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Case Report

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Seconds to React: Life-Threatening Rocuronium Anaphylaxis in a High-Risk Bariatric Candidate

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ABSTRACT

Anaphylaxis during anesthesia is rare but potentially fatal. Neuromuscular Blocking Agents (NMBAs), particularly rocuronium, are among the most common triggers. We present the case of a 40-year-old male undergoing bariatric surgery who developed severe anaphylaxis immediately after Rocuronium administration during induction. The patient exhibited sudden hypotension, bronchospasm, and generalized urticaria. Rapid diagnosis and management with epinephrine, fluids, antihistamines, and corticosteroids resulted in stabilization, and surgery was postponed. Postoperative allergy testing confirmed IgE-mediated hypersensitivity to rocuronium. This case underscores the need for heightened vigilance when administering NMBAs, early recognition of anaphylaxis, and postoperative allergological evaluation in suspected cases.

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Introduction

Perioperative anaphylaxis is a life-threatening complication with an estimated incidence of 1 in 10,000–20,000 anesthetics [1]. Neuromuscular Blocking Agents (NMBAs) remain the leading cause, responsible for up to 60–70% of anesthesia-related anaphylactic reactions in several series [2]. Rocuronium, in particular, has been frequently implicated due to its quaternary ammonium structure, which can act as an allergenic determinant [3].

The risk may be higher in certain patient groups, including those undergoing bariatric surgery, where airway manipulation, multiple drug exposures, and physiological alterations increase complexity and vulnerability during induction [4]. Early identification and prompt treatment are essential to prevent morbidity and mortality.

We report a case of severe IgE-mediated Rocuronium anaphylaxis occurring during the induction of anesthesia in a high-risk bariatric surgery patient, emphasizing the importance of rapid clinical recognition and systematic postoperative evaluation.

Case Report

A 40-year-old male (Height-161 cms, Weight-135 Kgs,BMI ≈ 52 kg/m²) was scheduled for an elective Roux-en-Y gastric bypass surgery, a weight loss procedure.

The patient was admitted in the hospital a day prior to the surgery. A detailed pre anaesthesia checkup was done. Patient had no known drug allergies and an unremarkable past anesthetic history. On examination, the patient was conscious and oriented. General physical examination was unremarkable, with no pallor, icterus, cyanosis, clubbing, lymphadenopathy, or pedal edema. Findings of Cardiovascular, respiratory, abdominal, and neurological examinations were normal. Airway examination revealed predictors of difficult airway, including Mallampati class III, a short neck, and a heavy jaw, in the setting of severe obesity. The patient had a history of obstructive sleep apnea and reported using CPAP therapy at night.

Baseline laboratory investigations were within acceptable limits. Complete blood count revealed a hemoglobin level of 14 g/dL, total leukocyte count of 5,600/mm³, and platelet count of 3.43 × 10^5/mm³. Renal function was normal with a serum creatinine of 0.82 mg/dL. Coagulation parameters showed an activated partial thromboplastin time of 35.8 seconds and a prothrombin time/international normalized ratio of 12.8 seconds/1.19. Serology for hepatitis B, hepatitis C, and HIV was non-reactive. Serum electrolytes were within normal limits (sodium 143 mEq/L, potassium 4.3 mEq/L). Glycemic control was acceptable with an HbA1c of 6.1%. Preoperative chest radiograph did not reveal any abnormalities.

Patient underwent upper GI scopy on the day of surgery under moderate sedation. The procedure was uneventful. Afterwards

the patient was shifted to the operation theatre.

Intraoperative Events

Standard ASA monitoring was applied. The baseline vitals were: HR-90/minute BP- 134/80 mmhg SPO2 on rooom air -96%.

After preoxygenation, anesthesia was induced with Inj. Fentanyl and Inj. Propofol. Following this, Inj. Rocuronium 100 mg IV was administered to facilitate intubation.

Within seconds of drug administration, the patient developed a sudden and profound hypotensive episode, with blood pressure dropping to 60/30 mmHg, accompanied by tachycardia. This was associated with severe bronchospasm, evidenced by markedly elevated peak airway pressures, along with generalized erythema and urticarial rash. An anaphylactic reaction was immediately suspected.

Management of Suspected Anaphylaxis

Immediate resuscitative measures were initiated, including intravenous Inj. epinephrine boluses of 100 µg, followed by a low-dose epinephrine infusion of 0.05 mcg/kg/min. Rapid crystalloid resuscitation was undertaken, and intravenous antihistamines and corticosteroids were administered. Anaesthetic depth was increased to facilitate hemodynamic and ventilatory stability. The vitals were stabilised with the medical management.

Outcome and Postoperative Course

After the hemodynamics were stabilised, the planned surgical procedure was abandoned in view of the life-threatening anaphylactic reaction. The patient's family was counselled about the same. The patient was transferred to the intensive care unit for close monitoring and supportive care. Hemodynamic and respiratory parameters stabilized, and the patient made a complete recovery over the subsequent 24 hours. And was extubation in the intensive care unit itself.

Diagnostic Confirmation

Subsequent allergological evaluation demonstrated a positive intradermal skin test and elevated serum-specific immunoglobulin E levels against Inj. Rocuronium, confirming the diagnosis of neuromuscular blocking agent–induced anaphylaxis.

Discussion

Rocuronium-induced anaphylaxis has been consistently documented as one of the most frequent hypersensitivity reactions associated with Neuromuscular Blocking Agents (NMBAs) [2,5]. The underlying mechanism is most often IgE-mediated and involves prior sensitization to quaternary ammonium groups, which are present in many NMBAs as well as in commonly encountered household and environmental substances [3]. This explains why severe reactions may occur even on first documented exposure to the offending agent.

The clinical presentation of perioperative anaphylaxis typically includes sudden cardiovascular collapse, bronchospasm, and cutaneous manifestations such as erythema and urticaria, usually occurring within minutes of drug administration [6]. In the perioperative setting, where multiple pharmacologic agents are administered in rapid succession, distinguishing anaphylaxis from other causes of intraoperative instability can be challenging. Early signs may be masked by surgical drapes, and hemodynamic or respiratory changes may initially be attributed to inadequate anesthetic depth, airway obstruction, or mechanical causes.

In the present case, the close temporal relationship between rocuronium administration and the immediate onset of profound hypotension, tachycardia, severe bronchospasm with elevated airway pressures, and generalized cutaneous manifestations strongly supported the diagnosis of perioperative anaphylaxis. This clinical suspicion was subsequently confirmed by formal allergological evaluation, including a positive intradermal skin test and elevated serum-specific immunoglobulin E levels to rocuronium.

Patients undergoing bariatric surgery represent a particularly high-risk population. Morbid obesity is associated with altered respiratory mechanics, reduced functional residual capacity, increased airway resistance, and challenging airway management [4]. These physiological factors may exacerbate the respiratory manifestations of anaphylaxis and complicate both diagnosis and management. Consequently, rapid recognition and prompt initiation of appropriate therapy are critical in this group.

Epinephrine remains the first-line treatment for anaphylaxis due to its combined α- and β-adrenergic effects, which counteract vasodilation, bronchoconstriction, and mediator release. Early administration of epinephrine has been consistently associated with improved outcomes and reduced morbidity [7]. In this case, timely administration of intravenous epinephrine, along with aggressive fluid resuscitation and adjunctive therapy, resulted in rapid stabilization and complete recovery.

Postoperative allergological evaluation is essential following suspected perioperative anaphylaxis to identify the offending agent and guide future anesthetic planning. Cross-reactivity among NMBAs is well recognized, and alternative agents must therefore be selected cautiously [8]. Current international and regional guidelines, including the Australasian Society of Clinical Immunology and Allergy (ASCIA) Guidelines for the Acute Management of Anaphylaxis, emphasize early recognition, prompt administration of epinephrine, and referral for specialist allergy assessment after recovery. Adherence to these established guidelines is crucial to optimize patient safety and prevent recurrence during future anesthetic exposures [9].

Conclusion

Rocuronium-induced anaphylaxis, although rare, represents a potentially life-threatening perioperative emergency requiring a high index of suspicion and immediate intervention. Patients undergoing bariatric surgery may be at increased risk during anesthetic induction due to altered physiology and airway challenges. This case highlights the critical importance of rapid recognition, early administration of epinephrine, and comprehensive postoperative allergological evaluation to confirm the diagnosis and guide safe future anesthetic management.

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