

A rare cause of intractable tachycardia during caesarean section: acute cannabis use

B. Tuncali

Department of Anaesthesiology, Baskent University Zubeyde Hanım Practice and Research Centre, Izmir (Turkey)

Summary

Persistent, unexplained perioperative tachycardia during caesarean section may be a challenge for the anaesthesiologist because the differential diagnosis is large and it may negatively impact patient outcome. Cannabis is the most common recreational drug generally used for its hallucinogenic properties in pregnancy. Although the cardiovascular effects of cannabis is dose-dependent, acute effects of low doses induce euphoria, tachycardia, and anxiety. However, the majority of pregnant patients with a history of drug addiction hide or deny it due to feelings of shame and guilt or legal concerns. The authors present a case of persistent perioperative tachycardia during caesarean section under combined spinal epidural anaesthesia (CSEA) in a drug-addictive pregnant who received cannabis-containing cigarettes six hours before her admission to the hospital.

Key words: Perioperative tachycardia; Cannabis; Caesarean section; Combined spinal epidural anaesthesia.

Introduction

Perioperative tachycardia is a common event which may be associated with poor outcome during anaesthesia [1]. To determine the cause is not always simple because the etiology may be of multiple origins [2]. Herein, the authors present a case of persistent perioperative tachycardia in a parturient who underwent an emergency caesarean section under combined spinal epidural anaesthesia.

Case Report

A 26-years-old pregnant patient was admitted to the obstetric clinic due to preterm labour at 37 weeks of gestation. She had no medical or surgical history, except for iron and multivitamin supplementation during pregnancy, and her blood pressure was 141/76 mmHg with a heart rate of 119/minute. Laboratory tests including the whole blood analysis, serum glucose levels, thyroid function, and coagulation tests were normal. An emergency caesarean section under combined spinal epidural anaesthesia (CSEA) was planned.

On arrival into the operating room, monitoring including non-invasive blood pressure, electrocardiogram, and pulse oximetry revealed a blood pressure of 136/78 mmHg, sinus rhythm with a heart rate of 128/minute, and peripheral oxygen saturation of 97%, respectively. Respiratory rate was 20/minute. After obtaining intravenous access, a CSEA was performed in the sitting position with 1.7 ml 0.5 % hyperbaric bupivacaine, followed by placement of an epidural catheter. At the 14th minute after CSEA, the sensory block level reached T₄ level and the operation was commenced. Meanwhile, her blood pressure and heart rate were 113/68 mm Hg and 126/minutes, respectively. A baby girl with a weight of 3,680 grams was delivered at the sixth minute after the skin incision with APGAR scores of 9 and 10 at one and five minutes, respectively. She expressed no pain or discomfort at the operation site. Following the injection of ten IU oxytocin, she received a total of three mg of

midazolam, 50 µg of fentanyl, and incremental doses of propofol (a total dose of 110 mg) in order to provide and maintain a Ramsay sedation score of 3-4, because her tachycardia was attributed to anxiety. The surgical procedure lasted 38 minutes with a body temperature of 36.5-36.7°C and stable hemodynamic status, except the sinus tachycardia (heart rate 117-132/minute) throughout the procedure. In the operation, a total of 1,300 ml crystalloid solution was given and the urine output was 600 ml. Postoperative pain control was provided by epidural bupivacaine 0.125% and intravenous analgesics afterwards. Intraoperative blood glucose level was 94 g/dl. At postoperative one hour, her haemoglobin and haematocrit levels were normal and the pain levels were below 3 according to visual analogue scale (VAS), but sinus tachycardia was still present with a heart rate of 112/minute. The authors discussed their concerns for tachycardia with the surgeon and informed the patient that advance tests and consultations including cardiologic assessment would be made to determine the underlying pathology. Meanwhile, she informed them that she had been using cannabis-containing cigarettes at least two days per week during the past three years, including the same day (six hours before her admission to the hospital) but did not tell this to the doctors due to legal concerns. At postoperative sixth hour, her heart rate gradually decreased to 76/minute and was discharged uneventfully on postoperative day 2.

Discussion

Sinus tachycardia, commonly confronted by anaesthesiologists, may be present preoperatively or occur at any time of the perioperative period, which usually indicates that there is a pathology in the absence of an identifiable cause. When promptly identified and appropriately treated, it has a little effect on perioperative morbidity. However, sometimes, it may be a great challenge for the anaesthesiologist. Because differential diagnosis is extensive, including emotional stress, pain, medications, drug withdrawal, undiagnosed infection,

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underlying diseases, such as hyperthyroidism and pheochromocytoma, or cardiac disorders, such as pre-excitation syndromes and re-entrant pathways. If not recognized or adequately treated, these disorders may increase the risk of anaesthesia and negatively impact outcomes [1-3]. Rose *et al.* showed that both intra- and postoperatively, tachycardia for longer than ten minutes and hypertension for longer than five minutes were found to be associated with an increased incidence of postoperative cardiac events [4]. Frolich and Caton found that a high baseline heart rate was strongly predictive of marked hypotension, following spinal anaesthesia in pre-hydrated pregnant patients [5]. The clinical significance of tachycardia depends on the simultaneous blood pressure and the cardiac rhythm of the patient. Watterson *et al.* showed 145 causative factors in 123 reports of tachycardia in 4,000 incidents reported to Australian Incidence Monitoring Study and found that 27% of the tachycardia events were associated with normotension. The most common (48%) cause in those events were related to drugs [6]. In the present patient, sinus tachycardia was accompanied with normotension and was attributed to anxiety, because there was no history of preoperative medication at home or in the ward preoperatively. Additionally, pre- and postoperative whole blood analysis did not show profound anaemia or leucocytosis, and intraoperative blood glucose level and body temperature were within normal limits, excluding the anaemia, hypoglycaemia or infection. The aetiology of tachycardia in the present patient was due to acute cannabis use and consequent increase in sympathetic activity, which is consistent with the study of Watterson *et al.* suggesting the most common causes of tachycardia in normotensive patients were related to drugs [6].

Cannabis is obtained from the dried flowering tops and leaves of *Cannabis Sativa*. It remains the most common recreational drug generally used for its hallucinogenic properties in pregnancy [7]. The acute effects of cannabis include euphoria, tachycardia, and anxiety. The cardiovascular effects of cannabis is dose-dependent. At low and moderate doses, cannabis leads to an increase in sympathetic activity resulting in tachycardia and increased cardiac output. However, at high doses, parasympathetic activity is increased, leading to bradycardia and hypotension. [7, 8]. Although changes in blood pressure have been reported with negligible clinical significance in a healthy parturient, additive effects of cannabis and potent inhaled anaesthetics can result in pronounced myocardial depression during general anaesthesia [8]. Additionally, adverse psychiatric and autonomic reactions to cannabis may interfere with safe induction of anaesthesia and postoperative recovery [8]. In a parturient with a history of acute cannabis abuse, drugs that increase heart rate such as ketamine, pancuronium, atropine, and epinephrine should be avoided. Additionally, respiratory complications including oropharyngitis, uvular edema, and bronchospasm during general anaesthesia have been reported [7, 8]. In the present patient, the caesarean section under combined epidural spinal anaesthesia was uneventful except for the tachycardia. On the other hand, the authors could have used general anaesthesia in which the

additive effects with potent inhaled anaesthetics, as well as the interactions with sedative-hypnotic drugs, might have resulted in hemodynamic instability and/or interfere with recovery.

In a cannabis addicted-parturient, cannabinoids enter the embryo or fetus during pregnancy. Although, there appears to be no evidence of teratogenicity, low neonatal birth weight, increased risk of complications during labour, delay in cognitive development in infants, and ten-fold increased risk of leukaemia have been reported [8]. In the present patient, APGAR scores and body weight of the baby were normal.

The prevalence of drug abuse in pregnancy is on the increase worldwide [8]. Although it has been suggested that a history of illicit drug use should be obtained routinely in the preoperative assessment, the majority of pregnant patients with a history of drug addiction hide or deny it due to feelings of shame and guilt or legal concerns [9-11]. Physicians should always be aware that patients may not tell the truth due to various causes including legal concerns. Anaesthesiologists should also be familiar with the effects of illicit drugs on body systems to provide a safe anaesthesia for this group of patients.

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Corresponding Author:

B. TUNCALI, M.D.

Department of Anaesthesiology and Reanimation
Baskent University Zubeyde Hanım Practice
and Research Centre, Caher Dudayev Bulvarı
Karsiyaka, Izmir 35540 (Turkey)
e-mail: tuncali.bahattin@gmail.com