



THE CLINICAL AND RADIOLOGICAL PROFILE OF RESPIRATORY COMPLICATIONS IN INTRAVENOUS DRUG ABUSERS: AN OBSERVATIONAL STUDY

Pulmonary Medicine

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ABSTRACT

Abuse of inhaled or intravenously injected illicit drugs is an increasingly common health problem worldwide. History of illicit drug use is often unavailable or delayed, which may preclude clinical diagnosis and prompt treatment of pulmonary complications. This study is taken up to determine the clinical and radiological profile of respiratory complications in intravenous drug abusers. Overall, 96% of intravenous drug abusers were males. The primary drugs injected were heroin, cocaine, buprenorphine and other pharmaceuticals. The most common respiratory complications in intravenous drug abusers identified in this study were Tuberculosis in 32% of the patients, pneumonia in 24%, septic emboli in 18%, pleural effusion in 10%, hydropneumothorax in 10%, empyema in 8%, pneumatocele in 4%, lung abscess in 4% and pyopneumothorax in 2%. Breathlessness was present in 92% of patients, cough with expectoration in 82% of patients and fever in 62% of patients. The majority of patients were having consolidation and/or cavitary disease on chest radiograph. As intravenous drug abuse can lead to wide range of respiratory complications, the diagnosis must be made as soon as possible since prompt treatment can save patients lives. This study provide a detailed analysis of clinical and radiological profile of respiratory complications in intravenous drug abusers.

KEYWORDS

Intravenous drug abuse, HIV, HCV, Heroin, tuberculosis

INTRODUCTION:

Improvement in access to drugs, advancements in biochemistry, and dramatic increases in the recommendation of drug use by clinical practitioners have exacerbated the problem of addiction significantly in this century. Introduction of synthetic compounds like methamphetamine etc. also contribute to drug addiction.[1]

Intravenous drug user is now the preferred term instead of the previous, broad term of drug abuser. [2] Pulmonary problems result from direct consequence of the pharmacological effects of the drug and also related to the method of drug administration. In general, drugs can be administered orally, inhaled, or parentally usually by the intravenous route.[3]

Substances used for intravenous drug misuse include narcotics (heroin, methadon, pentazocine, codeine, propoxyphene, buprenorphine, dipipanone), sedatives, tranquillisers (diazepam, temazepam, glutethimide, phenobarbital) and stimulants like methylphenidate, cocaine, amphetamines.

Pulmonary complications of the intravenous drug misuse: Respiratory depression, Community acquired pneumonia, Aspiration pneumonia, Septic pulmonary emboli, Lung abscess, Empyema, Fungal pneumonia, Tuberculosis, Pneumothorax, Emphysema, Foreign particle embolization.

The various pulmonary complications of illicit drug use result in 5 main patterns of parenchymal abnormality: nodules, ground-glass opacities, consolidation, air trapping, and emphysema. Other thoracic manifestations of illicit drug use include pulmonary arterial hypertension, pneumomediastinum, bacterial endocarditis, discitis, and septic arthritis.[4]

The risk of pulmonary infections is increased by virtue of general self neglect, poor nutrition, and the non-sterile technique used both to prepare the fix and to self administer an intravenous injection.[5]

This study was conducted with the aim to determine the clinical and radiological profile of respiratory complications in intravenous drug abusers.

METHODS:

Ethics:

This study was approved by institutional ethics committee (Memo number: 10801 and D-26, dated- April 3,2023). Informed consent was obtained from the participants of this study.

Study design and patient population:

This observation study was carried out in the Department of Chest and Tuberculosis, Government Medical College, Amritsar. A total of 50 patients who presented as intravenous drug abusers having respiratory complications, to outpatient department or admitted in wards were included in the study.

Patient selection:

Inclusion criteria:

- Patients presenting as intravenous drug abusers having respiratory complications to department of Chest and tuberculosis, Government Medical college, Amritsar.
- Patients consenting for the study.

Exclusion criteria:

- Patients not giving consent for the study.

A detailed history was sought, inquiring about age, sex, smoking history. History of addictive substance was taken and details were enquired regarding type of the drug, method, route of addiction, and duration of drug addiction. A complete clinical examination was performed in all cases, including general examination, examination of respiratory system in detail and other systems. Investigations were done to arrive at a diagnosis and to detect any associated conditions and comorbidities. Results of sputum microbiology and radiological investigations such as chest radiography and CT chest were also noted.

Statistical Analysis:

Data have been documented, tabulated and analyzed using appropriate statistical methods wherever applicable.

RESULTS:

Patient characteristics:

This observational study included 50 patients who presented as intravenous drug abusers with respiratory complications, to outpatient department or admitted in wards. After obtaining written informed consent, the clinical and radiological profile of these patients was evaluated.

In this study, the age of patients was in the range of 20 – 49 years. The majority of patients 25 (50%) belonged to age group of 21-30 years followed by 18(36%) patients in age group 31-40 years, 6(12%) patients in age group 41-50 years and 1(2%) patient in age group <20 years. The mean age recorded was 31.58 years. There was overall male predominance in this study with 48(96%) of patients being males and 2(4%) females.

Overall, 25(50%) were heroin abusers, 9(18%) were cocaine abusers,

3(6%) were buprenorphine abusers, 1(2%) were drotavarine abusers and 12(24%) were polysubstance abusers (abuse of more than one drug).

Moreover in addition to intravenous drug abuse, 29(58%) of patients were alcoholics, 28(56%) were smokers, 8(16%) were oral drug abusers and 4(8%) were tobacco abusers. As per marital status, 21(42%) were married, 20(40%) were single, 8(16%) were divorced, 1(2%) were widow.

In this study, majority of the Intravenous drug abusers were labourers (32%), followed by drivers (22%), unemployed (20%), prisoners (8%) and farmers (6%). Other occupations included baker, shopkeeper, student (2%) each.

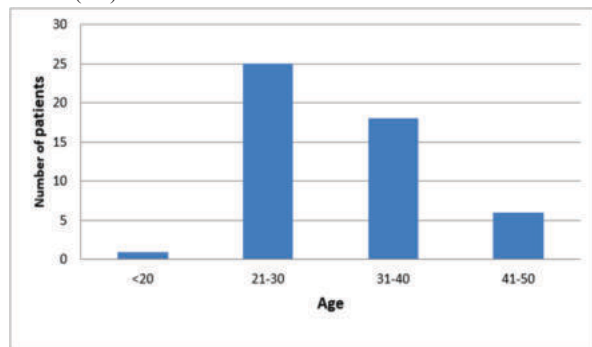


Figure 1: Age – Wise Distribution Of Cases

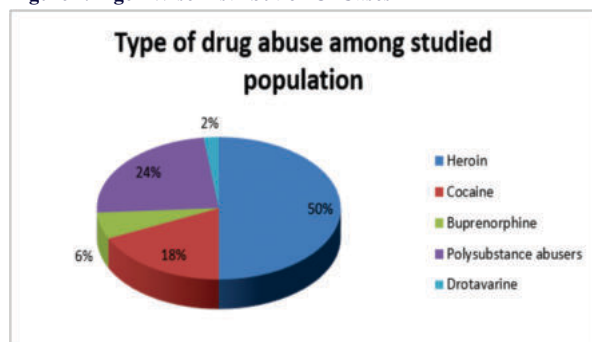


Figure 2: Type Of Drug Abuse Among Studied Population

Clinical Features:

Breathlessness (92%), cough with expectoration (82%), fever (62%), chest pain (44%) were four most common symptoms of these patients.

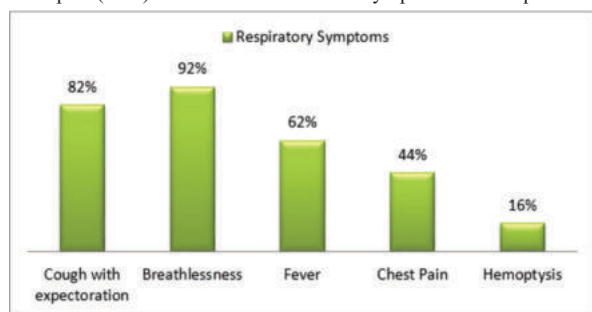


Figure 3: Respiratory Symptoms Among Cases

In this study, 56% of patients had hepatitis C virus (HCV) infection, 36% of patients had human immunodeficiency virus (HIV) infection, 18% of patients have other comorbidities like diabetes mellitus, hypertension.

Fourteen percent of patients were on Directly Observed Treatment short course (DOTS) and six percent of patients were having history of Anti-tuberculosis therapy (ATT) intake.

The majority of patients were having pallor (82%) followed by clubbing (16%).

According to the World Health Organization, normal hemoglobin

levels are considered to be above 12g/dl for individuals above 15 years of age. In the current study, 86% of the cases had anemia. The largest category was of severe anemia (42%) implying an Hgb level below 9g/dl, while 30% had moderate anemia (Hgb level of 9.1 – 10.5 g/dl) and 14% had mild anemia (Hgb level of 10.6 to 12 g/dl).

32(64%) patients showed induration of <5mm on tubercular skin testing, 8(16%) patients showed 5-10mm, 6(12%) patients showed induration of >10 mm and 4(8%) were not applicable for tubercular skin testing.

Respiratory Complications:

The most common respiratory complications in intravenous drug abusers identified in this study were Tuberculosis in 32% of the patients, pneumonia in 24%, septic emboli in 18%, followed by pleural effusion in 10%, hydropneumothorax in 10%, empyema in 8%, pneumatocele in 4%, lung abscess in 4% and pyopneumothorax in 2%.

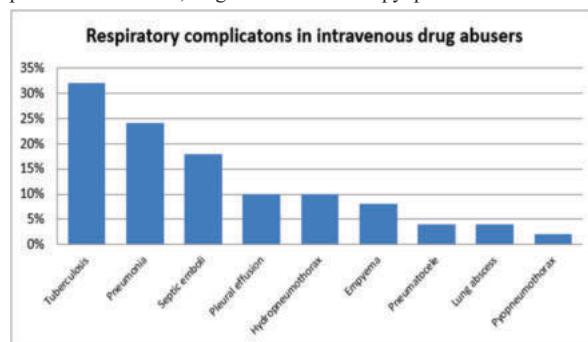


Figure 4- Respiratory Complications In Intravenous Drug Abuse microbiological Profile:

The majority of the patients, i.e., 80% tested negative on sputum smear examination for acid-fast bacillus (AFB) whereas 20% had positive smear results. In CBNAAT testing of sputum samples, "R" sensitive mycobacterium TB (MTB) was detected in the 13 (26%) patients, whereas MTB was not detected in the remaining 37 (74%) patients.

In CBNAAT testing of pleural fluid, out of 13 patients, "R" sensitive MTB was detected in 1 (7.6%) patient.

Bacterial and fungal infections were diagnosed in 28 (56%) patients. The most common organisms isolated from sputum cultures were Klebsiella in 16%, Methicillin Resistant Staphylococcus aureus in 12%, Pseudomonas in 8%, Staphylococcus aureus in 4%. Among the fungal pathogens, Aspergillus was isolated in 6% and Candida albicans in 2% of patients. No growth was obtained in sputum cultures of 22 (44%) patients.

Radiological Characteristics:

Out of the total patients, 70% were having bilateral disease whereas 30% of patients had unilateral disease. The majority of the patients were having consolidation and/or cavitary disease. Consolidation, cavitation, nodules, bronchiectasis were reported in 38(76%), 22(44%), 18(36%) and 14(28%) patients respectively. Other radiological findings were pleural effusion in 13(26%), hydropneumothorax in 5(10%), ground glass opacities in 4(8%), mycetoma in 3(6%), pneumatocele, lung abscess and pneumothorax in 2 (4%) patients each.

DISCUSSION:

Patients often abuse illicit drugs surreptitiously, so the pulmonary complications are often recognized only with careful questioning of the patient and/or use of laboratory testing for the presence of illicit drugs. Complications resulting from intravenous drug misuse affect the lung more frequently than any other organ. The risk of pulmonary infections is increased by virtue of general self neglect, poor nutrition, and the non-sterile technique used both to prepare the fix and to self administer an intravenous injection. [5] Drug misusers are also at risk from an ever widening range of pulmonary complications, not directly related to infection, making it difficult for treating physician to diagnose and manage these patients. This study was conducted with the aim to determine the clinical and radiological profile of respiratory complications in intravenous drug abusers.

Out of the 50 patients taken in this study, the age of patients was in the range of 20 – 49 years, but the majority of patients (50%) belonged to age group of 21-30 yrs. The mean age recorded was 31.58 years which correlates with study done by Shruti H. Mehta [6] in 2013, in which mean age was 33.

In our study, the maximum number of patients were males, i.e. 96%, whereas females constitutes 4% of the total patients. This is in agreement with demographic data of two Egyptian studies, one on 109 addict patients at different departments and ICUs at Abbassia Chest Hospital [7] and the other on 66 addict patients at different departments and ICUs at Ain Shams University Hospitals [8], in which males were 99.1 and 86.45% respectively, females were 0.9 and 13.6%, respectively.

Overall, in our study 50% were heroin abusers, 18% were cocaine abusers, 6% were buprenorphine abusers and 23% were polysubstance abusers. This finding correlates with study by Morineau et al. [9] in which heroin was the most common addictive substance used by drug abusers. However, our study did not correlate with Egyptian thesis on 80 intravenous drug addicts of Abbassia Chest Hospital, which found that heroin-only addicts represented 86.2% of the included addicts, whereas 12.5% were addicted to both cocaine and heroin together and Cocaine-only addiction represented just 1.2%. [10]

In our study, 42% were married, 40% were single, 16% were divorced, 2% were widow. This is in accordance with study done by Imtiaz Ahmad Dogar [12] in which 51% were married.

In this study, majority of the Intravenous drug abusers were labourers (32%), followed by drivers (22%), unemployed (20%), prisoners (8%), farmers (6%). Other occupations included baker, shopkeeper, student 1(2%). This is in agreement to study done by Saeed M. Adel, where 18.3% of patients were unemployed. [13]

Most common symptom was breathlessness in (92)% followed by cough with expectoration in (82%). These results were close to Saeed et al. [7] who concluded that most of their cases (93.6%) presented with cough and 88.1% presented with expectoration. Farrag et al. [10] showed that breathlessness and cough were present in 97.5 and 92.5%, of their patients respectively. Similar results were obtained by Asadi and Marjani [14] who studied patterns of pulmonary infections in 126 intravenous drug users, at Shaheed Beheshti University of Medical Sciences in Tehran and found that breathlessness was present in 73% of patients.

Among the cases included in my study, 56% of patients had hepatitis C virus (HCV) infection, 36% of patients had human immunodeficiency virus (HIV) infection, 18% of patients have other comorbidities like diabetes mellitus, hypertension. This is in accordance with the study done by Samiran Panda [15] in which HIV and HCV infection were 29% and 49%, respectively. Similar results were also seen by Solomon Sunil S [16] in which prevalence of HIV and HCV were 29.8% and 62.1% respectively.

According to the World Health Organization, normal hemoglobin levels are considered to be above 12g/dl for individuals above 15 years of age. In the current study 86% of the cases had anemia. The largest category was of severe anemia (42%) implying an Hgb level below 9g/dl, while 30% had moderate anemia (Hgb level of 9.1 – 10.5 g/dl) and 14% had mild anemia (Hgb level of 10.6 to 12 g/dl). This is in accordance with a study conducted by Imtiaz Ahmad Dogar [12] in which 89% of the cases had anemia.

In our study, respiratory complications in intravenous drug abusers identified were Tuberculosis in 32% of the patients, pneumonia in 24%, septic emboli in 18%, followed by pleural effusion in 10%, hydropneumothorax in 10%, empyema in 8%, pneumatocele in 4%, lung abscess in 4%, pneumothorax in 4% and pyopneumothorax in 2%. This is in accordance with the study by Saeed et al. [11] in which 49% and 51% had cavity and infiltrative patterns respectively. 10% of cases had pleural effusion, 4% had pneumothorax and 3% had lung abscess. Similar results were seen by Saeed et al. [7] who estimated that the prevalence of pulmonary TB in all drug addict cases was 35.8%.

In our study, bacterial and fungal infections were diagnosed in 28(56%) patients. The most common organisms isolated from sputum

cultures were Klebsiella in 16%, Methicillin Resistant Staphylococcus aureus in 12%, Pseudomonas in 8% and Staphylococcus aureus in 4%. Among the fungal pathogens, Aspergillus was isolated in 6% and Candida albicans in another 2% of patients. No growth was obtained in sputum cultures of 22(44%) patients. This is in accordance with a study conducted by Saeed M Adel [13] in which 28.3% had Klebsiella, 13.3% of patients had Pseudomonas, and 3.3% had Staphylococcus aureus on culture.

The majority of the patients, i.e., 80% tested negative on sputum smear examination for acid-fast bacillus (AFB), whereas 20% had positive smear results. In CBNAAT testing of sputum samples, "R" sensitive mycobacterium TB (MTB) was detected in 13 (26%) patients, whereas MTB was not detected in the remaining 37 (74%) patients. This finding of our study does not correlate with any study as very less data is available on sputum smear examination for acid-fast bacillus in intravenous drug abusers.

Out of the total patients, 70% were having bilateral disease and 30% of patients had unilateral disease. The majority of the patients were having consolidation and/or cavity disease. Consolidation, cavitation, nodules, bronchiectasis were reported in 38(76%), 22(44%), 18(36%) and 14(28%) patients, respectively. Other radiological findings were pleural effusion in 13(26%), hydropneumothorax in 5(10%), ground glass opacities in 4(8%), mycetoma in 3(6%), pneumatocele, lung abscess and pneumothorax in 2 (4%) patients each. The Saeed et al. [11], in their study, also found that 49 and 51% had cavity and infiltrative patterns, respectively and minority of cases had pleural effusion (10%), pneumothorax (4%) and lung abscess (3%).

Our study is believed to contribute to identifying the clinical and radiological profile of respiratory complications in intravenous drug abusers, so as to manage these patients.

CONCLUSION:

Intravenous drug abuse can lead to wide range of respiratory complications. This study provide a detailed analysis of clinical and radiological profile of respiratory complications in intravenous drug abusers.

Limitation Of Study:

The clinical and radiological profile of respiratory complications in developing parts of the world has not been studied extensively. This study, as any other studies, has its own limitations that should be noted. The number of patients, nature of the hospital where the study was done, and the duration should be taken into consideration while comparing these results with the results of other studies.

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