

# The Prognostic Value of Pretransplant QT Interval on One Year Outcomes after Liver Transplantation

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## INTRODUCTION

- Prolongation of QT-interval (QTc) on electrocardiogram (ECG) is associated with cardiac arrhythmia and death; it also remains supportive criteria for cirrhotic cardiomyopathy.
- The significance of QTc prolongation, particularly regarding post-transplant outcomes including sudden cardiac death, new onset heart failure (HF), HF death and readmission remain unclear.
- We investigated the 1-year post liver transplant risk of heart failure and overall death in patients with and without QT interval prolongation pre-transplant.

## METHODS

- We conducted a retrospective analysis of patients undergoing liver transplantation (LT) from 2014 to 2018 at the Medical University of South Carolina.
- Preoperative electrocardiograms (ECG) were analyzed; a QTc > 440 milliseconds (ms) calculated by the Bazett method was considered prolonged.
- We also collected demographic data, etiologies of cirrhosis, laboratory results used to calculate the Model for End-Stage Liver Disease (MELD) score as a measure of liver disease severity, echocardiographic findings, and right heart catheterization (RHC) data if available.
- Subjects were followed for 1 year after transplant.
- The primary outcome was 1-year survival; secondary outcomes included, post-operative heart failure, new onset heart failure, heart failure readmission, or heart failure death.

## RESULTS

- There were a total of 258 subjects; the majority were male (69%) and Caucasian (85%). The distribution of cirrhosis etiologies was Non-alcoholic steatohepatitis (NASH) (97/258 29%), Alcohol (74/258, 29%), and Other (87/258, 34%).
- QT prolongation was common (217/258, 84%), but it was not associated with any 1-year post-operative outcomes including overall death (19/194, 9.8% vs. 2/64, 3.1% p = 0.12), development of new HF (8/194, 4.1% vs 3/64, 4.7%, p 1.0), and an aggregate outcome of new HF, HF readmission, or HF death (12/194, 6.2% vs. 5/64, 7.8% p = 0.77).
- QTc prolongation was associated with echocardiogram findings consistent with elevated left ventricular filling pressures (peak e velocity, E/e', left atrial end-systolic and diastolic volume index) as well as left ventricular mass index.
- Although there are some echocardiographic abnormalities associated with a prolonged QTc, this did not translate to significant hemodynamic findings on right heart catheterization done on 59 subjects. Specifically, no difference in RAP, RVSP, mPAP, PVR, CO, CI, or PCWP.

Echocardiography	Prolonged QTc		p-value
	Yes (N=217)	No (N=41)	
LVEDVI	57.5 (16.6)	53.6 (17.4)	0.04
LVEF	66.8 (6.9)	67.4 (6.0)	0.78
LAESVI	36.7 (12.1)	33.0 (12.1)	0.005
Peak e	1.6 (9.3)	0.87 (0.23)	0.01
Peak A	1.6 (7.2)	0.8 (0.2)	0.19
Deceleration time			
E/A	6.6 (46.8)	1.6 (3.5)	0.38
Peak TR Velocity	79.5 (456.7)	25.3 (9.2)	0.38
E/e'	8.3 (3.5)	7.3 (2.3)	0.02
LVMI	78.7 (24.5)	68.4 (17.7)	0.04
RVSP	31.9 (11.0)	28.9 (8.0)	0.55

Table 1. Baseline characteristics of study cohort with association of QTc prolongation

	Prolonged QTc		p-value
	Yes (N=217)	No (N=41)	
Age	60.0 (10.7)	62.0 (9.18)	0.29
Gender			0.1
Male	144 (0.81)	33 (0.18)	
Female	73 (0.9)	8 (0.7)	
Race			0.11
Caucasian	189 (0.86)	31 (0.14)	
African American	28 (0.76)	9 (0.24)	
BMI	28.7 (6.5)	26.3 (5.7)	0.15
Cirrhosis Etiology			0.1
Nash	82 (0.85)	15 (0.15)	
Alcohol	67 (0.9)	7 (0.1)	
Other	68 (0.78)	19 (0.22)	
Bilirubin	3.3 (8.2)	3.0 (8.2)	0.34
INR	1.6 (0.6)	1.3 (1.1)	0.04
Creatinine	1.7 (1.3)	1.6 (1.3)	0.8
MELD score	19.0	17.0	0.53

Table 2. Echocardiogram related parameters in patients +/- QTc prolongation

## DISCUSSION

- QT-interval prolongation is a common finding in patients with cirrhosis.
- Our data suggest a significant association with QTc prolongation with left ventricular hypertrophy (LVH) and elevated left ventricular filling pressure.
- It was not associated with an increased risk of post liver transplantation outcomes including development of new heart failure, heart failure readmission, heart failure death, or overall death.

## REFERENCES

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