



Published in final edited form as:

J Addict Med. 2021 April 01; 15(2): 155–158. doi:10.1097/ADM.0000000000000725.

Medications for opioid use disorder associated with less against medical advice discharge among persons who inject drugs hospitalized with an invasive infection

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Abstract

Objectives: To identify the incidence, characteristics and factors associated with against medical advice (AMA) discharge among hospitalized patients with opioid use disorder (OUD) and injection related infections (e.g., endocarditis, osteomyelitis, epidural abscesses).

Methods: This retrospective cohort study evaluated adults with OUD admitted to an academic medical center from 1/1/2016-7/1/2019 for an invasive injection related infection. Multivariable logistic regression was used to determine independent factors associated with AMA discharge.

Results: Among 262 adults admitted with serious injection related infections and comorbid OUD, 138 received inpatient medications for opioid use disorder (MOUD). Univariate analysis showed a decreased odds ratio (OR) of AMA discharge when patients received MOUD inpatient (OR 0.55; 95% CI 0.34-0.91.). Adjusting for covariates associated with social determinants of health and other substance use, inpatient receipt of MOUD was associated with a decreased risk of AMA discharge (adjusted OR 0.49; 95% CI 0.028 – 0.84).

Conclusions: Among patients with OUD and serious injection related infections, inpatient initiation of MOUD is associated with decreased risk of AMA discharge.

Keywords

persons who inject drugs; opioid use disorder; endocarditis; osteomyelitis

Introduction:

The United States is facing an opioid-related overdose crisis so severe it may be contributing to the first decline in US life expectancy.¹ Persons who inject opioids are at increased risk of invasive infections, including endocarditis, epidural abscess, septic arthritis, and osteomyelitis. The care of persons who inject drugs (PWID) requires special considerations about treatment and risk mitigation. For example, due to safety concerns, most infectious

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Conflicts of Interest: None

disease specialists recommend that intravenous (IV) antibiotics for injection related infections be completed in an inpatient or other supervised setting.² The result is that hospitalizations for PWID are longer, requiring 4-6 weeks of inpatient care in order to complete IV antibiotic therapy. Persons who inject opioids are at increased risk for leaving the hospital against medical advice (AMA), frequently before completing adequate therapy for their illness.³ AMA discharge, for any condition, has been associated with increased risk for readmission and all-cause mortality.^{4,5}

Despite frequent hospitalizations and high healthcare costs, most hospitalized patients with opioid use disorder (OUD) are not engaged in OUD care prior to discharge.^{6,7} Many patients with OUD find the experience of admission to be traumatic, particularly with regard to undertreatment of pain and increased scrutiny from staff.⁸ With increasing attention focused on improving care for this vulnerable population, integration of medications for opioid use disorder (MOUD) into inpatient care has been recommended.⁹ However, few studies have addressed impact of MOUD initiation on retention in inpatient care. Suzuki et al. recently reported that MOUD use was not associated with a decrease in AMA discharges in persons with injection drug use associated endocarditis.¹⁰ However, the sample size for this study was small and how MOUDs were incorporated into a patient-centered care model was unclear. The objective of this study was to evaluate the impact of initiation of MOUD on AMA discharges among PWID with serious injection related infections.

Methods:

We performed a retrospective chart review of PWID with OUD admitted with invasive bacterial infections between January 2016 and July 2019 to Barnes-Jewish Hospital (BJH), a 1400-bed, academic, tertiary center in St. Louis, Missouri. All patients documented on admission with a concern for injection related infection in the electronic medical record were included in our database. Those who received an infectious diseases (ID) consultation for endocarditis, epidural abscess, septic arthritis, *Staphylococcus aureus* bacteremia and osteomyelitis were identified as previously described.¹¹ Admissions were individually chart reviewed by an author (LRM) and only those with confirmation of opioid related injection drug associated infection were included in this cohort. Two other physicians (NSN and MJD) reviewed 10% of charts at random to assess for data concordance with inclusion criteria. Patient demographics, clinical covariates, and outcomes data were collected.

The primary outcome studied was AMA discharge. Demographic and clinical characteristics were compared for all patients by therapy group using Fisher's exact tests and Mann-Whitney U test for categorical variables and continuous variables, respectively. In the secondary analysis, we used multivariable logistic regression models to explore associations with AMA discharges. We focused on social determinants of health and comorbid non-opioid substance use in the multivariable model. Specific factors were selected based on univariate results, underlying causal structure and our clinical observations as physicians. All tests for significance were performed using SPSS version 25 and were 2-tailed, with $p < 0.05$ considered significant. This study was approved by the Washington University Institutional Review Board.

Results:

Two-hundred and seventy-six unique admissions for PWID with invasive infections were identified during the study period. Fourteen patients died during the initial inpatient encounter and were excluded as the impact of MOUD on AMA discharge could not be assessed. Of the remaining 262 admissions included in the study, 107 patients (40.8%) left AMA during the study period. Baseline characteristics are presented in Table 1. Most patients who received MOUD had an associated addiction medicine consult (84.8%). Of those who received MOUD, 66 (47.8%) received buprenorphine or buprenorphine-naloxone, 56 (40.6%) received methadone, and 16 (11.6%) received a methadone in-hospital taper. Adjusting for social determinants of health and comorbid non-opioid substance use, multivariable analysis identified a significantly lower AMA discharge rate associated with receipt of MOUD (aOR = 0.49; 95% CI 0.28 – 0.84). Uninsured status (aOR = 4.10; 95% CI = 2.22 – 7.58) and female gender (aOR 2.37; 95% CI = 1.34 – 4.20) were also associated with AMA discharge. Housing status was not associated with AMA discharge. Concurrent methamphetamine use, in addition to injection opioid use, was correlated with increased risk of AMA discharge (aOR = 2.06; 95% CI 1.10 – 3.87).

Overall, 64% of AMA discharges were related to opioid withdrawal, with 22% related to social issues (e.g., child-care, potential loss of employment or housing and court appointments) and an additional 10% related to conflicts with staff. The remaining discharges did not have any documentation regarding the reason for AMA discharge. Among patients not prescribed MOUD, 73% of discharges were related to opioid withdrawal or cravings compared to 21% among those prescribed MOUD ($P < 0.001$).

Discussion:

In this retrospective study of 262 patients admitted for invasive injection related infection, receipt of MOUD during inpatient hospitalization was associated with decreased risk of AMA discharge. The most common reason for AMA discharge among PWID with injection related infections was opioid withdrawal or cravings. However, social issues, such as the need for child-care and potential loss of employment or housing, were also significant drivers of AMA discharges.

While our results differed from recent data published by Suzuki et al.,¹⁰ which did not find a significant difference between those receiving MOUD treatment and rate of AMA discharge, we agree that initiation of MOUD represents only one aspect of the comprehensive care needed during an inpatient encounter.¹⁰ An observation in working with this population has been their diverse and often unique social needs. For example, we observed that female gender was associated with increased risk of AMA discharge, often with associated concern of childcare. This represents the frequent disparity of resources and support networks available to those struggling with addiction. Additional studies specifically evaluating the role for and impact of health navigators, case managers, therapist and addiction medicine professionals are needed to identify optimal care pathways for this population.

There are notable trends when comparing the characteristics of those who received inpatient MOUD. Patients with multiple prior admissions for injection related infections and those with Hepatitis C virus infection were much more likely to be treated with inpatient MOUD. This suggests missed opportunities to engage patients earlier in their illness. MOUD initiation has been associated with reduction in risk for acquiring Hepatitis C infection.¹² The delay in prescription of MOUD may be related to biases about addiction severity and lack of education on benefits of MOUDs. Specifically, some providers may not perceive first time admissions to warrant referral for addiction services. Alternatively, patients may be less likely to engage in addiction treatment prior to recurrent and obvious complications.

Limitations of this study include its single center retrospective design; our data may not be generalizable to other institutions. Substance use patterns vary widely across different geographic areas.¹³ It was notable that in this cohort, concurrent use of methamphetamines was associated with AMA discharge. Data on patients offered MOUD but who declined treatment may not be captured in the chart review.

Conclusions:

Our study suggests that MOUDs decrease AMA discharge. We recommended larger, multicenter and possibly randomized-controlled trials to further investigate this question. Based on available evidence, we believe physicians should consider initiation of MOUD as part of a comprehensive approach to caring for persons with injection opioid related infections.

Acknowledgments

Funding Sources: This work was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under grant numbers [KL2TR002346, and T32AI007172]. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

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Table 1.

Baseline demographics and univariate analysis of predictors of discharge against medical advice stratified by receipt of medications for opioid use disorder.

	Baseline characteristics		
	Inpatient MOUD N=138	No MOUD N=124	P value
Demographics			
Age (mean, SD)	38±9	41±12	0.040
Female	83 (60.1%)	51 (41.1%)	0.002
African American	58 (42.0%)	49 (39.5%)	0.261
Unstable Housing	23 (16.7%)	15 (12.1%)	0.294
Uninsured	36 (26.1%)	43 (34.7%)	0.140
Received Addiction Med Consult	117 (84.8%)	13 (10.5%)	<.001
Substance Use Patterns			
Prior IDU-related infections	109 (79.0%)	67 (54.0%)	<.001
Opioid Use (fentanyl or heroin) without other substances	72 (52.2%)	71 (57.2%)	0.409
Opioids + Methamphetamines	30 (21.7%)	33 (26.6%)	0.357
Opioids + Cocaine	42 (30.4%)	25 (20.2%)	0.570
Opioids + Benzodiazepines	0 (0%)	3 (2.4%)	0.066
Comorbidities			
Hypertension	14 (10.1%)	17 (13.7%)	0.372
Diabetes Mellitus	6 (4.3%)	12 (9.7%)	0.089
Psychiatric comorbidity	12 (8.7%)	18 (14.5%)	0.140
Hepatitis C infection	111 (80.4%)	63 (50.8%)	<.001
HIV infection	7 (5.1%)	5 (4.0%)	0.688
Type of Serious Injection Related Infection			
Infective endocarditis	88 (63.8%)	65 (52.4%)	0.063
Osteomyelitis	49 (35.5%)	37 (29.8%)	0.329
Septic Arthritis	20 (15.5%)	25 (20.2%)	0.225
Epidural Abscess	15 (11.1%)	15 (12.1%)	0.755
Isolated Bacteremia	6 (4.3%)	8 (6.5%)	0.450
<i>Staphylococcus aureus</i> infection	94 (68.1%)	79 (63.7%)	0.452
Outcomes			
AMA Discharge	47 (34.1%)	60 (48.4%)	0.018
Number of Days left in hospitalization if leaving AMA (Mean, SD)	11±14	18±17	0.001
Average Length of Stay (Mean, SD)	30±12	25±13	0.029

Table 2:

Univariate and multivariable analyses for risk of AMA discharge

	Univariate analysis		Multivariable Logistic Regression Model	
	OR (95% CI) for AMA discharge	P value	aOR (95% CI) for AMA discharge	P value
Received MOUD	0.55 (0.34 – 0.91)	0.013	0.49 (0.028 – 0.84)	0.009
Female	1.69 (1.03 – 2.79)	0.038	2.37 (1.34– 4.20)	0.003
Unstable Housing	0.85 (0.54 – 1.32)	0.489	1.39 (0.62 – 3.12)	0.422
Uninsured	3.93 (2.17 – 7.13)	0.001	4.10 (2.22 - 7.58)	<.001
Opioid Use (fentanyl or heroin) without other substances	0.54 (0.34 – 0.87)	0.013	0.837 (0.173 – 4.062)	0.825
Opioids + Methamphetamines	1.86 (1.05 – 3.29)	0.0337	1.83 (0.99 – 3.41)	0.056
Opioids + Cocaine	1.35 (0.77 – 2.36)	0.2955	1.38 (0.73 – 2.59)	0.324

OR – Odds Ratio; aOR – Adjusted Odds Ratio; adjusted for receipt of MOUD, health insurance status, homelessness, gender, and substance use patterns.