Channelopathies in drowning or near-drowning events in pediatric population

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Swimming or immersion in water can be a trigger for malignant arrhythmias and sudden death in patients with channelopathies (known or concealed) like long QT syndrome (LQTS) or catecholaminergic polymorphic ventricular tachycardia (CPVT).

Objective
Detection of cardiac channelopathies in patients admitted for drowning or near-drowning in a Pediatric Intensive Care Unit (PICU).

Methods
All cases admitted in the PICU for drowning or near-drowning have been revised. When available, ECG has been analyzed and extended genetic panel has been performed when samples were available.

Results
From 2015 to 2018 our PICU has had 4658 admissions, of which 22 (0.47%) were for drowning or near-drowning events. Fourteen occurred in children that knew how to swim (6-16y). Two died. After comprehensive study including ECG, exercise test and genetic screening, 6/14 were diagnosed of LQTS (4 KCNQ1, 2 negative genetic tests), 2/14 of CPVT (both RYR2+), 1 Brugada syndrome (negative genetic test, drowning occurred during prolonged apnea under water). Five patients had only ECG which was normal, but no further studies were performed.

Conclusion
Drowning and near-drowning events can mask underneath channelopathies. Comprehensive cardiac study should be performed in all cases, including genetic study that in our sample is positive in 66% of the patients.