Infective Endocarditis and Medication Assisted Treatment in Opioid Use Disorder

Poster # 707

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Background

- The opioid epidemic and its associated complications are on the rise, including injection drug use-associated infective endocarditis (IDU-IE).¹
- IE is often associated with prolonged hospital stays due to its associated complications, as well as the inherent duration and route of treatment. Those with opioid use disorder-associated IE (OUD-IE, a major subset of IDU-IE) often experience withdrawal in the hospital, putting them at risk of leaving prior to completion of IE treatment.
- Our study examined the role of inpatient initiation of medication assisted treatment (MAT) with buprenorphine or methadone for treatment of opioid withdrawal and opioid use disorder in those with IE.
- We hypothesized that patients with OUD-IE who were initiated on MAT would be more likely to adhere to IE treatment and less likely to leave against medical advice compared to those were not initiated on MAT.

Figure 1			
Prolonged Hospital Stays	Withdrawal	Risk of leaving AMA	Morbidity & Mortality
Current IDSA guidelines recommend 2- 6 weeks of intravenous antimicrobial treatment	Those with opioid use disorder IE (OUD-IE) are at risk of opiate withdrawal	Withdrawal puts them at risk of leaving prior to completion of treatment	Untreated IE is almost universally fatal

- Retrospective chart review conducted at the Los Angeles County-University of Southern California Medical Center (LAC+USC), a 600-bed public teaching hospital.
- Participants included adults with OUD-IE admissions between 10/2015 09/2019. Vizient clinical database was used to identify as admissions associated with OUD-IE using ICD-9-CM and ICD-10-CM codes and were confirmed with manual chart review of electronic medical records (EMR).
- We assessed group differences on two outcomes; 1) adherence to IE treatment, defined as completion of treatment while inpatient or transferred to a recuperative care or acute care facility for completion of treatment, and 2) leaving against medical advice prior to completion of treatment for infective endocarditis.
- Chi-square and t tests examined differences between the groups. Odds ratios (OR) with 95% confidence intervals (CI) evaluated the influence of MAT on targeted outcomes.

Adr	nission for infective and opioid use (n	endocarditis =518)
		Excluded (n=429) no evidence of opiate use and/or did not meet Modified Duke Criteria for IE
	89 unique admiss among 49 patier	ions nts
		Excluded (n=8) intubated throughout admission and died
Yes	МАТ	No
 Received inpatient MAT Evaluable admissions (n=18) among 15 patients 		 Did not receive inpatient MAT Evaluable admissions (n=63) among 26 patients

References

1. Fleischauer AT, Ruhl L, Rhea S, Barnes E. Hospitalizations for Endocarditis and Associated Health Care Costs Among Persons with Diagnosed Drug Dependence - North Carolina, 2010-2015. MMWR Morb Mortal Wkly Rep 2017;66(22):569-73 doi: 10.15585/mmwr.mm6622a1[published Online First: Epub Date]| 2. Larochelle MR, Bernson D, Land T, et al. Medication for Opioid Use Disorder After Nonfatal Opioid Overdose and Association With Mortality: A Cohort Study. Ann Intern Med 2018;169(3):137-45 doi: 10.7326/M17-3107[published Online First: Epub Date]].

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Study Design

Variab Adhe Yes No Left A death Yes No

AMA – Ag • **M** sig

lea

Results						
Table 1:	Demographic a	and Clinical Cha	racteristics		Table 2: Endocarditis Charact	teristics
	Inpatient MAT n=15	No Inpatient MAT n=2	6		Variable	No./Total (%)
<u>Variable</u> Age, mean (SD)	<u>No./Total (%)</u> 47 (15.3)	<u>No./Total (%)</u> 39 (13.6)	<u>p-value*</u> 0.08		Modified Duke Criteria Microorganism in vegetation Pathologic lesion	3/49 (6)
Sex Male Female	12/15 (80) 3/15 (20)	19/26 (73) 7/26 (27)	0.62		Blood cultures positive for infective endocarditis Predisposing heart conditions or injection drug use	$ \begin{array}{c} 6/49 (12) \\ 45/49 (92) \\ 49/49 (100) \\ 26/40 (74) \end{array} $
Race White Black Other/Unknown	3/15 (20) 2/15 (13) 10/15 (67)	6/26 (23) 7/26 (27) 13/26 (50)			Vascular phenomenon Immunologic phenomenon Microbiological evidence	36/49 (74) 16/49 (33) 1/49 (2) 0/49 (0)
Ethnicity Hispanic or Latin Not Hispanic or I	o 5/15 (33) Latino 10/15 (67)	3/26 (12) 23/26 (88)	0.09		Definite Possible	41/49 (84) 8/49 (16)
Hepatitis C Status Positive Negative or Unkn	14/15 (93) 1/15 (7)	23/26 (88) 3/26 (12)	0.61		Vegetation seen on TTE Yes No	28/49 (57) 21/49 (43)
Homelessness Yes No Other substance us	8/15 (53) 7/15 (47) e	23/26 (88) 3/26 (12)	0.01		Vegetations seen on TEE Yes No Not complete	13/49 (27) 5/49 (10) 31/49 (63)
Methamphetamin Yes No/unknown Cocaine Yes	nes 10/15 (67) 5/15 (33) 5/15 (33)	17/26 (65) 9/26 (35) 5/26 (19)	0.93 0.31		Valve involved (if known) Tricuspid Pulmonic Mitral Aortic	18/35 (51) 1/35 (3) 10/35 (29) 10/35 (29)
No/unknown Phencyclidine Yes No/unknown	10/15 (67) 2/15 (13) 13/15 (87)	21/26 (81) 2/26 (8) 24/26 (92)	0.56		Organism Methicillin-sensitive Staphylococcus aureus Methicillin-resistant Staphylococcus aureus Coagulase-negative staphylococci Viridians group streptococci Streptococci (non-viridians group)	10/49 (20) 18/49 (16) 4/49 (8) 13/49 (27) 4/49 (8)
SD - standard deviation. MAT - Medication assisted treatment. * Chi-squared used for categorical variables and t-test for means † Documented hepatitis C antibody positive or reported history of infection 3/49 (6) Culture negative						
ble 3: Outcomes among 81 unique hospital admissions involving 41 unique patients Infective Endocarditis Complication 4/49 (8) Spinel Enidurel Absense 5/40 (10)						
	Inpatient MAT N=18 admissions	No Inpatient MAT PVa N=63 admissions	alue OR (95% C	CI)	Brain Abscess Sentic Pulmonary Emboli	2/49(4) 17/49(35)
o <u>le</u> ed to treatment	<u>No./Total (%)</u> 14/18 (78) 4/18 (22)	<u>No./Total (%)</u> 21/63 (33) 42/63 (67)	< 0.001 7.0 (2.05	5, 23.91)	Septic Fullionary Embor Stroke Splenic Infarction Septic Shock Denal Informat	3/49 (6) 3/49 (6) 13/49 (27) 2/40 (4)
MA (excluding 3)	4/18 (22) 14/18 (78)	39/60 (65) 21/60 (35)	0.001 6.5 (1.9,	, 22.27)	Heart Failure Cardiac Abscess Cardiac Conduction Abnormality	2/49(4) 7/49(14) 3/49(6) 6/49(12)
ainst Medical Advice AT with buprenorphine or methadone was associated with a gnificant increase in adherence to treatment and decrease in tring AMA in those with OUD-IE. TE – transtoracic echocardiogram. TEE – Transesonhageal echocardiogram.						

Results						
Table 1:	Demographic a	nd Clinical C	haracteristics		Table 2: Endocarditis Charac	teristics
	Inpatient MAT n=15	No Inpatient MAT	n=26		Variable	No./Total (%)
Variabla	$\frac{1-13}{N_0 / T_0 t_0 l (0/c)}$	No /Total (%)	\mathbf{n} volue*	7	Modified Duke Criteria	
<u>Variable</u>	$\frac{10.7101a1(70)}{17(15.3)}$	$\frac{100.7101a1(\%)}{30(13.6)}$	$\frac{p-value^{n}}{0.08}$	1	Microorganism in vegetation	3/49 (6)
Age, mean (SD) Sex	47 (13.3)	59 (15.0)	0.08		Pathologic lesion	6/49 (12)
Male	12/15 (80)	19/26 (73)	0.62		Blood cultures positive for infective endocarditis	45/49 (92)
Female	3/15(20)	7/2.6 (27)	0.02		Predisposing heart conditions or injection drug use	49/49 (100)
		(27)			Fever	36/49 (74)
Kace White	2/15(20)	(2)(2)			Vascular phenomenon	16/49 (33)
W IIIte Plaak	3/15(20) 2/15(12)	0/20(23)			Immunologic phenomenon	1/49 (2)
	2/13(13)	1/20(27)			Microbiological evidence	0/49 (0)
Otner/Unknown	10/15 (67)	13/26 (50)				
Ethnicity					Definite	41/49 (84)
Hispanic or Latin	10 5/15 (33)	3/26 (12)	0.09		Possible	8/49 (16)
Not Hispanic or I	Latino 10/15 (67)	23/26 (88)				
Hepatitis C Status [†]					Vegetation seen on TTE	
Positive	14/15 (93)	23/26 (88)			Ves	28/49 (57)
Negative or Unkn	iown 1/15 (7)	3/26 (12)	0.61		No	20/49(37) 21/49(43)
Homelessness						
Ves	8/15 (53)	23/26 (88)	0.01		vegetations seen on TEE	12/40 (27)
No	7/15 (47)	3/26 (12)	0.01		Yes	13/49(27)
Other archeter ee ve	//15 (17)	5/20 (12)				5/49 (10)
Other substance us	e				Not complete	31/49 (63)
Nietnampnetamir	10/15 ((7)	17/26 ((5)	0.02		Valve involved (if known)	
Yes	10/15(67)	1/20(03)	0.93		Tricuspid	18/35 (51)
No/unknown	5/15 (33)	9/26 (35)			Pulmonic	1/35 (3)
Cocaine			0.21		Mitral	10/35 (29)
Yes	5/15(33)	5/26 (19)	0.31		Aortic	10/35 (29)
INO/UNKNOWN	10/15 (67)	21/20 (81)			Organism	
Phencychaine	2/15(12)	2/2	0.50		Methicillin-sensitive Staphylococcus aureus	10/49 (20)
Yes No /um lum ourum	2/15(13)	2/20(8)	0.56		Methicillin-resistant Staphylococcus aureus	18/49 (16)
INO/UIIKIIOWI	13/13 (87)	24/20 (92)			Coagulase-negative staphylococci	4/49 (8)
					Viridians group streptococci	13/49 (27)
					Streptococci (non-viridians group)	4/49 (8)
					Enterococci	2/49 (4)
SD – standard deviation. MA * Chi-squared used for categ	T – Medication assisted treatment. orical variables and t-test for means				Finegoldia magna	1/49 (2)
+ Documented hepatitis C an	tibody positive or reported history of in	fection			Culture negative	3/49 (6)
ole 3: Outcon	nes among 81 un	ique hospital a	dmissions involvi	ng 41	Infective Endocarditis Complication	
	uniqu	e patients			Septic Arthritis	4/49 (8)
	Inpatient MAT N=18	No Inpatient MAT	P Value OR (95% C	CI)	Spinal Epidural Abscess	5/49 (10)
	admissions	N=63 admissions			Brain Abscess	2/49 (4)
le	No./Total (%)	No./Total (%)			Septic Pulmonary Emboli	17/49 (35)
ed to treatment					Stroke	3/49 (6)
	14/18 (78)	21/63 (33)	< 0.001 7.0 (2.05	, 23.91)	Splenic Infarction	3/49 (6)
	4/18 (22)	42/63 (67)			Septic Shock	13/49 (27)
MA (excluding 3					Renal Infarct	2/49 (4)
					Heart Failure	7/49 (14)
	4/18 (22)	39/60 (65)	0.001 6.5 (1.9,	22.27)	Cardiac Abscess	3/49 (6)
	14/18 (78)	21/60 (35)			Cardiac Conduction Abnormality	6/49 (12)
ainst Medical Advice						
			• · · • • · •		Cardiac valvular Surgery	10/49 (20)
A'I' with bup	orenorphine or r	nethadone wa	s associated with		Inpatient Death	11/49 (22)
nificant inc	rease in adherer	ce to treatme	nt and decrease	in		
	n these					
	II UIUSE WILL UL			Т	TE – transthoracic echocardiogram. TEE – Transesophageal echocardiogram.	

Conclusions

• Our findings demonstrate that inpatient initiation of MAT with buprenorphine or methadone is associated with improved adherence to treatment of infective endocarditis in patients with OUD-IE.

• Despite this, the majority of individuals with OUD-IE in our study did not receive inpatient MAT, which demonstrates a significant need for improvement. This is consistent with national studies that show the majority of individuals discharged from hospitals are not started on MAT for OUD even after hospitalizations for opioid overdose.²

• Devising institutional screening tools for OUD and withdrawal, as well ensuring prescribing capabilities for inpatient MAT with methadone or buprenorphine, would likely improve outcomes in those with IE-OUD.

• Limitations of our study include its retrospective study design, small sample size, and completion at a single-center urban public hospital which may limit its generalizability to other patient populations.

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