



## Case Report

# The use of sugammadex in a pregnant patient with Wolff-Parkinson-White syndrome<sup>☆</sup>



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**Abstract** Wolff-Parkinson-White (WPW) syndrome is a rare pre-excitation syndrome which develops when atrioventricular conduction occurs through a pathologic accessory pathway known as the bundle of Kent instead of atrioventricular node, hence resulting in tachycardia. Patients with WPW syndrome may experience various symptoms arising from mild-to-moderate chest disease, palpitations, hypotension, and severe cardiopulmonary dysfunction. These patients are most often symptomatic because of cardiac arrhythmias. In this case report, we present an uneventful anesthetic management of a pregnant patient with WPW syndrome undergoing cesarean delivery. A 23-year-old American Society of Anesthesiologists class 2 pregnant patient was diagnosed with WPW syndrome. Her preoperative 12-lead electrocardiogram showed a sinus rhythm at 82 beats per minute, a delta wave, and a short PR interval. After an uneventful surgery, sugammadex 2 mg/kg was administered as a reversal agent instead of neostigmine. Then she was discharged to her obstetrics service. Serious hemodynamic disorders may occur in patients with WPW syndrome due to development of fatal arrhythmias. Neostigmine used as a reversal agent in general anesthesia can trigger such fatal arrhythmias by leading changes in cardiac conduction. We believe that sugammadex, which is safely used in many areas in the scope of clinical practice, can be also used for patients diagnosed with WPW syndrome.

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## 1. Introduction

Wolff-Parkinson-White (WPW) syndrome is a rare pre-excitation syndrome which develops when atrioventricular conduction occurs through a pathological accessory pathway known as the bundle of Kent instead of atrioventricular node, hence resulting in tachycardia [1,2]. The diagnosis of WPW syndrome is established after a thorough

history and physical examination and observation of characteristic electrocardiographic (ECG) findings such as a short PR interval (<120 milliseconds), a slurred upstroke of QRS complex (delta wave), and widened QRS complex (>120 milliseconds) as well as secondary ST segment–T wave changes reflecting repolarization abnormalities [3].

Patients with WPW syndrome may experience various symptoms arising from mild-to-moderate chest disease, palpitations, hypotension, and severe cardiopulmonary dysfunction. These patients are most often symptomatic because of cardiac arrhythmias. Anesthetic drugs and methods may affect atrioventricular node conduction [4]. During anesthesia management, it is important to avoid drugs prolonging normal AV conduction or the refractory

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period in AV node and to anticipate and to be prepared for treatment of tachyarrhythmias.

In this case report, we present an uneventful anesthetic management of a pregnant patient with WPW syndrome undergoing cesarean delivery. The case was managed successfully using sugammadex instead of atropine/neostigmine for reversal of neuromuscular blockade during recovery from general anesthesia, and no rhythm disturbance or tachyarrhythmia was observed.

## 2. Case report

A 23-year-old American Society of Anesthesiologists class 2 pregnant patient who was 75 kg and 160 cm, was evaluated before cesarean delivery. The patient was diagnosed with WPW syndrome in the 22nd week of her pregnancy and was referred to cardiology for follow-up. Because of her pregnancy, she was not started on any medications. Her preoperative 12-lead ECG showed a sinus rhythm at 82 beats per minute, a delta wave, and a short PR interval. Examination of other systems and routine laboratory tests were normal. Cardiology was reconsulted before delivery for preoperative optimization and final recommendations.

It was recommended to have amiodarone and defibrillator readily available during the operation. We counseled the patient about her condition and recommended regional anesthesia to minimize sympathetic system activation. However, she rejected regional anesthesia and requested general anesthesia for which she provided informed consent before the operation. After the patient was taken into the operating room, 5-lead ECG, pulse oximetry, and non-invasive blood pressure monitoring were started. The patient was hemodynamically stable; her heart rate was 95 beats per minute with the prevailing rhythm showing the pre-excitation pattern compatible with WPW (Fig. 1). Non-invasive blood pressure at rest was 138/80 mm Hg, and SpO<sub>2</sub> was 97%. She received no premedication. Orotracheal intubation was performed after 2 µg/kg fentanyl, 2 mg/kg propofol, and 0.6 mg/kg rocuronium were administered for induction of general anesthesia. Sevoflurane 2% and 50%

oxygen in air were used for the maintenance of anesthesia. We did not observe any surgical or anesthetic complications. A postoperative 12-lead ECG was obtained. The change in ECG was noted with the presence of normal sinus rhythm and the disappearance of the delta wave (Fig. 2).

The duration of surgery was 35 minutes after detection of acceleromyographic TOF ratio of 35% with TOF-SX neuromuscular monitor. Sugammadex 2 mg/kg was administered as a reversal agent instead of neostigmine. After sugammadex administration, the patient's muscle strength recovered quickly, and having fulfilled other criteria for extubation, she was extubated within the first minute with a TOF ratio of >90%. We did not observe any change in ECG after administration of the sugammadex. When all parameters were found to be stable during a 5-minute follow-up in the operating room, she was delivered to the postanesthesia recovery unit. At the end of a 30-minute follow-up in postanesthesia recovery unit, her modified Aldrete score was 10 with a sinus rhythm, and her TOF ratio was 95% to 100% in sequential measurements. Her postoperative ECG was showing recurrence of the pre-excitation pattern. She was transferred to the obstetrics floor where her postpartum course was uneventful. She was discharged from the hospital on the second postoperative day with cardiology follow-up scheduled.

## 3. Discussion

The ideal perioperative anesthetic management of WPW syndrome requires medications and methods which have minimum effect on cardiac conduction and hemodynamics. In our case, general anesthesia was administered because regional anesthesia was rejected by the patient. It has been reported earlier that using neostigmine during postanesthesia recovery leads to deceleration in atrioventricular conduction and activation of accessory pathways resulting in tachyarrhythmias. Kadoya et al [5] observed rapid atrial fibrillation in a WPW patient after neostigmine administration in anesthetic recovery, whereupon they administered a 100 J shock without any response. Afterwards, they performed DC



**Fig. 1** The prevailing rhythm of patient showing the pre-excitation pattern compatible with WPW.

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