads to cutaneous signs which may be meaningless abscesses to more serious and at times fatal complications. These complications can be because of the drug itself, site of injection, route employed and effects of adulterants.

LOCAL COMPLICATIONS:

Occur at the site or within the area of injection is usually of two types:

Acute; occurring within forty two to seventy two hour

Delayed complications

Acute complications: Injection marks: recent prick marks are usually present.

Skin and soft tissue infections: Most common acute manifestations are skin and soft tissue infections. In fact this is the leading cause of hospitalization among the injectable drug users. Abscesses and cellulitis occur in 22% to 65% of addicts.¹⁸⁻²⁰ A variety of factors favor skin and soft tissue infections (SSTI), which include non-sterilized needles. Tissue trauma, effects of the drug and its fillers, speed ball injection (mixture of heroin and cocaine), booting (drawing back blood before injecting again, usually with unsterile syringes) and skin popping.²¹ Skin popping is the most important contributory factor for skin and soft tissue infections and also infections are usually multiloculated and more extensive.²²

A variety of common and uncommon pathogens including almost all bacteria and fungi have been isolated in these infections. Most cases have negative blood culture.^{23,24} Source of these infections is variable, and they may arise from skin or oropharynx. Some intravenous drug users (IDUs) clean their needles or skin with saliva before injection. Most common organism isolated is *Staphylococcus aureus*, followed by Group A β hemolytic *Streptococcus* and other *Streptococci*.¹ Anaerobes are the second most common pathogen.²⁵ *Clostridium tetani* and *Clostridium botulinum* are unusual organisms except in IDU's who skin pop.²⁶⁻²⁹

Other *Clostridium* species including *novyi*, *perfringens*, *sordellii*³⁰ & *histolyticum*³¹ have been reported to be the cause of serious illnesses or death among IDU's. Pharmacological action of drugs such as vasoconstrictive action of cocaine may also contribute to infections.²⁴ Irritant substances among diluting agents can cause chemical cellulitis and abscesses.³²

Necrotizing fasciitis is uncommon but potentially life threatening complication particularly seen among IDUs who employ skin popping. This infection usually presents with pain out of proportion of examination & hypothermia or hyperthermia.³³ Classical finding of hemorrhagic bullae may not be seen.

Cutaneous necrosis and necrotizing ulcers may develop among IDU users due to several factors like employing skin popping technique, pharmacological effects of the drugs like cocaine which can cause vasoconstriction & thrombosis or due to irritant properties of drug & adulterants, vascular thrombosis & infection.³⁴⁻³⁹ Cutaneous necrosis may also result from direct intra-arterial injection such as of scrotal skin after pudendal artery injection.⁴⁰

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Fungal infections like Dermatophytosis are common among IDUs. Disseminated candidiasis has been reported among IV heroin users, who used lemon juice to dissolve the heroin. They present clinically with painful nodular lesions over scalp which resolves with alopecia. Similar lesions are involved over beard & other hair bearing areas. Helpful signs in diagnosis are negative cultures for pyogenic organisms, unresponsive to antibiotics & these patients can also have candidal endophthalmitis, pleuritis & Costochondritis.⁴¹⁻⁴⁴

Pseudo-aneurysm may develop after accidental or intentional intra-arterial injection and may present as a pulsatile mass located in the area of major artery. Occasionally it may present as a non-pulsatile mass & can be mistaken for cutaneous abscess.^{45,46} Mycotic aneurysm usually grow *Staphylococcus aureus*.

Other local complications are Lymphadenitis, Thrombophlebitis,⁴⁷ Ecthyma gangrenosum & gas gangrene.

Intra-arterial Injections: Intentional or unintentional intra-arterial injections may cause severe tissue ischemia & necrosis. Immediately after injection, patient complains of severe pain & burning sensation followed by edema & cyanosis around the territory of artery.

Direct vasoconstrictive action of the drug like cocaine or amphetamines, local chemical toxicity of the drug or adulterants may cause end arteritis, vasospasm & thrombosis. Injected material may contain microparticles which then act as emboli. This could be true in cases where tablets are crushed, dissolved & then injected. Ultimate outcome is peripheral ischemia, edema & compartmental syndrome-which further worsens the ischemia.⁴⁸⁻⁵³

Chronic Complications: After prolonged abuse of injectable drugs, many cutaneous signs can occur which may be diagnostic, particularly scars resulting from skin popping are quite distinctive.

Hyperpigmentation – Weidman and Fellner found hyperpigmentation at the site of injection to be the most common cutaneous finding present in 54% of subjects.³

Rail road tracks result from repeated trauma to the veins because of frequent injections in the veins. Repeated injections, irritant action of the drugs or adulterants result in venous thrombosis & subsequent fibrosis to form linear cord like hypo pigmented or hyper pigmented scars. This is the main stigmata of injectable drug abuse⁶. Main sites involved are –anti cubital fossae & dorsum of hands. The presence of scarring is related to the duration of drug abuse.⁵⁴

Skin popping scars are quite distinctive usually multiple, varying in size from 0.3 to 5mm in size, punched out, atrophic, hyperpigmented or hypopigmented⁸. Preferred sites for skin popping are-extensor aspect of arms, dorsum of hands, abdomen & thighs, but they may be seen at any accessible site.

Sooting Tattoos result from cooking of the drugs, flaming of the needles with matches & injecting the carbon, soot or foreign material into the dermis.⁵⁴

Puffy hand syndrome- This condition seems so to be specific for i.v drug addiction⁵⁵. It presents as non –pitting edema of the hands & may spare the fingers.⁵⁶ This is a kind of lymphedema & may persist even after the addict stops injections. Quinine, an adulterant in heroine is thought to induce lymphatic injury.^{57, 58}

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Chronic venous insufficiency & ulcers are quite common. In one study, it was found that 88% of addicts had clinical evidence of chronic venous insufficiency.^{59, 60} Repeated trauma to the veins, superficial & deep vein thrombosis, lymphatic blockage & sclerosing effects of the adulterants seem to contribute to chronic venous insufficiency.^{59, 60} Venous insufficiency & chronic lymphedema may lead to chronic edema of lower extremities. Ulcers can appear at the site of previous sub cutaneous injection as a result of lymphatic & venous impairment.

Nodular lesions are also commonly seen among IDUs. Drug itself or the contaminants particularly talc are capable of causing granulomatous reaction at the site of reaction.⁵¹ Lesions may break down & ulcerate producing chronic ulcers.^{61, 62} The vascularized granulation tissue in & around the ulcers may be the site for drug injections.^{62, 63}

Pentazocine abuse is known to cause tense woody fibrosis that extends well beyond the sites of injections, irregularly shaped deep ulcers which may expose muscles, halo of hyper pigmentation surrounding the ulcers & surprisingly apparent indifference of the patient towards disfiguring process & lack of expression of face are diagnostic.³⁴⁻³⁹

Related to the site of injection: No area of skin is spared by addicts. Injection at uncommon sites like penile veins, particularly dorsal vein of the penis may result in necrotizing penile ulcers.^{64, 65} Jugular vein injection (in the neck) may lead to descending cervical cellulitis & mediastinitis with high rate of mortality.⁶⁶

Injection into the direct pudendal artery in groins may cause penile & scrotal ulcerations.

Opiates can cause itching due to histamine release. Urticaria has been reported in 4% by Weidman and Fellner.³

Other uncommon complications include- bacteremia, osteoarthritis, and endocarditis. 50% of bacteremia in drug addicts is caused by *Staphylococcus aureus*.⁶⁷ Bacteremia can cause septic arthritis.

Various vasculitic & vasculopathic processes have been associated with IDUs including urticarial vasculitis, Churg Strauss vasculitis, Raynaud phenomenon, Henoch Schonlein purpura, necrotizing vasculitis, Buerger's disease & pseudo-vasculitis. Drug reactions including acute generalized exanthematous pustulosis, Steven Johnson's syndrome have also been reported. Levamisole is frequently used to dilute cocaine. Levamisole can cause neutropenia, agranulocytosis & vasculitis.^{68, 69} Many cases have been reported of agranulocytosis with retiform purpura among cocaine users. These purpuric lesions have characteristic distribution involving internal pinna & cheeks.

In conclusion, it is emphasized that skin can give important clues to the physician and alert the physician to the possibility of injectable drug abuse even if history is not volunteered by the patient and therefore can help the physician to motivate the patient at the earliest to take remedial measures.

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