

# Troponin: A Predictor of Mortality in Methadone Exposure - An Observational Prospective Study

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# Background

- Methadone poisoning/overdose is an international public health problem
- Major risks of deaths:
  - Age
  - Respiratory depression
  - *Cardiotoxicity*, effect on QT interval prolongation/torsades de pointes arrhythmia

# Coincident/Aim

- Methadone-poisoned patients had elevated high-sensitivity troponin I (hsTnI) levels without any evidence of myocardial infarction or ischemia on their electrocardiograms (ECGs)
- To determine if there is abnormal cardiac troponin in methadone poisoning/exposure
- To assess if troponin levels predicted need for intubation/ICU admission and mortality in methadone-poisoned patients.

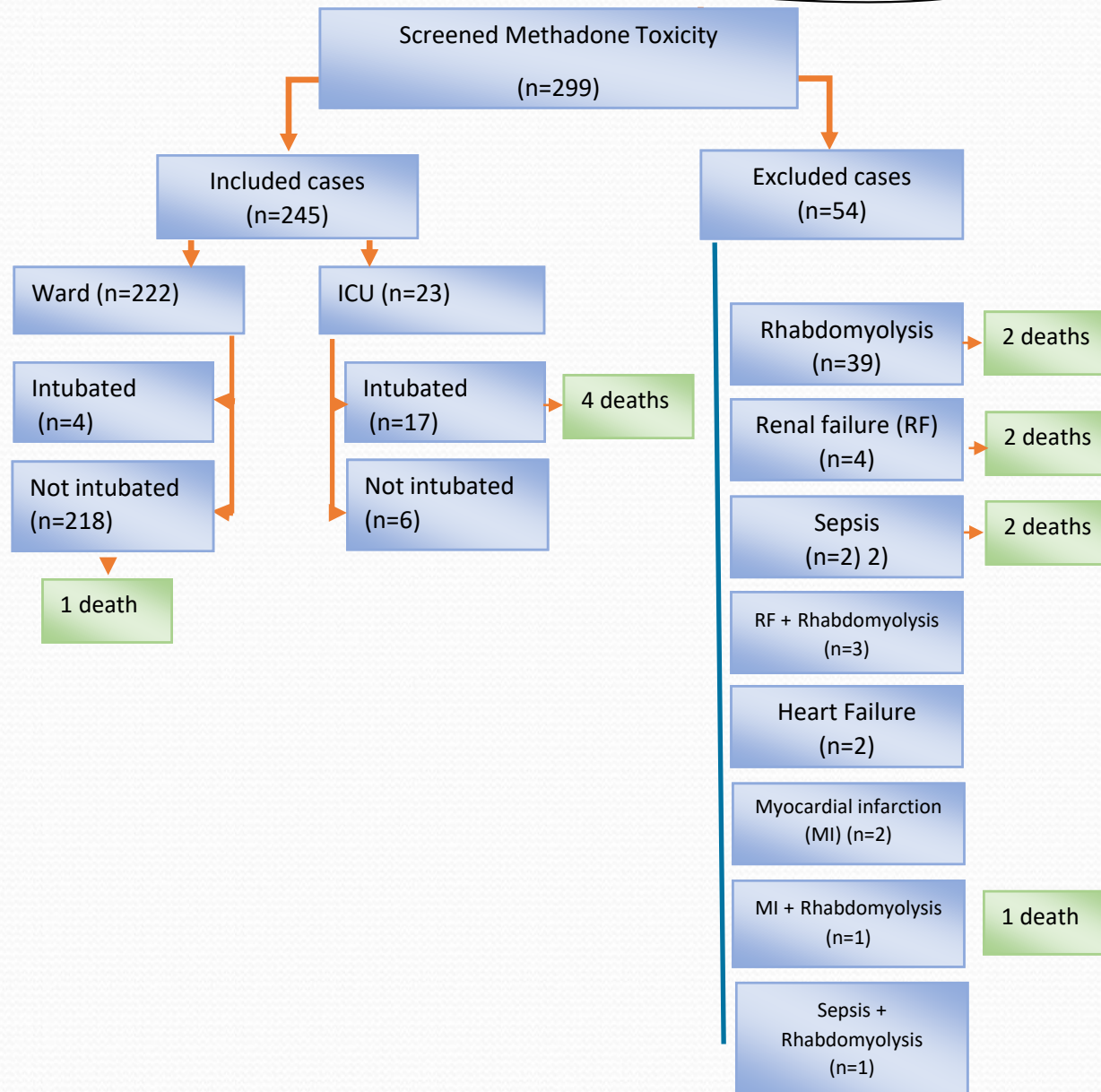
# Study Design and population

- An observational prospective single-center study
- Patients >14 years of age presenting to our toxicology ED at Loghman-Hakim Hospital (Tehran, Iran)
- June 2018 - February 2019 with a diagnosis of single-drug exposure of methadone
- Exclusion:
  - Positive urine drug screen test for other substances
  - Medical condition that was known to cause elevated hsTnI
  - Presentation of acute chest pain and significant ischemic ST-T
  - Ejection fraction <% 45 and significant regional wall motion abnormality with positive troponin

# Procedures

- Urine drug screening
- ECG
- hsTnI and CPK levels for every patient in ED
- A second hsTnI measurement and ECG six hours post admission if the patient had initial high levels of hsTnI
- The recommended cut-off for the diagnosis of MI, has been defined at 0.019 ng/mL. Any hsTnI levels within the range of 0.019 – 0.1 were defined as borderline and values of >0.1 as positive.

# Patient's algorithm (n=299)



# Outcomes in excluded and included patients based on troponin (hsTnI) level

	hsTnI cut-off n (%)	Rhabdomyoly sis n (%)	Long QT n (%)	ICU admission n (%)	Intubation n (%)	Mortality n (%)
<b>Excluded patients (n=54)</b>						
>0.1 ng/mL	32 (59)	22 (50)	4 (100)	14 (82)	13 (87)	6 (86)
0.019-0.1 ng/mL	12 (22)	12 (27)	0	2 (12)	2 (13)	1 (14)
< 0.019 ng/mL	10 (19)	10 (23)	0	1 (6)	0	0
p-value		0.015	0.227	0.061	0.027	0.264
Cramer's V		0.395	0.235	0.322	0.366	0.222
<b>Included patients (n=245)</b>						
>0.1 ng/mL	19 (8)	0	1 (17)	14 (61)	3 (14)	2 (40)
0.019-0.1 ng/mL	41 (17)	0	1 (17)	6 (26)	6 (29)	2 (40)
< 0.019 ng/mL	185 (76)	0	4 (66)	3 (13)	12 (57)	1 (20)
p-value		-	0.707	0.227	0.122	0.005
Cramer's V		-	0.053	0.111	0.131	0.208
<b>Excluded (n=54) vs. included patients (n=245)</b>						
p-value	< 0.001	< 0.001	0.085	< 0.001	< 0.001	< 0.001
Cramer's V	0.552	0.885	0.106	0.250	0.227	0.214
OR (95% CI)	-	-	0.9, 11.8	4.4 (2.2, 9.1)	4.1 (2.0, 8.7)	7.2 (2.2, 23.6)
<b>All patients (n=299)</b>						
>0.1 ng/mL	51 (17)	22 (50)	5 (50)	17 (42)	16 (44)	8 (67)
0.019-0.1 ng/mL	53 (18)	12 (27)	1 (10)	8 (20)	8 (22)	3 (25)
< 0.019 ng/mL	195 (76)	10 (23)	4 (40)	15 (38)	12 (33)	1 (8)
p-value		< 0.001	0.019	< 0.001	< 0.001	< 0.001
Cramer's V		0.408	0.163	0.278	0.288	0.287

## Selected outcomes among troponin cut-off of 0.0365 ng/mL (n=245)

	Troponin cut-off >0.0365 ng/mL		P value	OR	95% CI
	Yes (%)	No (%)			
<b>Mortality</b>	4 (80%)	1 (20%)	0.002	23.4	2.5 – 215.8
<b>ICU admission</b>	6 (26%)	17(74%)	0.161	2.0	0.7 – 5.5
<b>Intubation</b>	6 (29%)	15(79%)	0.097	2.3	0.8 – 6.4
<b>ST abnormality</b>	1 (100%)	0 (0 %)	0.160	0.9	0.9-1.0
<b>QTc prolongation</b>	1 (17%)	5 (83%)	0.999	1.1	0.1- 9.3



# Discussion

- Cardiac troponins are specific biomarkers of myocardial injury
- Methadone poisoning/exposure may cause cardiac injury
- Myocardial damage may play a role in methadone poisoning due to myocarditis
- These results may help physicians to identify high-risk patients in the ED and provide them with appropriate intensive care

# Suggestions

- Monitoring/ICU admission of high-risk patients
- Avoiding early discharge
- Cardiovascular magnetic resonance imaging should be available to diagnose possible myocarditis cases
- Establishing multi-center studies
- Longitudinal designs on MMT clients to see if this is cardiotoxic effect of chronic methadone use or it is an acute effect in methadone poisoning

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