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REVIEW ARTICLE

A Comprehensive Review on Complications of Intravenous Drug Abuse

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ABSTRACT:

The misuse of drugs which are taken through intravenously have been a cause in youngsters which would lead to major health disorders that could increase the morbidity and mortality rate to an higher ratio following complications, infections and permanent health disorders. The introduction of mind-altering substances into body through intravenous needle reports to addiction which is a source for unending complications causing higher death rates. Certain drugs are injected into muscles, under skin or directly into the vein, where tack marks can be seen which would be a sign for chronic intravenous drug use. Collapsed vein is the common effect due to intravenous drug use. Cocaine, heroin, crystal methamphetamine, amphetamines, opiates and prescription drugs are used among IV users. Prescription drugs are taken via injection illegally including barbiturates to hydrocodone, consuming them for certain reason other than for what they are prescribed for and with altered dose along with altered route of administration. Due to rapid onset of action the addicts prefer intravenous method for induction of drugs into their body. Major complications could be faced by IV drug abusers which includes severe blood-borne diseases, infections, abscesses, collapsed veins, increased chance of over dose since intravenous administration has rapid onset of action which bypasses body's detoxifying system. patient Counselling remains as best treatment to addicts which would help them to get rid of the habit followed by the infectious disease that are due to misuse of drug could be treated with appropriate antibiotics along with anti-viral drugs depending on the type of infection they have undergone. A comprehensive literature search has been carried out in PubMed, Google Scholar, and articles pertaining to complications of intravenous drug use were selected for review.

KEYWORDS: Drug abuse, intravenous, complications.

INTRODUCTION:

The word drug abuse refers to using a drug as habit can also be said as usage of drugs to an extent which leads to impairment of social, physiological, psychological functioning of normal body.

Addiction plays a major role in drug abusers which draws a person to use the drugs as habit. The word addiction refers to a chronic relapsing disorder which leads to compulsive drug-seeking and drug taking behaviour continue to exist in spite of serious negative consequences^[1]. Due to rapid onset of action intravenous route of administration of drugs have been chosen by abusers. Dopaminergic Mesolimbic Pathway in CNS are associated with the habit forming aspects of drug abuse.

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Injection of drug is a method of injecting drugs into the body reaching systemic circulation via hypodermic needle through intravenously, sometimes intramuscularly and subcutaneously. The experience of full effect of drug is seen via injection within 10 seconds, this is the reason why abusers are favoured of IV route of administration.^[2]

Heroin and cocaine are commonly preferred drugs by addicts, where direct cytotoxic effect is exhibited by cocaine, which acts as powerful adrenergic agents, thus it is used for vasoconstriction. The ratio of advantage and disadvantage of use of this route for administration of drug has equal weightage where the misuse of this route leads to severe infection in different sites, blood borne-disease, abscesses, permanent vein damage etc. The infections occurred could tend to be highly precarious, the infection spread to neighbouring areas with an disgusting odour and puss formation.^[3]

Botulism, eubacterium necrotizing fasciitis in black-tar diacetylmorphine users, following protozoal infection square measure a number of the samples of uncommon infectious complications in injection drug users. Black-tar diacetylmorphine might shield against sure infections throughout preparation, since it's heated in water before use, however clostridial spores survive boiling.^[4] Food poisoning is also troublesome to diagnose, not just because of its rarity, however additionally as a result of it will masquerade as intoxication if the patient presents with unintelligible speech, nausea and unconditioned reflex, and no evident-neural structure palsy or expanded pupils.

Pulmonary Talcosis is a condition seen due to IV drug abuse of oral medication, where the magnesium silicate that is talc acts as lubricant and filler and it is crushed, melted and dissolved in water and is injected via intravenously. Inhalation of pure talc, which includes cosmetic talc would act as reason for Talcosis.^[5] The tiny particles get accumulated and result in blockage of pulmonary vessels. Talc is additionally unremarkably instilled in intrapleural areas as a sclerosing agent for malignant serous membrane effusions. Respiratory organ manifestations from serous membrane instillation don't seem to be common, although cases of acute metabolism failure from general absorption of intrapleural talc are reported. Therefore the accumulated particles get migrate to the pulmonary interstitium and occurrence of granulomatous reaction takes place forming a foreign body granuloma. In the year 2006, there were approximately 13million peoples who take drugs intravenously.^[52]

Drug of abuse during pregnancy may lead to retardation of growth of placenta or abortive condition. Heroin and

cocaine are the drugs that are commonly used at maximum rate. Even though the people are aware of the health risk that could be occurred due to use of highly dependence on opioids, cocaine and heroin, they are intended to be use it again as it has become an habitual event.^[7]

The diagnosis of infections and complications were made easy through culture media method, gram staining, and many of the equipment that could detect the presence of infectious micro-organism causing insecure health condition. These infections can be treated with broad spectrum antibiotics and in combination with anti-inflammatory and anti-viral drugs depending on the condition that patient has undergone.^[6]

Complications of heroin and cocaine:

Over dose of may lead to Anoxic brain injury, ischemic shock, transverse myelopathy and acute inflammatory poly-radiculo-neuropathy in central nervous system followed by constipation in gastro-intestinal track, pulmonary oedema due to over dose, immunosuppression, oligo and amenorrhea, nausea, increased risk of pregnancy complications and Takotsubo cardiomyopathy. Psychosis, hyperthermia due to severe psychomotor agitation, poste binge, depression, acute kidney injury and teratogenic.

Complications of amphetamines

General complications include anorexia, weight loss, increased dose and recurrent use of drugs for longer periods leads to myocardial infarction, myocardial ischemia in CVS and ischemic and hemorrhagic shock in central nervous system, followed by pregnancy complications in genitourial system, psychosis, paranoia, propensity to high risk behaviours.

Primary complications:

1. Cutaneous and musculoskeletal manifestation of iv drug abuse

In IV drug abusers, commonly seen infection are the cutaneous that is the skin infection. This results from the recurrent penetration of needle in sake of injection of the drug along the respected area of hand. The skin and the musculoskeletal region are prone to get infected which would result in Cutaneous abscess, cellulitis. Scarring on the skin are due to recurrent penetration of needle, commonly in addicts. A wide range of pathogens, including all types of bacteria and fungi have been isolated in infection, where as gram positive bacteria cocci are seen very often, Streptococcus and staphylococcus aureus species are the pathogens that are frequently found in infection^[8]. Outburst among drug abusers caused by unfamiliar pathogens which includes clostridia species and pseudomonas aeruginosa stipulates a particular drug or behaviour of the drug. Heroin and

Cocaine are the drugs that addicts gives first preference for injection through IV route. In cross sectional studies of drug abusers, in San Francisco suspected that 32 percent of patients were subjected to abscess, cellulitis or combination of both which have been confirmed with physical examination. Bacterial infections are prevalent which is termed as common complication in IV drug abusers, skin popping, necrosis, extravasation could be seen. The higher chances for tissue death would be due to toxic materials and leakage of drugs out of vein during injection leads to extravasation^[9]. The drugs to be injected must be reconstituted, it must be diluted with solvents such as dextrose, lactose, caffeine, magnesium silicates, inositol, quinine. The powder drugs are expected to be contaminated with pathogens, soils during manufacture process. Thus, these contaminated drugs, when injected are suspected to be infective on soft tissues^[10]. Injection of crushed buprenorphine tablets have been reason for cutaneous injection. Buprenorphine is categorised under opioid agonist which is used for treatment for opioid dependence^[11]. The appearance of redness, warmth and inflammation on the skin are the found as signs for infection, which are atypical in IV drug abusers, due to the reason of frequent penetration of needle into the skin and vein, resulting in damage in the lymph nodes and swollen of blocked lymphatic vesicles causing lymphedema^[12]. Injection of mixture of cocaine and heroine which is popularly known as "speed balls" often infection of this mixture are suspected for HIV positive antibody combined with skin abscesses. Use of contaminated needles with repeatedly flushing and pulling back the drug in a syringe during injection has the higher chances of skin abscesses. Cutaneous sphaelus and necrotizing ulcers could develop as a result of many combined factors primarily skin popping, toxicity, irritant properties of the drug, adulterants, vascular thrombosis and infection as well^[13]. These infections must be treated earlier with antibiotics, usually given through IV route, followed by removal of damaged part of skin if necessary.

2. Pulmonary complication of intravenous drug abuse

Staphylococcus aureus organism have been commonly found in the blood and sputum culture of patients. Lung is estimated to get affected rapidly compared to other organs by drug abusers. Pulmonary oedema, respiratory failure, airway interstitial disease, acquired immunodeficiency syndrome (AIDS) are the common disorders that are noticed in patients of drug abusers, and are assumed to be highly fatal^[14]. Pneumocystis carinii pneumonia, Mycobacterium intracellulare, pneumococcal pneumonia were included in pulmonary manifestation of peoples with positive HIV antibody. Bilateral pyopneumothoraces seems to be occurred due to Streptococcus sanguis which are apparently caused by direct pleural trauma during bilateral jugular self-

injection^[18]. Heroine users have been highly affected with pneumonia and pulmonary infraction. Haematogenous spread of lung parenchyma is to be developed by continuous use of contaminated needled and drug supply^{[15][16]}. Incidence of Mycobacterium infections are at peak level where the patients are expected to develop tuberculosis at high rise, which by not only use of drug but also due to immunosuppression combined with HIV^[17]. Fewer number of patients have been developed with HIV positive antibody, the level of causation of clinical AIDS infection ratio is lesser compared to HIV positive antibody. Several patients were found to be consistent in aspiration of gastric contents^{[19][20]}. Accumulation of pus in the pleural cavities which is common called Empyema have found to be as a result of severe bacterial infection, that must be nursed with strong antibiotics^[21]. Non-infectious respiratory organ diagnoses within the cluster of IV drug abusers enclosed four cases of adult respiratory distress syndrome (ARDS)^[22]. One patient had heroin- elicited respiratory organ lump that resolved spontaneously however the opposite patients developed non cardiogenic respiratory organ –pulmonary edema due to sepsis^{[22][23][24]}. Interstitial and bullous lung diseases were diagnosed in lesser number of patients. One young man had intensive bullous respiratory disorder and underwent a left lower cutting out, that dramatically improved his condition. Intensive talc granulomatosis was found on histological examination. Bronchoscopy was most ordinarily performed on AIDS patients. However, patients in every of the community-acquired respiratory disorder, septic emboli, and respiratory disorder classes additionally underwent bronchoscopy as a result of their clinical shows were thought to be suspect for infection^{[25][26][27][28]}. Treatment and management with broad spectrum Antibiotics has survived many patients with high and faster rate of recovery, especially infections with non-AIDS pulmonary complication, that seems to be common, but the number of patients with pulmonary complications are expected to be at an higher number in near future due to IV drug abuse^{[29][30][31][32]}.

Acute non-cardiac pulmonary oedema after takine over dose

Drug over dose, coma, respiratory depression are commonly seen in heroine users. It is estimated that at least 1-2% of addicts are encountered to death in each year. These complications are seen heroine over dose especially non-cardiac pulmonary oedema is of critical case^{[33][34]}. Most of the case admitted with this complaint of over dose would be non-cardiac pulmonary oedema which would suspect to sudden death. Because of the immoderate adulteration of the pure opiate, the road samples vary significantly in efficiency^[35]. A minimum of 3% opiate is needed to produce the addict with a "kick" however over 20% can cause a fatal over- dose.

Addicts returning to blood vessel use once a amount of abstinence, throughout that their tolerance can have fallen, square measure particularly at risk of this complication, as square measure neophytes trying to imitate their a lot of drug tolerant colleagues^{[36][37]}.

The mechanism of the acute non-cardiac pulmonic dropsy that generally quickly follows drug is obscure, although varied hypotheses are urged, as well as acute alveolitis related to the non-narcotic constituents of the injected material^{[38][39]}. Heroin addicts are highly expected with circulation precipitins to *Aspergillus*, *Micropolyspora feani* and *Thermoactinomyces vulgaris*. Oedema, varying degrees of acute and chronic infection, voluminous lungs with congestion, intra alveolar exudate, have been reported in post-mortem of patients associated with iv drug abuse^[40].

3. Central nervous system complication of IV drug abuse

Injecting medication is taken into account to be a risk issue for stroke. Heroin-related stroke has been related to giant vessel inflammation, and street drug use has been connected to cerebral inflammation as a cause for ischemia. Strokes related to cannabis use classically are anemia in nature, although vasospasm has been planned as a mechanism for cannabis-associated stroke^[41]. Street drug, cocaine, and therefore the connected ecstasy became necessary causes of body part aortal dissection and of intracranial hemorrhage among young adults^[42]. More recently, the artificial cannabinoid spice has been connected to subarachnoid hemorrhage and stroke. Persistent unexplained headache in Associate in Nursing injection soul ought to raise concern structural abscess^[43] additionally to alternative grievous processes.^[43]Of special concern area unit infectious CNS complications like spine redness, discitis, and epidural symptom of the brainpan and spine.

Localized back pain in a very patient with a history of injecting medication and while not another obvious clarification ought that prompt applicable imaging^[44].

Normal designation entails resonance imaging (MRI) with pre- and post-gadolinium distinction imaging to exclude these complications^{[45]-[47]}. There is no predictable level at that the spine could also be concerned within the injection drug user one survey found the body part level to be the foremost common level; another found the foremost common level to be cervical^{[48]-[51]}.

CONCLUSION:

Patients suffering from complications must be treated with Antibiotic therapy, which would be highly effective and are assured with the recovery, in other case,

mortality is seen at higher rate, in similar manner, alternative treatment could be chosen, which have been associated with high risk of failure. Cutaneous, Pulmonary and Central nervous system complication are seen commonly and numbers of peoples affected are higher, where skin, lung and CNS are prone to get infected easily and are affected faster compared to other organs in human body. Thus, addicts must be treated with proper care, patient counselling plays a major role in addicts, which would help them to get rid of the habit in an expected way.

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