ACQUIRED LONG QT SYNDROME IN THE PERIOPERATIVE PERIOD

Joshua Johnston, MD; Lisa de las Fuentes, MD; Frank Brown; Peter Nagele, MD, MSc
Washington University, St. Louis, Missouri

Background: Many commonly used drugs, such as antibiotics, can lead to a prolongation of the QT interval in the EKG (drug-induced long QT syndrome) which increases the risk for a specific type of ventricular tachycardia, torsades de pointes. Torsades de pointes is a life-threatening arrhythmia that can progress to ventricular fibrillation and result in death. The perioperative period may be a particularly vulnerable time for acquired long- QT syndrome as patients are simultaneously exposed to a large number of intravenously administered drugs that have been shown to prolong the QT-interval (antibiotics, antiemetics) as well as conditions such as hypothermia and electrolyte disturbances. Despite several case reports of perioperative torsades de pointes, only a few studies have aimed to measure QT prolongation of single drugs, but none has systematically investigated acquired long QT-syndrome in the perioperative period.

Methods: Serial 12-lead EKGs were obtained from 93 adult patients undergoing general anesthesia. Baseline QTc (corrected QT-intervals) were compared to end of surgery, and postoperative day 1 and 2 and the change (delta QTc) calculated. QTc were calculated according Bazzett's formula. According to the FDA-endorsed ICH E14 guidance document, a special emphasis was put on determining the fraction of patients who had an absolute QTc-interval prolongation >500 ms and relative increases of 30 ms and 60ms. A QTc-interval of > 440 ms is commonly considered as abnormal.

Results: At baseline, 28/93 patients (30%) had an abnormal, prolonged QTc interval (>440 ms). The mean baseline QTc was 421 ± 31 ms (SD). The QTc interval measured at the end of surgery was significantly prolonged compared to baseline with a mean QTc of 448 ± 29 ms (SD) ($p < 0.0001$, Figure 1). A total of 43/93 patients (46%) experienced a QTc prolongation of >30 ms, 14/93 (15%) >60 ms and three patients (3%) had a peak QTc interval > 500 ms (considered high-risk cutoff). The mean QTc interval length on the first and second postoperative day reverted back to baseline and were not significantly different (means: 428 ± 36 ms and 423 ± 30 ms).

Conclusions: This preliminary study confirms that adult patients undergoing general anesthesia are at significant risk for acquired long QT syndrome. Subsequent studies will be required to determine if the observed QT interval prolongation is drug-induced, clinically relevant and associated with certain risk factors.