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### Case Report

## Raynaud's phenomenon during anesthesia recovery period: A case report

### Abstract

This case report revealed that Raynaud's phenomenon happened during anesthesia recovery period and caused panic. We performed general anesthesia for a patient who underwent laparoscopic nephrectomy and denied any significant medical history. After surgery, just when the patient started breathing, we noticed that the displayed waveform and numerical values of SpO<sub>2</sub> disappeared suddenly. No problems were detected in the monitor and the ventilator. On auscultation, both lungs were being ventilated well. Severe complications were suspected which led to tense and panic. The patient was extubated later, and she confirmed that she had primary Raynaud's for 6 years. The patient was transferred to the recovery room later, and then her ward uneventfully. It is important to know the whole medical history of patients'. The attack of Raynaud's phenomenon can make the displayed waveform and numerical values of SpO<sub>2</sub> disappear suddenly.

### Introduction

Raynaud's phenomenon is a disorder of the microvasculature that generally affects the fingers and toes and can present on other extremities such as the nose, ears and nipples. There are two forms of Raynaud's phenomenon: Primary or idiopathic and secondary [1-3]. Because it only affects extremities, generally without vital organs involved, most anesthesiologists don't think the attack of Raynaud's phenomenon will result in serious problems. We are reporting a case of Raynaud's phenomenon which happened during anesthesia recovery period and caused panic.

### Case report

A 58-year-old female patient was admitted for left renal tumor. The patient's body weight was 63 kg and height was 159 cm. She declared she was healthy without significant medical history. A written consent was achieved from the patient for publishing this case report when she was discharged.

A computerized tomography revealed a 5 cm×6 cm mass in the left kidney. All other clinical examinations and laboratory examinations were within normal range.

She was scheduled to undergo a laparotomy for nephrectomy under general anesthesia. Anesthesia induction was performed with 0.3 mg·kg<sup>-1</sup> etomidate, 3 μg·kg<sup>-1</sup> fentanyl and 0.15 mg·kg<sup>-1</sup> cisatracurium. Anesthesia was maintained with continuous infusions of propofol and remifentanyl at the rates

of 6 to 8 mg·kg<sup>-1</sup>·h<sup>-1</sup> and 0.012 mg·kg<sup>-1</sup>·h<sup>-1</sup> respectively, and cisatracurium was administrated intermittently as needed. Intraoperative blood loss was around 100 mL, and she received around 1.0 L crystalloid during surgery which lasted for around 90 min. During surgery, her hemodynamic and respiratory parameters were stable and within normal limit. After surgery, just when the patient started breathing, we noticed that the displayed waveform and numerical values of SpO<sub>2</sub> disappeared suddenly and the monitor began to sound an alarm. Double check the monitor and the ventilator, no problems were detected. On auscultation, breath sounds were clear and equal, confirming both lungs were being ventilated well. Acute pulmonary infarction was suspected. An arterial blood sample was drawn and sent for blood gas analysis. At this time, the patient opened her eyes and could respond to command. The patient was extubated, and then she could speak. She presented no sign of pulmonary infarction, although numerical values of SpO<sub>2</sub> were still not displayed on the monitor. During this period, her fingers and toes were pale, cold and dry and her blood pressure and heart rate were stable. The result of blood gas analysis was normal. We asked the patient about her medical history again. At this time, she said that she had primary Raynaud's for 6 years. About 10 min later, numerical values and waveform of SpO<sub>2</sub> began to be displayed on the monitor, and the values of SpO<sub>2</sub> stabilized at 99%. The patient was shifted to the postanesthesia recovery room 10 min later, and then was transferred to her ward after uneventful period of 2 hours.

## Discussion

We make a presumptive diagnosis of Raynaud's phenomenon which is a functional vascular disorder. The diagnosis is based on the patient's medical history and clinical presentation. To the best of our knowledge, Raynaud's phenomenon during anesthesia has not been reported before. Exact mechanism of development of Raynaud's phenomenon is not known [4]. The most common trigger is thought to be exposure to cold. Other reported triggers include emotional stress, medications, injury, smoking and the presence of other arterial diseases, et al [5]. The hallmark of Raynaud's phenomenon is ischemia of the digits in response to cold, which produces a characteristic "triphasic" color pattern, (pallor, cyanosis, rubor) as well as numbness and swelling [2,6]. In this case, the fingers and toes of the patient's are pale, cold and dry during the whole period, even when SpO<sub>2</sub> is 99% on the monitor, this symptom is not typical. The temperature in the operating room is warm and constant and Raynaud's phenomenon develops when the patient is coming to one's senses, so the most possible trigger may be the stimuli from recovery which could cause an overactive neurological reflex resulting in deregulated constriction of precapillary arterioles in a patient with Raynaud's [7]. The stimuli from recovery should be part of emotional stress.

Raynaud's disease is fairly common, affecting 3–5% of the global population with a shift in prevalence toward colder climates [2,3,7]. Despite the widespread prevalence of Raynaud's, standardized diagnostic criteria have not been thoroughly established and the current criteria are somehow complicated [4]. Therefore, many people with Raynaud's are undiagnosed. If these people undergo surgery, stimuli from anesthetic induction, intubation and recovery and surgical procedures all may lead to attack of Raynaud's phenomenon. Raynaud's phenomenon generally won't contribute to severe consequence in a short time period, because it doesn't disrupt the blood supply to vital organs, but in the surgery it may cause sudden lost of the values of SpO<sub>2</sub>, just like this case, resulting in tense and panic which are unnecessary. In this situation, End-tidal CO<sub>2</sub> monitor which our department does not have should be applied to this kind of patients and we also can send

samples for blood-gas analysis, but arterial puncture and catheterization in the distal extremities should be avoided, because Raynaud's phenomenon may be exacerbated for the injury of distal artery.

In 10–20% of cases, Raynaud's phenomenon is the initial manifestation of an associated underlying connective tissue disease, such as scleroderma, dermatomyositis, systemic lupus erythematosus, mixed connective tissue disease, Sjögren's syndrome and rheumatoid arthritis [3]. It is necessary to find the identifiable underlying disease, because the patients will benefit from early diagnosis and treatment, which will help with better anesthetic management.

In conclusion, it is important to know the whole medical history of patients'. The attack of Raynaud's phenomenon can make the displayed waveform and numerical values of SpO<sub>2</sub> disappear suddenly.

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