

The Effect of QTc Prolongation in the Management of Medications for Opioid Use Disorder in Medical Inpatients



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BACKGROUND

Consultation-Liaison (CL) psychiatrists frequently provide consultation for patients receiving medications for Opioid Use Disorder (MOUD), including methadone or buprenorphine, and who have complex cardiopulmonary disease with prolonged QTc interval. The increased prevalence of fentanyl and other high potency synthetic opioids sometimes necessitates higher doses of methadone to suppress cravings. However, methadone has a dose dependent association with QT prolongation, increasing the risk for Torsades de Pointes (TdP), a potentially fatal cardiac arrhythmia.

To assess the risk of QTc prolongation and TdP, the literature suggests relying on EKG parameters or correction methods not routinely available on automated EKG interpretations (Beach et al., 2018). For example, the Bazett formula (QTc(b)), typically used on automatic EKG interpretations, may overestimate the QTc(b) at higher heart rates. It also does not account for conditions that widen QRS but do not actually increase risk of TdP (Funk et al., 2021).

PURPOSE & OBJECTIVES

1. To examine patterns of MOUD prescribing and correlation with QTc prolongation.
2. To identify quality improvement (QI) targets for programmatic change.

METHODS

This study included a retrospective chart review of patients receiving MOUD from August 1, 2023, to March 15, 2024. The integrated EPIC reporting tool was queried to identify patients prescribed "Opioid Use Disorder Maintenance" from existing EPIC MED GROUP grouper. This grouper included inpatients hospitalized during the study period with at least one order for either methadone, buprenorphine, or both. After patient charts were identified using the reporting tool, we narrowed the cohort using the following inclusion and exclusion criteria:

Inclusion Criteria	Exclusion Criteria
<ul style="list-style-type: none"> Adults ages 18-120 Medical inpatient EKG in the chart from the study period 	<ul style="list-style-type: none"> Outpatients Emergency department only encounters Psychiatric inpatients Children (ages <18 years)

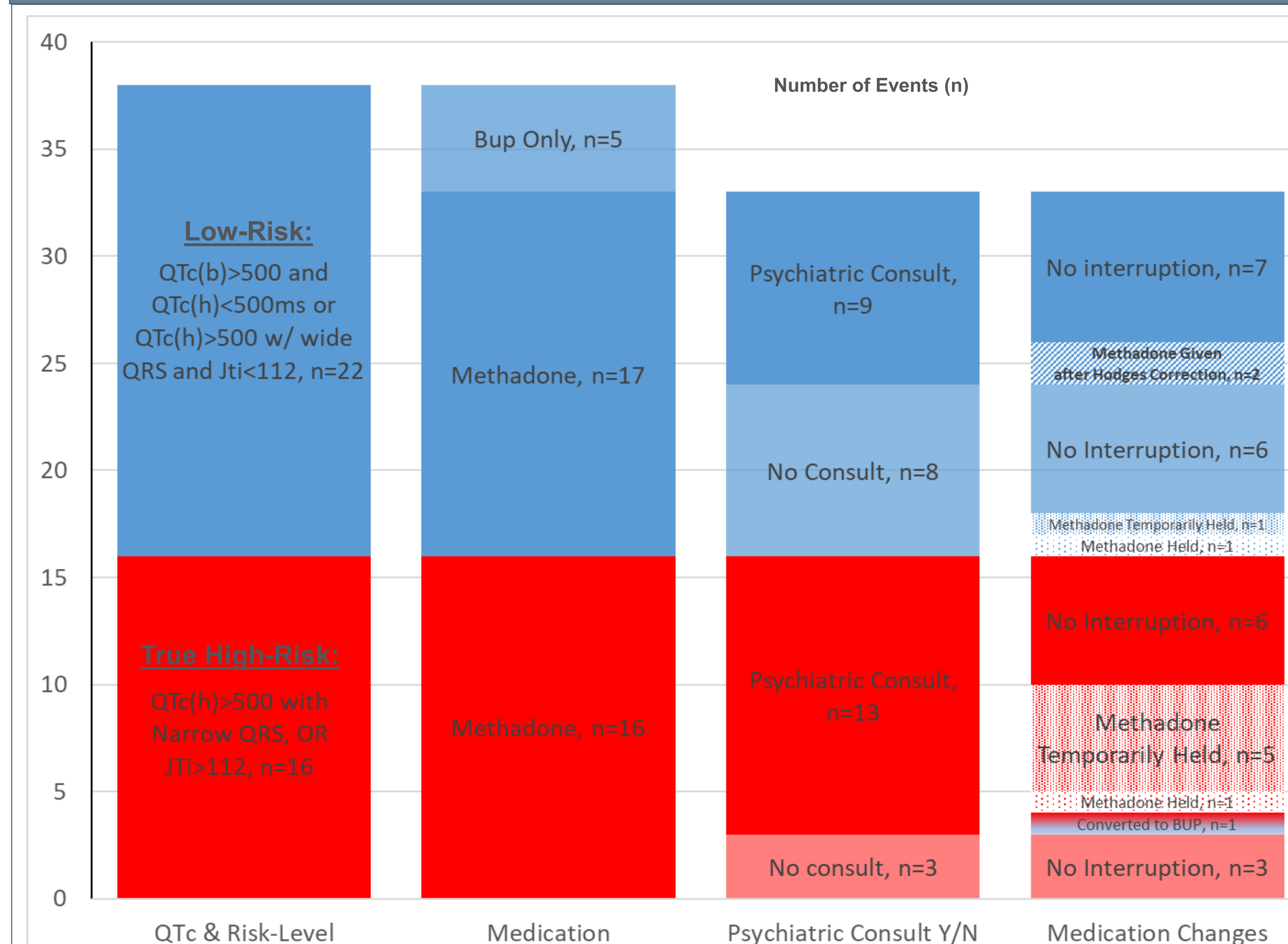
Patient variables (age; sex; DX of OUD or Pain), EKG parameters from the automated read, and Medication variable (medication name, dose, treatment interruptions or management strategy) were also collected. If more than one EKG was available, the one with the longest QT was chosen for inclusion.

According to expert recommendations (Beach et al., 2018; Funk et al., 2021), we used an alternative QTc correction formula and adjusted for wide QRS, if present, to more accurately assess the risk of TdP. For each EKG, QTc was calculated using the Hodges correction method (QTc(h)) followed by a JT index (JTI) calculation to account for QRS >110ms, if present. Based on these variables, we then created QTc Risk Levels for data analysis.

TABLE 1: Results Summary

Category	MOUD Order (n)	Total (%)	Prolonged QTc(h/b) (n)	Total (%)	True High-Risk: QTc(h/b) & (QRS < 110ms OR JT>112) (n)	Total (%)
Total Orders w/ EKG	204	100.0%	38	100.0%	16	100%
Female	59	28.9%	9	23.7%	3	18.8%
Age > 60	78	39.2%	13	34.2%	5	31.3%
Methadone Given (average dose) (70.7mg)	150	73.5%	32 (62.2mg)	84.2%	16 (60.9mg)	100%
Buprenorphine Given	60	29.9%	9	23.7%	2	12.5%
Both Given	14	6.9%	5	13.2%	2	12.5%
None Given	8	3.9%	1	2.6%	0	0%
Psychiatry Consultation	na	na	24	63%	13	81.3%
OUD Dx	na	na	31	81.6%	16	100%
Pain Dx	na	na	7	18.4%	0	0%
Enrolled in MMTP	na	na	22	58%	13	81.3%
Prolonged QTc(b) or (h)	38	18.6%	38	100%	16	100%
True High-Risk	16	7.8%	16	42.1%	16	100%

FIGURE 1: MOUD ORDER EVENTS w/ PROLONGED QTc(b) or (h)



KEY RESULTS

- The overall prevalence of QTc prolongation in this patient population was 18.6%. Of these, 42.1% were classified as true high-risk after correction methods utilized, indicating a substantial proportion of patients with potentially dangerous QTc prolongation.
- While 30.4% of patients were female, they accounted for only 18.8% of true high-risk cases.
- In low-risk cases with QTc(b)>500ms: psychiatric consultation led to 2 of 9 patients having methadone restored after recommendation of Hodges correction, while in 2 of 8 patients without consultation had methadone held at least temporarily.
- In true high-risk cases: consultation led to methadone being held in 7 of 13 patients. In 5 of these patients, methadone was restored after QTc normalized or a risk-risk discussion, 1 patient was converted to buprenorphine, and 1 patient was managed with hydromorphone

LIMITATIONS & FUTURE DIRECTIONS

- Limitations: Small sample size; incomplete analysis of methadone dose; case/episode-based analysis vs. patient-based (patient could be counted more than once); unknown underlying medical co-morbidities & hospital admission reason; prevalence of TdP or adverse cardiac event not recorded.
- Future Directions: Statistical analysis; methadone dose dependency, medical comorbidities (i.e. endocarditis).

CONCLUSION

- A substantial proportion of patients in this sample experienced potentially dangerous QTc prolongation, even after additional QTc correction methods were utilized. Careful risk-benefit assessment is important to weighing risk of TdP vs risk of changing MOUD.
- Risk factors for QTc prolongation included male sex, methadone use, OUD Dx, & MMTP enrollment.
- This study suggests a need for cardiac monitoring, QTc correction, & Psychiatric Consultation in patients receiving methadone.

REFERENCES

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2. Funk MC, Cates KW, Rajagopalan A, Lane CE, Lou J. Assessment of QTc and Risk of Torsades de Pointes in Ventricular Conduction Delay and Pacing: A Review of the Literature and Call to Action. *J Acad Consult Liaison Psychiatry*. 2021 Sep-Oct;62(5):501-510. doi: 10.1016/j.jaclp.2021.02.003. Epub 2021 Feb 13.