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Combined spinal-epidural anesthesia for cesarean section in a patient with Takayasu arteritis complicated by heart failure

Junichi Ogata[1], Takafumi Horishita[2], Munehiro Shiraishi[2], and Kouichiro Minami[3,4]

[1]Department of Anesthesiology, Kyushu Rosai Hospital, 1-3-1 Kuzuharatakamatsu, Kokuraminami-ku, Kitakyushu, Fukuoka 800-0296, Japan

[2]Department of Anesthesiology, University of Occupational and Environmental Health School of Medicine, Fukuoka, Japan

[3]Department of Anesthesiology and Critical Care Medicine, Jichi Medical University, Tochigi, Japan

[4]Emergency Life-Saving Technique Academy of Tokyo (ELSTA Tokyo), Tokyo, Japan

To the editor: For cesarean section in patients with Takayasu arteritis (TA), epidural anesthesia has been performed to attenuate hemodynamic change [1,2]. However, this technique is still controversial in pregnant patients with heart failure, because progesterone and failing heart potentiate local anesthetic (LA) intoxication [3,4]. Here we present a successful case of combined spinal-epidural anesthesia (CSEA), and the anesthetic management is discussed.

A 35-year-old pregnant woman (gestational age, 37 weeks and 5 days), known to have a 10-year history of TA, was scheduled for a cesarean delivery, due to heart failure and dysrhythmias. Her heart failure had persisted over the previous year due to over-afterload, and had worsened because of volume-overload after 32 weeks of pregnancy. She discontinued treatment with betamethasone and an angiotensin-conventing enzyme inhibitor, as the heart failure attenuated her hypertension. Echocardiogram revealed a low ejection fraction (0.39), and Holter electrocardiogram indicated "R-on-T" and ventricular tachycardia (Fig. 1). Her fetus suffered from intrauterine growth retardation, with an estimated weight of 2100 g. Although the obstetrician recommended a pre-term artificial delivery, she wished to keep her fetus in utero as long as possible.

Prior to the CSEA procedure, lactated Ringer's solution 500 ml was given intravenously, then epidural catheterization was achieved at T11–12. Sequentially, spinal anesthesia was performed with 1.3 ml 0.5% isobaric bupivacaine, resulting in hypesthesia at the T10 level after 10 min. An additional 8 ml 1% mepivacaine, via the epidural catheter, obtained analgesia at the T4 level. During the procedure, she was fully awake without any symptoms, and her blood pressure (BP) was stable above 100 mmHg. The Apgar scores of the neonate were 8 and 9 at 1 and 5 min, respectively. Neither oxytocin nor prostaglandin was used to stimulate uterine contractions. Her postoperative pain was well controlled with the epidural administration of 2 ml·h^{-1} 0.2% ropivacaine.

In pregnant women, Rosenberg et al. [3] recommend reducing the LA dose, because progesterone can potentiate the cardiac alterations produced by LAs [4]. A reduction in protein binding in pregnancy also increases the risk of systemic toxicity with LAs [5]. In the patient with heart failure, the LA dosage needs to be decreased [3], because the reduction in blood flow to the liver and kidney increases the LA blood concentration [6]. From these findings, we mainly focused on the reduction of the LA dose in our patient. Although CSEA was performed for cesarean section in the patients without heart failure [7], we could not directly adapt this to our patient because of her heart failure. On the other hand, Hampl et al. [8] reported the use of spinal anesthesia for therapeutic abortion, and Van Bogaert [9] demonstrated that spinal block with 1.5 ml 0.5% bupivacaine was safe as regards fetal and maternal

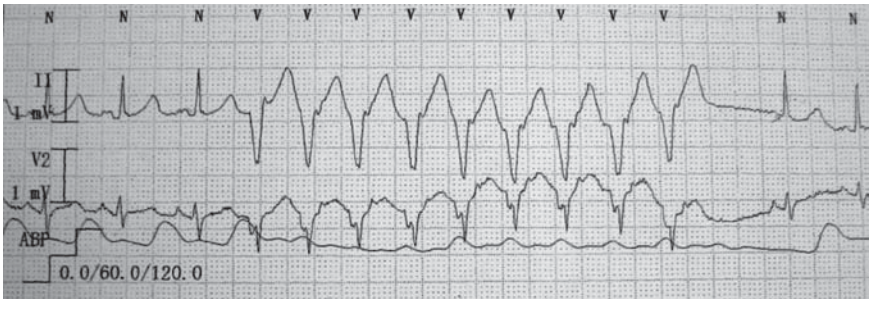

Fig. 1. Electrocardiogram. The patient had standard monitoring in place in the operation room, and arterial blood pressure was monitored via her left radial artery. In the resting state, nine beats of slow-VT occurred. Lead II (*top*) and lead V_2 (*middle*) in the five leads of the electrocardiogram are shown. The *perpendicular lines* indicate 1 mV. Radial artery blood pressure is also indicated (*bottom*). A scale in the ladder represents 60 mmHg

outcome. These reports suggested that our patient would well tolerate low-dose spinal anesthesia. Thus, we modified the Van Bogaert protocol with 6.5 mg bupivacaine, and adapted this to the CSEA. With our protocol, we could reduce the mepivacaine dosage to 80 mg, and enough time was allowed to compensate for the BP decline. The epidural "top-up" effect [10,11] and the high sensitivity of the central nervous system (CNS) to LA in pregnant women [3,4] could be involved in these beneficial effects. Our technique could be suitable for cesarean delivery in TA patients with heart failure and arrhythmias.

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Address correspondence to: J. Ogata
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