Automated perioperative QT monitoring in a patient with long QT syndrome 2

Editor—The perioperative treatment of patients with long QT syndrome (LQTS) is increasingly recognized as being challenging.\(^1\)\(^2\) This is in part due to the risk of inducing severe ventricular arrhythmia by unopposed sympathetic stimulation\(^3\) and also the risk posed by drug-induced torsade de Pointes (TdP).\(^4\) As a consequence, standardized management including perioperative QT monitoring has been recommended.\(^5\)

However, despite the current recommendation\(^4\) and increasing awareness of the perioperative implications of LQTS,\(^1\)\(^2\) continuous automated perioperative monitoring of the QT time or the QTc interval has not been established. In this report, we describe the feasibility of automated continuous perioperative QT monitoring in a 57-yr-old female patient suffering from congenital LQT2 syndrome. The patient had a family history of severe cardiac events and sudden cardiac death. QT prolongation resulted from A2069G mutation in the KCNH2 gene. This mutation results in LQT2 through amino acid exchange N629S in HERG channel proteins.\(^3\) The patient was undergoing tibial implant removal after tibial and fibular plate osteosynthesis.

Recording of continuous perioperative 12-lead electrocardiograms included automated QT and QTc analysis\(^4\) (12 SL algorithm, GE Medical Systems, Milwaukee, WI, USA). The QTc interval immediately before induction was 619 ms (Fig. 1). Anaesthesia was induced with fentanyl (0.1 mg) and propofol (150 mg). Ventilation was secured by the placement of a laryngeal mask airway. Balanced anaesthesia was maintained by the combination of fentanyl and end-expiratory concentrations of desflurane of between 4% and 6%. Heart rate, arterial pressure, pulse oximetry, and end-expiratory carbon dioxide were kept within normal ranges. The maximal deviation of any QTc interval from the median QTc interval duration (631 ms) was 10% with a difference between the maximal (694 ms) and the minimal perioperative value (584 ms) of 16%. Recovery from anaesthesia was uneventful and postoperative pain control was achieved by i.v. piritramid. Despite severe QTc-prolongation during the entire perioperative period (Fig. 1), the patient remained free from cardiac arrhythmia such as T-wave alternans, short–long–short RR intervals, R on T phenomena, or TdP. The patient was discharged from the post-anaesthesia recovery unit fully awake, free from pain, and without any signs of cardiovascular compromise.

Monitoring of the QT interval during the entire perioperative treatment of patients with LQTS has been recommended.\(^1\)

However, despite these requirements, neither the feasibility of
continuous perioperative monitoring of the QT time nor of the QTC interval in patients suffering from congenital LQTS has so far been described. Recently, an algorithm for perioperative QTC determination has been established. This algorithm, which requires manual measurement of the QT interval, has so far only been validated in postoperative patients. As it is not immediately and automatically available, it is currently unclear whether this algorithm is applicable under the time constraints of intraoperative management. In our patient, we used an automated algorithm for QT and QTC analysis that has extensively been validated in non-surgical populations. This algorithm forms a T-wave detection function based on vector magnitude signals from eight independent lead inputs. This automated algorithm does not require manual analysis of the QT interval, and it is immediately available without interobserver variability. The presented case demonstrates that continuous perioperative QT monitoring in patients with congenital LQTS seems feasible and should be considered.

Conflict of interest
P.F. received study funding and honoraria from GE Healthcare.

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Written informed consent has been obtained from the patient described.

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Spinal anaesthesia guided by computed tomography scan in a patient with severe post-polio sequelae

Editor—The anaesthetic management of a patient with post-polio syndrome (PPS) is always a challenge. Spinal anaesthesia is controversial in these patients because the abnormal spinal anatomy may lead to difficult dural puncture or risk of exacerbating existing disease. However, there have been no reports of adverse effects due to regional anaesthesia in PPS patients, and the increased susceptibility of motor neurones to local anaesthetic toxicity remains theoretical. We report here a case of successful spinal anaesthesia guided by computed tomography (CT) scan in a patient with severe post-polio spinal deformities who underwent transurethral resection of bladder tumour.

A 66-yr-old man (height, 180 cm; weight, 55 kg) was undergoing transurethral resection of a bladder tumour. He presented with severe PPS sequelae. He had a history of paralytic poliomyelitis when he was 19 yr old requiring ventilation. The patient's motor deficit due to polio at that time was severe with paraplegia, left-arm paralysis, and major spinal deformities (Fig. 1a and b). Preoperative evaluation showed difficult intubation criteria. After a risk–benefit discussion, spinal anaesthesia was proposed to the patient preferentially to general anaesthesia with fibreoptic nasotracheal intubation, because of the restrictive chest wall deformities with poor respiratory function and the need for neurological evaluation to prevent TURP syndrome, and despite the predicted difficulties in achieving spinal anaesthesia. The patient gave informed consent for this procedure. A pre-procedural spine CT scan (Fig. 1c) showed severe scoliosis associated with axial rotation of the lumbar spine and ossification of the interspinous ligament. The puncture was performed with a paramedian approach, 2 cm from the midline, at the L4/5 intervertebral level (Fig. 1c). The procedure was uneventful and successful after one attempt. We injected 10 mg of hyperbaric bupivacaine and 2.5 μg of sufentanil and the patient developed good sensory and motor block. Surgery was performed uneventfully and lasted 1 h. Approximately 2 h after surgery, his motor and sensory function returned to normal. Neurological examination was unchanged from the preoperative status. The postoperative course was uneventful, and the patient was discharged from hospital on day 4.

To our knowledge, our case is the first report demonstrating that spinal anaesthesia guided by CT scan may be a safe option for patients with severe PPS spinal deformities. Spinal anaesthesia without incident has been reported in one PPS patient with relatively normal spinal anatomy. In our case, the choice of spinal anaesthesia was based on an extensive risk–benefit analysis with discussion of general anaesthesia. The predicted difficulties of airway management, the effects of invasive mechanical ventilation on poor respiratory function, and the need for neurological checking during surgery to prevent a TURP syndrome were the key points to support our decision. As previously published, real-time ultrasound-guided spinal anaesthesia could have been an option, but this technique requires advanced skills in ultrasound-guided regional anaesthesia, both in terms of imaging the relevant anatomical structures and in terms of the simultaneous manipulation of the needle and transducer. Moreover, obtaining and maintaining alignment of the ultrasound beam with the needle and the