

QTc Interpretation in Methadone-Treated Patients with LBBB: A Multidisciplinary Approach to Psychopharmacologic Decision-Making

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Introduction

Methadone is widely used for chronic pain and opioid use disorder but is associated with **dose-dependent QT interval prolongation and torsades de pointes risk**, particularly at higher doses especially when combined with other QT-prolonging medications.

Psychiatric patients receiving methadone frequently require pharmacologic treatment for **depression or anxiety**, creating a clinical dilemma when electrocardiograms demonstrate prolonged QTc intervals.

Interpretation becomes especially complex in patients with **conduction abnormalities such as left bundle branch block (LBBB)**, where QRS widening can **artificially prolong QTc values and overestimate arrhythmic risk**. Overreliance on automated QTc calculations may therefore lead to **unnecessary avoidance of needed psychiatric treatment**.

Clinical Question:

How should clinicians interpret QT prolongation and safely initiate antidepressant therapy in methadone-treated patients with left bundle branch block?

Case

49-year-old female admitted for **major depressive disorder, generalized anxiety disorder, and active suicidal ideation**.

Medical history:

- Fibromyalgia
- Coronary artery disease (s/p stent)
- Diabetes mellitus
- Autoimmune hepatitis in remission

Medication history

- Methadone **90 mg/day** for chronic pain for ~15 years

Initial ECG Findings

Automated QTc values ranged from **493–541 ms** in the setting of **Left Bundle Branch Block**. Concern for torsades risk initially limited antidepressant treatment.

Electrophysiologic Interpretations of QT Prolongation

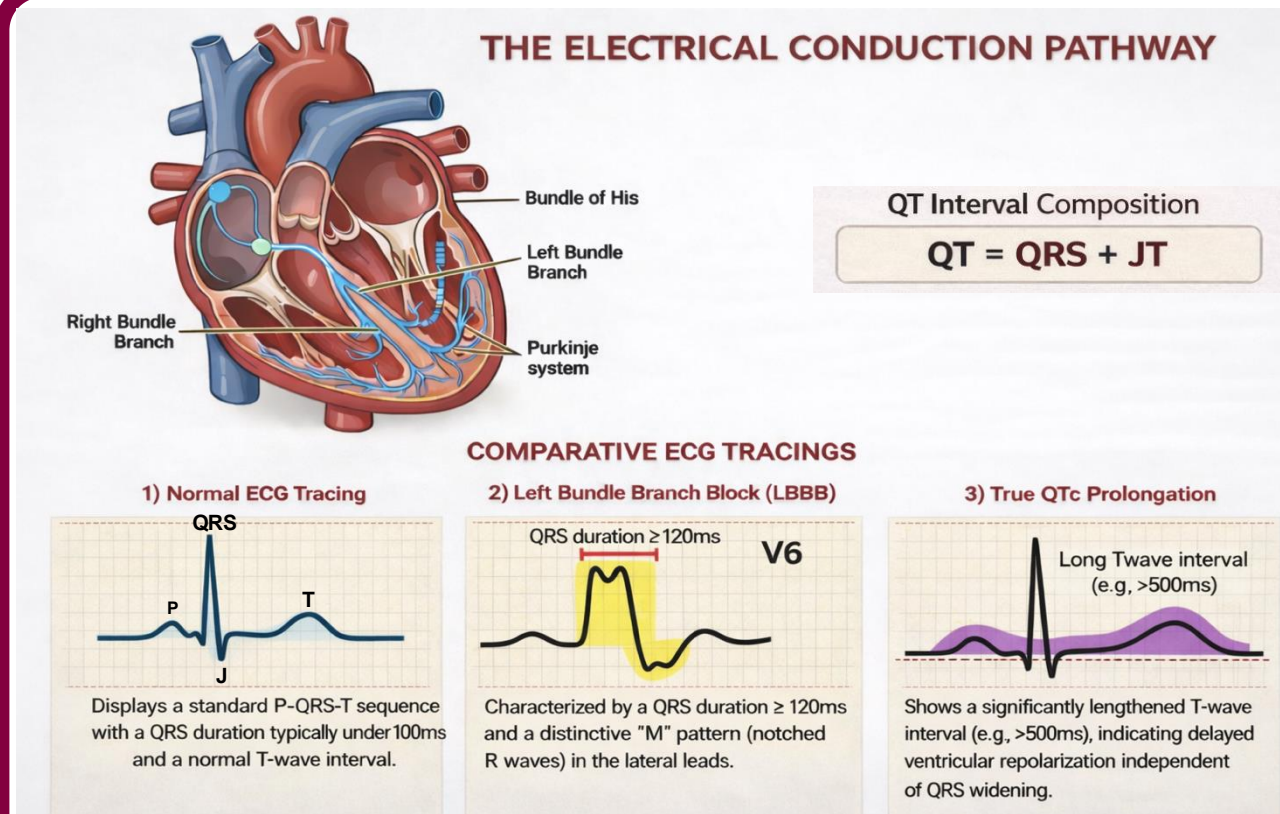


Figure 1: Ventricular conduction pathways and electrocardiographic features of left bundle branch block (LBBB).



Figure 2: Hospital course and sequential introduction of psychotropic medications following cardiology consultation and QT-risk mitigation

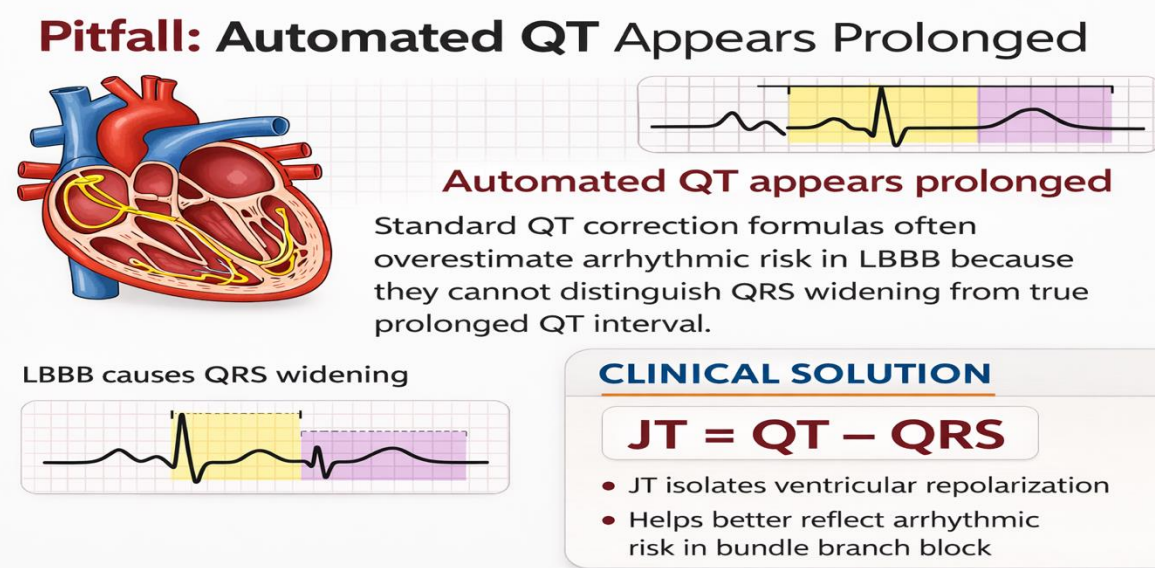


Figure 3: interpretation of QT prolongation in the presence LBB

Discussion

- Methadone therapy is associated with **dose-dependent QT prolongation** and torsades risk, particularly at doses ≥ 60 –100 mg/day. However, in patients with **left bundle branch block (LBBB)**, automated QTc measurements may **overestimate true arrhythmic risk**, because the QT interval includes both ventricular depolarization (QRS) and repolarization (JT). This could potentially lead clinicians to unnecessarily avoid needed psychotropic treatment.
- The QT interval includes both **ventricular depolarization (QRS)** and **repolarization (JT)**. In LBBB, QRS widening prolongs the measured QT interval even when repolarization is unchanged, causing standard QT correction formulas to **overestimate repolarization abnormality**.
- In this case, **multidisciplinary collaboration** between psychiatry, cardiology, and pharmacy enabled structured risk mitigation. QT-contributing medications were reviewed and lower risk psychotropic were introduced sequentially with ECG monitoring. The patient tolerated **mirtazapine and escitalopram** without clinically significant deterioration in repolarization parameters while depressive symptoms improved.
- Automated QTc measurements in the presence of conduction abnormalities should be **interpreted cautiously**. Contextual ECG interpretation and multidisciplinary risk stratification may allow safe psychiatric pharmacotherapy while avoiding unnecessary therapeutic restriction.

Clinical Takeaway

- In patients with LBBB, automated QTc values may overestimate arrhythmic risk due to QRS widening, and multidisciplinary ECG interpretation can allow safe psychopharmacologic treatment.

References & Acknowledgements

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