

## Non-Drug Factors Associated With QT Prolongation and TdP

Autonomic Nervous System					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Pheochromocytoma	Yes	High	Yes	High	<a href="#">link</a>
Alpha adrenergic stimulation	Yes	Moderate	Yes	Low	<a href="#">link</a>
Emotion (Arousal)	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Head-up tilt	Yes	High	None	No evidence	<a href="#">link</a>
Pure Autonomic Failure	Yes	High	None	No evidence	<a href="#">link</a>
Cold Water Immersion	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Parkinson's disease	Yes	Moderate	None	No evidence	<a href="#">link</a>
Esophageal ulcer	Weak	Low	None	No evidence	<a href="#">link</a>
Migraine headache	Yes	Moderate	None	No evidence	<a href="#">link</a>
Encephalitis (West Nile virus)	Weak	Moderate	None	No evidence	<a href="#">link</a>
Endotracheal intubation	Yes	Moderate	None	No evidence	<a href="#">link</a>
Sleep Deprivation	Yes	High	None	No evidence	<a href="#">link</a>

### Cardiovascular Diseases

Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Bradycardia, AV Block, Pause	Yes	High	Yes	High	<a href="#">link</a>
Takosubo (stress-related) Cardiomyopathy	Yes	High	Yes	High	<a href="#">link</a>
Acute Myocardial Ischemia	Yes	Moderate	Yes	Low	<a href="#">link</a>
Stroke	Yes	High	Yes	Low	<a href="#">link</a>
Hypertension/LVH	Yes	Low	Weak	Very Low	<a href="#">link</a>
Mitral Valve Prolapse	Yes	Moderate	Weak	Very Low	<a href="#">link</a>
Cardiomyopathy/CHF	Yes	Moderate	Weak	Low	<a href="#">link</a>
Atrial Fibrillation Conversion	Weak	Moderate	Yes	Moderate	<a href="#">link</a>
Mitral valve stenosis	Yes	Moderate	None	No evidence	<a href="#">link</a>
Hypertrophic Cardiomyopathy	Weak	Low	Weak	Low	<a href="#">link</a>
Metabolic Syndrome	Yes	Moderate	None	No evidence	<a href="#">link</a>
Aortic Stenosis	Yes	High	Yes	Moderate	<a href="#">link</a>

Electrolyte Disorders					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Hypokalemia (3.5 mEq/L)	Yes	High	Yes	High	<a href="#">link</a>

Hypomagnesemia ( 1.7 mg/dL)	Yes	High	Yes	High	<a href="#">link</a>
Hypocalcemia ( 8.5 mg/dL)	Yes	High	Yes	High	<a href="#">link</a>
Diarrhea	Yes	Moderate	Weak	Very Low	<a href="#">link</a>
Licorice (Excessive ingestion)	Yes	High	Yes	Moderate	<a href="#">link</a>
Bartter Syndrome	Yes	Moderate	Weak	Very Low	<a href="#">link</a>
Hemodialysis	Yes	Moderate	Weak	Moderate	<a href="#">link</a>
Hypernatremia (extreme)	Yes	Low	Yes	Very Low	<a href="#">link</a>
Apheresis/blood transfusion	Yes	High	Yes	Moderate	<a href="#">link</a>
Gitelman Syndrome	Yes	High	None	No evidence	<a href="#">link</a>
Hypoalbuminemia	Weak	Very Low	None	No evidence	<a href="#">link</a>

Endocrine Disorders					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Hypothyroidism	Yes	High	Yes	High	<a href="#">link</a>
Hyperglycemia	Yes	Low	Weak	Very Low	<a href="#">link</a>
Diabetes	Yes	Very Low	Weak	Very Low	<a href="#">link</a>
Obesity (BMI >30, adiponectin)	Yes	Moderate	None	No evidence	<a href="#">link</a>
Leptin	Yes	Low	None	No evidence	<a href="#">link</a>

Decreased PI3 kinase (inc. INaL)	Yes	Low	None	No evidence	<a href="#">link</a>
Primary Aldosteronism	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Hypoglycemia	Yes	Low	Yes	Moderate	<a href="#">link</a>
Hyperthyroidism	Yes	Low	Weak	Very Low	<a href="#">link</a>
Panhypopituitarism	Yes	Moderate	Yes	High	<a href="#">link</a>
Hyperparathyroidism	Yes	High	Weak	Very Low	<a href="#">link</a>
Hypogonadism	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Hypoparathyroidism	Yes	Moderate	Yes	Low	<a href="#">link</a>

Environmental Effects					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Hypothermia	Yes	High	Yes	Moderate	<a href="#">link</a>
Smoking	Weak	Low	None	No evidence	<a href="#">link</a>
Alcohol (excess)	Yes	Low	None	Very Low	<a href="#">link</a>
Herbals/Dietary Supplements	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Hypoxia, COPD, Sleep apnea	Yes	Moderate	None	Low	<a href="#">link</a>
Lead exposure	Yes	Low	None	No evidence	<a href="#">link</a>
Carbon Monoxide	Yes	High	Weak	Low	<a href="#">link</a>
Chlorobutanol	Yes	Low	Yes	Low	<a href="#">link</a>

Omega 3 PUFA deficiency	Weak	Very Low	None	No evidence	<a href="#">link</a>
Grapefruit juice	Yes	High	Yes	Low	<a href="#">link</a>
Synthetic Cannabinoids	Yes	High	None	No evidence	<a href="#">link</a>

General Clinical					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Female Sex	Yes	High	Yes	High	<a href="#">link</a>
Age 65 yr	Yes	High	Yes	Low	<a href="#">link</a>
Renal failure (GFR 30 ml/min)	Yes	Low	Yes	Very Low	<a href="#">link</a>
Liver failure (cirrhosis)	Yes	Moderate	None	No evidence	<a href="#">link</a>
Pulmonary embolism	Yes	Moderate	None	No evidence	<a href="#">link</a>
Thiamine deficiency	Yes	Low	None	No evidence	<a href="#">link</a>
Vitamin D deficiency	Yes	Low	Yes	Moderate	<a href="#">link</a>

Inflammation/Auto-immune					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Sepsis	Yes	Low	Yes	Moderate	<a href="#">link</a>

Systemic Lupus Erythematosus	Yes	Moderate	None	No evidence	<a href="#">link</a>
HIV	Yes	Moderate	None	No evidence	<a href="#">link</a>
C-Reactive protein	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Heat Shock Proteins	Yes	Low	None	No evidence	<a href="#">link</a>
Cytokines (TNF, IL1, IL6)	Yes	Moderate	Yes	Moderate	<a href="#">link</a>
Fever	Yes	Low	Yes	Low	<a href="#">link</a>
Inflammation/Rheum. Arthritis	Yes	High	Yes	Moderate	<a href="#">link</a>
Sarcoidosis	Yes	Low	Weak	Very Low	<a href="#">link</a>
Anti-Ro/SSA Antibody	Yes	Low	Yes	Very Low	<a href="#">link</a>
Multiple sclerosis	Yes	Low	None	No evidence	<a href="#">link</a>
Celiac disease	Yes	High	None	No evidence	<a href="#">link</a>
Psoriasis	Weak	Very Low	None	No evidence	<a href="#">link</a>
Cardiac Allograft Rejection	Yes	Low	None	No evidence	<a href="#">link</a>
Ankylosing Spondylitis	Yes	High		No evidence	<a href="#">link</a>

Miscellaneous					
Clinical Factor	Clinical Association with Increased QT	Quality of Evidence for Assoc. with Increased QT	Clinical Association with TdP	Quality of Evidence for Assoc. with TdP	Pubmed Search Link
Pre-eclampsia	Weak	Low	None	No evidence	<a href="#">link</a>
Genotypic Assoc.	Yes	High	Yes	High	<a href="#">link</a>

Ferritin/Iron overload	Yes	Moderate	Weak	Moderate	<a href="#">link</a>
Propionic acidemia	Yes	High	Yes	Low	<a href="#">link</a>
Epilepsy/Seizures	Yes	Moderate	None	No evidence	<a href="#">link</a>
Uric Acid	Weak	Low	None	No evidence	<a href="#">link</a>
Electrical Shock	Yes	Moderate	None	No evidence	<a href="#">link</a>
Liquid Protein Diet	Yes	High	Yes	Moderate	<a href="#">link</a>
Sickle Cell Disease	Yes	High	Weak	Very Low	<a href="#">link</a>
Congenital Gen. Lipodystrophy (PTRF)	Yes	Moderate	Weak	Very Low	<a href="#">link</a>
Low density lipoprotein receptor-related protein 5 (LRP5)	None	Very Low	None	No evidence	<a href="#">link</a>
Fatty Acid Binding Protein 4	Weak	Moderate	None	No evidence	<a href="#">link</a>