ORIGINAL ARTICLE

Various Symptoms and Complications Seen in Critically Ill Adult Substance Use Disorders Patients in Intensive Care Unit of a Tertiary Care Hospital: An Observational Study

Sanjeev K Singla[1], Rakendra Singh[2], Shah Aiman[3], Gurmeet Brar[4]

Received on: 07 September 2022; *Accepted on:* 08 February 2023; *Published on:* 30 June 2023

Abstract

Introduction: Substance use disorders are a common problem all over the world. Substance dependence may be associated with one or more substances at the same time and may include the use of illicit or illegal substances or misuse of legal substances like alcohol, tobacco, and prescription drugs. Common substance use disorders include tobacco products, alcohol, benzodiazepines, opioids, and derivatives. This leads to increased mortality, morbidity, medical interventions, along with hospital stays.

Aim: To find the challenges like delirium, withdrawal, and its complications in adult patients with substance use disorders who are critically ill, posed to the treating staff in the critical care unit.

Materials and methods: A cross-sectional observational study included 110 adult patients of both sexes, aged between 18 and 60 years, who were dependent on substances like tobacco, alcohol, opioids, and benzodiazepines and needed admission to the intensive care unit (ICU); from 15th February to 15th August 2022. Relevant data on adverse events that occurred due to substance withdrawal, any complications from substance use like local or general infection, and any comorbidity were noted. The Confusion Assessment Method for the ICU (CAM-ICU) scale was used to diagnose delirium. A urine toxicology screen was done. The data were collected, tabulated, and statistically analyzed by descriptive-analytical method.

Results: A total of 429 adverse events were noted. The most common adverse event due to substance withdrawal was agitation and delirium (46.39%), followed by inconvenience to other patients in the unit 17.02%, increased requirement of sedation and analgesia (15.11%), increased hospital stay (8.39%), arrhythmias including atrial fibrillation and cardiac myopathy in (4.43%). The younger population was addicted to more than one substance intravenously than the older individuals.

Conclusion: The symptoms and complications seen in substance dependents in the ICU increase the morbidity, mortality, hospital stay, number of interventions, and financial burden on a family. These patients not only harm themselves but also harm the treating staff and damage hospital equipment and also disturb other fellow patients.

Keywords: Critical care unit, Delirium, Substance withdrawal, Withdrawal complications.

Indian Journal of Respiratory Care (2023): 10.5005/jp-journals-11010-1029

Introduction

Common substance use disorders include alcohol, tobacco products, opioids, derivatives, and benzodiazepines. The routes by which these are consumed include oral, intravenous, intramuscular, and sniffing or inhalation. These patients are prone to infectious diseases like human immunodeficiency virus, hepatitis B, C, and D, sepsis, malignancies, pneumonia, immunosuppression, and other critical illnesses depending upon the route of administration.[1] There can be substance withdrawal or overdose symptoms. These symptoms can mimic serious illnesses like sepsis.

Tobacco product use has a dose-related influence on hospital stay, morbidity, and mortality in the ICU. The clinical care of these patients may be complicated by nicotine withdrawal[2] and this may lead to a higher risk of agitation and delirium in these patients.[2,3] Risk of withdrawal symptoms is highest during the 1st week of quitting smoking and may last for 2–4 weeks.[3] Agitation can occur alone or may be associated with delirium in 64% of tobacco users in ICU.[3]

[1]Department of Anesthesiology and Intensive Care, Adesh Institute of Medical Sciences & Research (AIMSR), Bathinda, Punjab, India

[2,3]Department of Medicine, Adesh Institute of Medical Sciences & Research (AIMSR), Bathinda, Punjab, India

[4]Department of Psychiatry, Adesh Institute of Medical Sciences & Research (AIMSR), Bathinda, Punjab, India

Corresponding Author: Sanjeev K Singla, Department of Anesthesiology and Intensive Care, Adesh Institute of Medical Sciences & Research (AIMSR), Bathinda, Punjab, India, Phone: +91 9592261611, e-mail: singla1978@gmail.com

How to cite this article: Singla SK, Singh R, Aiman S, *et al.* Various Symptoms and Complications Seen in Critically Ill Adult Substance Use Disorders Patients in Intensive Care Unit of a Tertiary Care Hospital: An Observational Study. Indian J Respir Care 2023;12(2):118–122.

Source of support: Nil

Conflict of interest: None

Consumption of alcohol is common worldwide. The incidence of delirium due to withdrawal varies from 10 to 60% in patients who consume alcohol.[4] Alcohol withdrawal can lead to delirium tremens. Development of delirium with every passing day is associated with an increased mortality rate of 10% in critically ill.[4]

Opioids and derivatives are other common substances taken orally, by inhalation, or intravenously. The patients who use the intravenous route present with conditions like infection at the injection site, generalized sepsis, deep vein thrombosis, infective endocarditis, septic pulmonary emboli, etc. There is a case series that reported delirium due to opioid withdrawal.[5]

Delirium in benzodiazepine withdrawal is less common, but the administration of benzodiazepines in the ICU commonly leads to delirium and agitation. The management of delirium in the ICU includes treating the underlying disease and environmental factors and avoiding benzodiazepines and other psychoactive medications.[6–8] Occurrences of delirium cause an increase in mechanical ventilation days, hospital-acquired infections, and a higher need for psychotropic agents.[8–10]

Intensive care unit (ICU) delirium is seen in 11–80% of patients.[11] Previous studies have shown that prolonged delirium in ICU itself leads to higher mortality risk.[12] The medical interventions, length of stay in ICU, and mortality are higher in substance use disorders patients.[2,4] ICU delirium can contribute to cognitive dysfunction.[13] These patients frequently get agitated and can harm themselves or their caregivers.

Comorbidities like diabetes and hypertension are commonly seen in critically ill patients; many interventions are needed to treat these.[14] Major challenge is to manage psychiatric complications that are seen due to pharmacological measures.[15]

There are few studies on single substance use and its withdrawal effects in the critically ill.[2,5] The present study is done to find out the withdrawal effects and complications with multiple substance withdrawal in adult patients with substance use disorder and who are critically ill.

The present study was done to find the challenges like delirium, withdrawal, and its complications in adult patients with substance use disorders who are in ICU posed to the treating staff in the critical care unit.

Materials and Methods

This is a cross-sectional observational tudy that is planned in the critical care unit of a tertiary care center from 15th February to 15th August 2022 and was approved by the institutional ethics board (AU/EC/PH/2K22/136) dated 15.2.2022.

The study included adult critically ill patients, 18–60 years of age, who were admitted to the ICU with various illnesses and had substance use disorder. Patients with a head injury, low Glasgow Coma Scale score, electrolyte disturbances, and a history of psychiatric illness were excluded from the study.

The demographic data and comorbid conditions were recorded. Adverse events related to substance withdrawal and complications and all other relevant data were collected by the attending physician and nursing staff. Delirium was diagnosed by the CAM-ICU scale.[16]

Statistical Analysis

Data were collected, tabulated and statistically analyzed using the descriptive-analytical method.

Results

This study included 110 adult patients (male-109, female-1) who had substance dependence on one or more substances. Demographic data are shown in (Table 1).

The substance use is shown in Table 2. Tobacco was the most commonly abused substance, followed by alcohol. Among females, tobacco consumption was noted.

The younger population consumed more than one substance intravenously than the older individuals. The rural population was more addicted to multiple substances than the urban population. Tobacco was more common in urban, alcohol in rural while tobacco plus alcohol consumption was more common in the rural population. Opioid consumption in all forms was more among the less educated. Intravenous substance administration was more common in the rural population. The length of ICU stay was greater in intravenous substance use disorders. Urine screen for substances was positive in 14.54% of patients (Table 3).

A total of 429 adverse events were noted, as shown in Table 4. The most common adverse event due to substance withdrawal was agitation and delirium (46.39%), followed by inconvenience to other patients, as was complained by the patients in the unit (17.02%).

Discussion

Due to hospitalization substance use disorder, patients are prone to withdrawal symptoms, and this can complicate their management. As many of these patients are positive for serology during agitation,

Table 1: Demographic data

Parameter	*N (%)*	*Total n (%)*
Age (years) mean ± standard deviation	52.54 ± 8.34	
Sex		
Male	109 (99.09)	110
Female	1 (0.91)	
Locality		
Rural	70 (63.64)	110
Urban	40 (36.36)	
Education		
Below senior secondary	66 (60)	110
Undergraduate	24 (21.8)	
Postgraduate	20(18.2)	
Comorbidity		
Diabetes	9 (8.18)	14 (12.72)
Hypertension	5 (4.54)	

Table 2: Types of substance use

	N (%)		*Total (out of 110)*
Substance	*Male*	*Female*	*N (%)*
Tobacco (T)	33 (30)	1 (0.90)	34 (30.90)
Alcohol (A)	20 (100)		20
Benzodiazepine (B)	16 (100)		16
Opioids (O)			
Oral	26 (100)		26
Parenteral	14 (100)		14

Table 3: Distribution of combination of agents (substance use) in relation to demographics

	Tobacco (T)		*Opioids (O)*			*Benzodiazepine*				
	(N)	*Alcohol (A)*	*Oral*	*Parenteral*	*Both*	*(B)*	*T + A*	*A + O*	*T + A + O + B*	*Total (n) (%)*
Age (years) Mean ± standard deviation	49 ± 9.12	40.62 ± 7.56	42 ± 9.4	34.1 ± 5.4	36.2 ± 6.12	45.22 ± 11.58	37.16 ± 15.2	44.76 ± 12.2	28.94 ± 9.68	
Locality										
Rural (*n*)	16 (14.54)	10 (9.09)	17 (15.45)	10 (9.09)	5 (4.55)	1 (0.90)	4 (3.63)	3 (2.73)	4 (3.64)	70 (63.64)
Urban (*n*)	13 (11.81)	10 (9.09)	2 (1.82)	4 (3.63)	1 (0.90)	4 (3.63)	6 (5.45)	1 (0.90)	1 (0.90)	40 (36.36)
Education										
Senior secondary or below	28 (25.45)	8 (7.27)	10 (9.09)	4 (3.63)	1 (0.90)	3 (2.73)	5 (4.54)	4 (3.63)	3 (2.73)	66 (60)
Undergraduate	2 (1.81)	4 (3.63)	1 (0.90)	3 (2.73)	2 (1.82)	4 (3.63)	5 (4.54)	1 (0.90)	2 (1.81)	24 (22)
Postgraduate	3 (2.73)	5 (4.54)	1 (0.90)	1 (0.90)	–	2 (1.81)	6 (6.0)	1 (0.90)	1 (0.90)	20 (17)
Duration of stay in ICU (days) mean ± standard deviation	2.1 ± 1.1	4.1 ± 1.8	3 ± 1.1	11 ± 5.2	7 ± 3.2	1.8 ± 0.9	2.8 ± 2.1	2.1 ± 1.4	3.8 ± 2.6	
Urine toxicology screen	–	–	8 (7.27)	2 (1.82)	2 (1.82)	1 (0.90)	–	2 (1.82)	1 (0.90)	16 (14.54)

Table 4: Adverse events due to substance withdrawal, complications of its use seen

Incidence of adverse events	*Total (n) (%)*
Agitation/delirium	199 (46.39)
Requirement of sedation and analgesia	68 (15.85)
Disturbance to other patients in the unit, as complained by patients	73 (17.02)
Increased length of hospital stay due to interventions done	36 (8.39)
Arrhythmias and cardiomyopathy	19 (4.43)
Mortality	4 (0.93)
Sepsis and septic shock due to local or generalized infection due to parenteral substance use	4 (0.93)
Hypotension due to sedatives	4 (0.93)
Invasive mechanical ventilation (due to delirium and pulmonary complications)	3 (0.70)
Accidental fall from bed due to agitation	1 (0.24)
Damage to the monitoring system by pulling the cables	1 (0.24)
Soft tissue infection at the injection site	3 (0.70)
Additional surgical or nonsurgical intervention (debridement)	2 (0.47)
Difficulty in weaning from the ventilator	2 (0.47)
Agitation-induced acute left ventricular failure	3 (0.70)
Deep vein thrombus	2 (0.47)
Upper limb	1 (50)
Lower limb	1 (50)
Infective endocarditis in intravenous substance users	3 (0.70)
Total	429 (100)

staff can get needle stick injuries. Many of the hemodynamic changes like tachycardia, tachypnea, and blood pressure changes may be seen in drug withdrawal or another disease process like sepsis and thus may pose difficulties in resuscitation depending upon the vital signs. There should be high suspicion of substance use disorders in these patients. The sudden abstinence from smoking upon admission to the hospital is a big risk for agitation and delirium.[17] The nicotine patch and chewing gum had been used with varying results to prevent withdrawal symptoms from tobacco.[18]

Mehta et al. found a significantly higher incidence of delirium in mechanically ventilated critical patients with the consumption of alcohol. Mechanical ventilation and hospital stay were longer in these patients.[19] Diagnosis of alcohol consumption in critically ill patients is important because the risk of alcohol withdrawal is higher in patients who consume alcohol chronically. Alcohol use is a risk factor for developing a critical illness, along with longer ICU stays due to complications associated with substance consumption.[20] These patients should be supplemented with thiamine and chlordiazepoxide to prevent withdrawal symptoms from alcohol.

The opioid withdrawal has been managed with oral supplementation of buprenorphine in the hospital and posthospitalization period with varying success. It reduces the withdrawal symptoms in dependent patients.

Around 30% of older individuals develop delirium during hospitalization. This is precipitated by substance withdrawal in the critically ill. Substance use disorder may be missed in the absence of proper history because either the family is unaware or the patient is not in a condition to give a history. Patients with delirium during hospitalization have higher morbidity and mortality.[21,22] In ICU, delirium is the most commonly diagnosed condition with a prevalence of 70–90%.[23,24] The incidence is further increased by substance withdrawal. Frequent meetings with relatives are helpful for the prevention of delirium, but that may not be feasible all the time in ICU. The patient should be shifted to the ward from ICU as soon as possible; exposure to sunlight in conscious patients daily reduces the incidence of delirium.

The application of restraints (mechanical or physical) is a controversial issue in ICU physical, psychological, legal, and ethical issues.[25] Management challenges are due to intoxication and

substance withdrawal in critically ill.[26] Utilization of resources in ICU is higher due to acute and chronic sequelae of substance use disorders.[27] Admissions due to substance use disorders utilize almost 25% of resources in ICU.[28] Patients with substance disorders need a more extended hospital stay and a higher economic burden than hospitalization due to other reasons (4.2 vs 2.8 days).[29] As we found in our study, the duration of hospital stay was higher in intravenous substance use disorders. The most crucial risk for substance use disorders is poor socioeconomic status.[30]

Dexmedetomidine is a recent agent that has selective α2 receptor agonist activity along with anxiolytic sympatholytic, anaesthetic drug sparing, sedative, and opioid-sparing analgesic effects. It is a common drug used for conscious sedation in ICU because it does not lead to respiratory depression.[31–33] A meta-analysis showed that dexmedetomidine significantly decreases delirium, agitation and confusion, reducing ICU stays and mechanical ventilation days as compared to other sedatives.[34] Maximizing efficacy of targeted sedation and reducing neurological dysfunction trial showed that it lowers the incidence and duration of delirium compared to lorazepam.[35] Riker et al. showed a significantly lower risk of delirium in the dexmedetomidine group as compared to the midazolam group.[36] The benzodiazepines use in ICU should be reduced. The use of haloperidol instead of benzodiazepines reduces the risk of delirium.

Limitations

The limitation of this study is that it is difficult to identify patients with hypoactive delirium using this method, so the incidence of delirium may be underestimated. Hyperactive delirium is easily diagnosed. Comorbidity and the primary disease for which the patients were in ICU were not analyzed.

Conclusion

The symptoms and complications seen in substance dependents in ICU increase the morbidity, mortality, hospital stay, number of interventions, and financial burden on a family. These patients not only harm themselves but also harm the treating staff and damage hospital equipment, and also disturb other fellow patients.

References

1. Stein MD. Medical consequences of substance abuse. Psychiatr Clin North Am 1999;22(2):351–370. DOI: 10.1016/s0193-953x(05)70081-2
2. Lucidarme O, Seguin A, Daubin C, et al. Nicotine withdrawal and agitation in ventilated critically ill patients. Crit Care 2010;14(2):R58. DOI: 10.1186/cc8954
3. Van Rompaey B, Elseviers MM, Schuurmans MJ, et al. Risk factors for delirium in intensive care patients: a prospective cohort study. Crit Care 2009;13(3):R77. DOI: 10.1186/cc7892
4. Ely EW, Shintani A, Truman B, et al. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. JAMA 2004;291(14):1753–1762. DOI: 10.1001/jama.291.14.1753
5. Das S, Sah D, Nandi S, et al. Opioid withdrawal presenting as delirium and role of buprenorphine: a case series. Indian J Psychol Med 2017;39(5):665–667. DOI: 10.4103/0253-7176.217027
6. Ely EW, Stephens RK, Jackson JC, et al. Current opinions regarding the importance, diagnosis, and management of delirium in the intensive care unit: a survey of 912 healthcare professionals. Crit Care Med 2004;32(1):106–112. DOI: 10.1097/01.CCM.0000098033.94737.84
7. Patel RP, Gambrell M, Speroff T, et al. Delirium and sedation in the intensive care unit: survey of behaviors and attitudes of 1384 healthcare professionals. Crit Care Med 2009;37(3):825–832. DOI: 10.1097/CCM.0b013e31819b8608
8. Hermus IP, Willems SJ, Bogman AC, et al. "Delirium" is no delirium: on type specifying and drug response. Crit Care Med 2015;43(12):e589. DOI: 10.97/ccm.0000000000001251
9. Dubois MJ, Bergeron N, Dumont M, et al. Delirium in an intensive care unit: a study of risk factors. Intensive Care Med 2001;27(8):1297–1304. DOI: 10.1007/s001340101017
10. Gilbert B, Morales JR, Searcy RJ, et al. Evaluation of neuroleptic utilization in the intensive care unit during transitions of care. J Intensive Care Med 2017;32(2):158–162. DOI: 10.1177/0885066615622424
11. Ouimet S, Kavanagh BP, Gottfried SB, et al. Incidence, risk factors and consequences of ICU delirium. Intensive Care Med 2007;33(1):66–73. DOI: 10.1007/s00134-006-0399-8
12. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders DSM-IV-TR. Chicago: American Psychiatric Association; 2000. pp. 135–47.
13. Girard TD, Jackson JC, Pandharipande PP, et al. Delirium as a predictor of long-term cognitive impairment in survivors of critical illness. Crit Care Med 2010;38(7):1513–1520. DOI: 10.1097/CCM.0b013e3181e47be1
14. Hipp DM, Ely EW. Pharmacological and nonpharmacological management of delirium in critically ill patients. Neurotherapeutics 2012;9(1):158–175. DOI: 10.1007/s13311-011-0102-9
15. Reade MC, Finfer S. Sedation and delirium in the intensive care unit. N Engl J Med 2014;370(5):444–454. DOI: 10.1056/NEJMra1208705
16. Ely EW, Inouye SK, Bernard GR, et al. Delirium in mechanically ventilated patients: validity and reliability of the confusion assessment method for the intensive care unit (CAM-ICU). JAMA 2001;286(21):2703–2710. DOI: 10.1001/jama.286.21.2703
17. Kowalski M, Udy AA, McRobbie HJ, et al. Nicotine replacement therapy for agitation and delirium management in the intensive care unit: a systematic review of the literature. J Intensive Care 2016;4:69. DOI: 10.1186/s40560-016-0184-x
18. Barua RS, Rigotti NA, Benowitz NL, et al. 2018 ACC expert consensus decision pathway on tobacco cessation treatment: a report of the American college of cardiology task force on clinical expert consensus documents. J Am Coll Cardiol 2018;72(25):3332–3365. DOI: 10.1016/j.jacc.2018.10.027
19. Mehta S, Cook D, Devlin JW, et al. Prevalence, risk factors, and outcomes of delirium in mechanically ventilated adults. Crit Care Med 2015;43(3):557–566. DOI: 10.1097/CCM.0000000000000727
20. Mehta AJ. Alcoholism and critical illness: a review. World J Crit Care Med 2016;5(1):27–35. DOI: 10.5492/wjccm.v5.i1.27
21. Francis J. Delirium in older patients. J Am Geriatr Soc 1992;40:829–838. DOI: 10.1111/J1532-5415.1992.tb01859.x.
22. Francis J, Kapoor WN. Prognosis after hospital discharge of older medical patients with delirium. J Am Geriatr Soc 1992;40(6):601–606. DOI: 10.1111/j.1532-5415.1992.tb02111.x
23. Ely EW, Gautam S, Margolin R, et al. The impact of delirium in the intensive care unit on hospital length of stay. Intensive Care Med 2001;27(12):1892–1900. DOI: 10.1007/s00134-001-1132-2
24. Barr J, Fraser GL, Puntillo K, et al. Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit. Crit Care Med 2013;41(1):263–306. DOI: 10.1097/CCM.0b013e3182783b72
25. Hine K. The use of physical restraint in critical care. Nurs Crit Care 2007;12(1):6–11. DOI: 10.1111/j.1478-5153.2006.00197.x
26. Donroe JH, Tetrault JM. Substance use, intoxication, and withdrawal in the critical care setting. Crit Care Clin 2017;33(3):543–558. DOI: 10.1016/j.ccc.2017.03.003
27. Cervellione KL, Shah A, Patel MC, et al. Alcohol and drug abuse resource utilization in the ICU. Subst Abuse 2019;13:1178221819869327. DOI: 10.1177/1178221819869327
28. Westerhausen D, Perkins AJ, Conley J, et al. Burden of substance abuse-related admissions to the medical ICU. Chest 2020;157(1):61–66. DOI: 10.1016/j.chest.2019.08.2180
29. Baldwin WA, Rosenfeld BA, Breslow MJ, et al. Substance abuse-related admissions to adult intensive care. Chest 1993;103(1):21–25. DOI: 10.1378/chest.103.1.21

30. Ramsewak S, Putteeraj M, Somanah J, et al. Exploring substance use disorders and relapse in Mauritian male addicts. Heliyon 2020;6(8):e04731. DOI: 10.1016/j.heliyon.2020.e04731
31. Mantz J, Josserand J, Hamada S, et al. Dexmedetomidine: new insights. Eur J Anaesthesiol 2011;28(1):3–6. DOI: 10.1097/EJA.0b013e32833e266d
32. Bajwa S, Kulshrestha A. Dexmedetomidine: an adjuvant making large inroads into clinical practice. Ann Med Health Sci Res 2013;3(4):475–483. DOI: 10.4103/2141-9248.122044
33. Kemp KM, Henderlight L, Neville M, et al. Precedex: is it the future of cooperative sedation? Nursing 2008;38:7–8. DOI: 10.1097/01.NURSE.0000314838.93173.f2
34. Pasin L, Landoni G, Nardelli P, et al. Dexmedetomidine reduces the risk of delirium, agitation and confusion in critically Ill patients: a meta-analysis of randomized controlled trials. J Cardiothorac Vasc Anesth 2014;28(6):1459–1466. DOI: 10.1053/j.jvca.2014.03.010
35. Pandharipande PP, Pun BT, Herr DL, et al. Effect of sedation with dexmedetomidine vs. lorazepam on acute brain dysfunction in mechanically ventilated patients: the MENDS randomized controlled trial. JAMA 2007;298(2):2644–2653. DOI: 10.1001/jama.298.22.2644
36. Riker RR, Shehabi Y, Bokesch PM, et al. Dexmedetomidine vs. midazolam for sedation of critically ill patients: a randomized trial. JAMA 2009;301(5):489–499. DOI: 10.1001/jama.2009.56