

Case Report

Opioid-Free Anesthesia Management in a Patient with Fentanyl Allergy Undergoing Laparoscopic Appendectomy: A Case Report

Authors:

**Dr. Hany Fawzi W. Greiss¹, Dr. Osama Sami Maki Al Ani², Dr. Osama Ahmed Mohamed Elhanfi³,
Dr. Said Omar Jaro⁴.**

¹Head of Anaesthesia & Consultant, Rashid Hospital, Dubai Academic Health Corporation, Dubai Health

^{2,3}Anaesthesia Consultant, Rashid Hospital, Dubai Academic Health Corporation, Dubai Health

⁴Anaesthesia Registrar, Rashid Hospital, Dubai Academic Health Corporation, Dubai Health

<https://www.dubaihealth.ac/w/rashid-hospital>

Corresponding Author:

Dr. Said Omar Jaro

Anaesthesia Registrar, Rashid Hospital, Dubai Academic Health Corporation, Dubai Health

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ABSTRACT:

Laparoscopic appendectomy is a routine procedure for acute appendicitis, traditionally managed with opioid analgesics like Fentanyl. However, opioid allergies present significant challenges in anesthesia management. This case report discusses the successful application of Opioid-Free Anesthesia (OFA) in a 19-year-old female patient with a known Fentanyl allergy. The patient developed an allergic reaction after receiving Fentanyl in the Emergency Room. Consequently, an OFA approach was adopted for her laparoscopic appendectomy. The anesthesia regimen included Dexmedetomidine, Lidocaine, Propofol, and Rocuronium for induction, with sevoflurane for maintenance and multimodal analgesia using Perfalgan and Dynastat. The patient's intraoperative hemodynamics remained stable, and she was smoothly extubated post-surgery. Postoperatively, she experienced no pain, nausea, or vomiting and was discharged from the PACU with stable vital signs. This case underscores the feasibility and effectiveness of OFA in managing patients with opioid allergies, ensuring safe and effective perioperative outcomes.

Keywords: *allergic reaction management, dexmedetomidine, multimodal analgesia, non-opioid anesthesia, perioperative management*

INTRODUCTION:

Laparoscopic appendectomy is a commonly performed surgical procedure for treating acute appendicitis [1]. Traditionally, opioid analgesics such as Fentanyl are extensively used in anesthesia management to provide adequate pain control during and after surgery [2]. However, the occurrence of opioid allergies, particularly Fentanyl, poses significant challenges in anesthetic management [3].

Opioid allergies, although rare, can have severe consequences, ranging from mild dermatologic reactions to life-threatening anaphylaxis. Fentanyl, a synthetic opioid, is a cornerstone of modern anesthesia practice due to its potent analgesic properties and hemodynamic stability. However, allergic reactions to Fentanyl, as reported in some studies, necessitate alternative anesthesia approaches to avoid adverse effects. According to a study by Mali et al., the incidence of perioperative anaphylaxis is estimated to be between 1 in 4000 to 1 in 25,000 cases, with opioids accounting for a significant proportion of these reactions [4].

Opioid-Free Anesthesia (OFA) has emerged as a viable alternative in managing patients with opioid allergies or those at risk of opioid-induced adverse effects. OFA techniques utilize non-opioid medications such as Dexmedetomidine, Lidocaine, and Propofol, among others, to achieve effective anesthesia and analgesia. Recent studies have demonstrated the efficacy of OFA in providing adequate pain control while minimizing opioid-related complications. For instance, a study by Tochie et al. highlighted that OFA could be successfully employed in various surgical procedures, ensuring patient safety and comfort without the need for opioids [5].

The use of OFA is particularly relevant in patients with known opioid allergies. Dexmedetomidine, a selective alpha-2 adrenergic agonist, is frequently utilized in OFA protocols due to its sedative, anxiolytic, and analgesic properties [6]. Additionally, multimodal analgesia, incorporating agents like Lidocaine and non-steroidal anti-inflammatory drugs (NSAIDs), further enhances pain control while mitigating the risk of opioid-induced side effects [7]. Studies such as

those by Wang et al., have confirmed the effectiveness of Dexmedetomidine in maintaining hemodynamic stability and providing analgesia in OFA settings [8]. This case discusses the feasibility and effectiveness of OFA in managing patients with opioid allergies, ensuring smooth intraoperative and postoperative outcomes.

Case Presentation:

Patient History:

A 19-year-old female patient with a history of Fentanyl allergy was admitted to the hospital for acute appendicitis.

The patient's height was 162 cm and body weight was 50 kg.

Clinical Presentation:

The patient presented with acute appendicitis and was initially treated with Fentanyl in the ER, which led to an allergic reaction.

Adverse Reaction:

She received Fentanyl 50 micrograms IV in the Emergency Room (ER) and subsequently developed an allergic reaction, few hours before surgery.

Surgical Intervention and Anesthetic Management:

The patient underwent a laparoscopic appendectomy. Given the patient's known Fentanyl allergy, an Opioid-Free Anesthesia (OFA) approach was adopted. For induction, Dexmedetomidine induction dose 1 microgram /Ideal BW was administered over 10 minutes IV, along with 80 mg of Lidocaine IV (1.5mg/kg) , 120 mg of Propofol IV, and 50 mg of Rocuronium IV. Intubation was then performed. Anesthesia was maintained with sevoflurane 1 MAC, and Dexmedetomidine maintenance dose 0.2-0.5 microgram /ideal BW/hour IV infusion, and multimodal analgesia was provided prior the surgical incision, using Ketamine (0.25mg/kg) IV, Paracetamol (15mg/kg) IV, and Parecoxib 40 mg IV. Antiemetics were also given intravenously, Dexamethasone 8 mg IV after intubation and Ondansetron 8 mg IV at the end of surgery. The patient's hemodynamics remained very stable during general anesthesia, and she was smoothly extubated post-surgery after reversal with Sugammadex 200 mg IV and TOF monitor. The anesthesia monitoring chart provides a detailed record of the patient's intraoperative hemodynamic stability, showing consistent vital signs throughout the procedure (Figure 1).

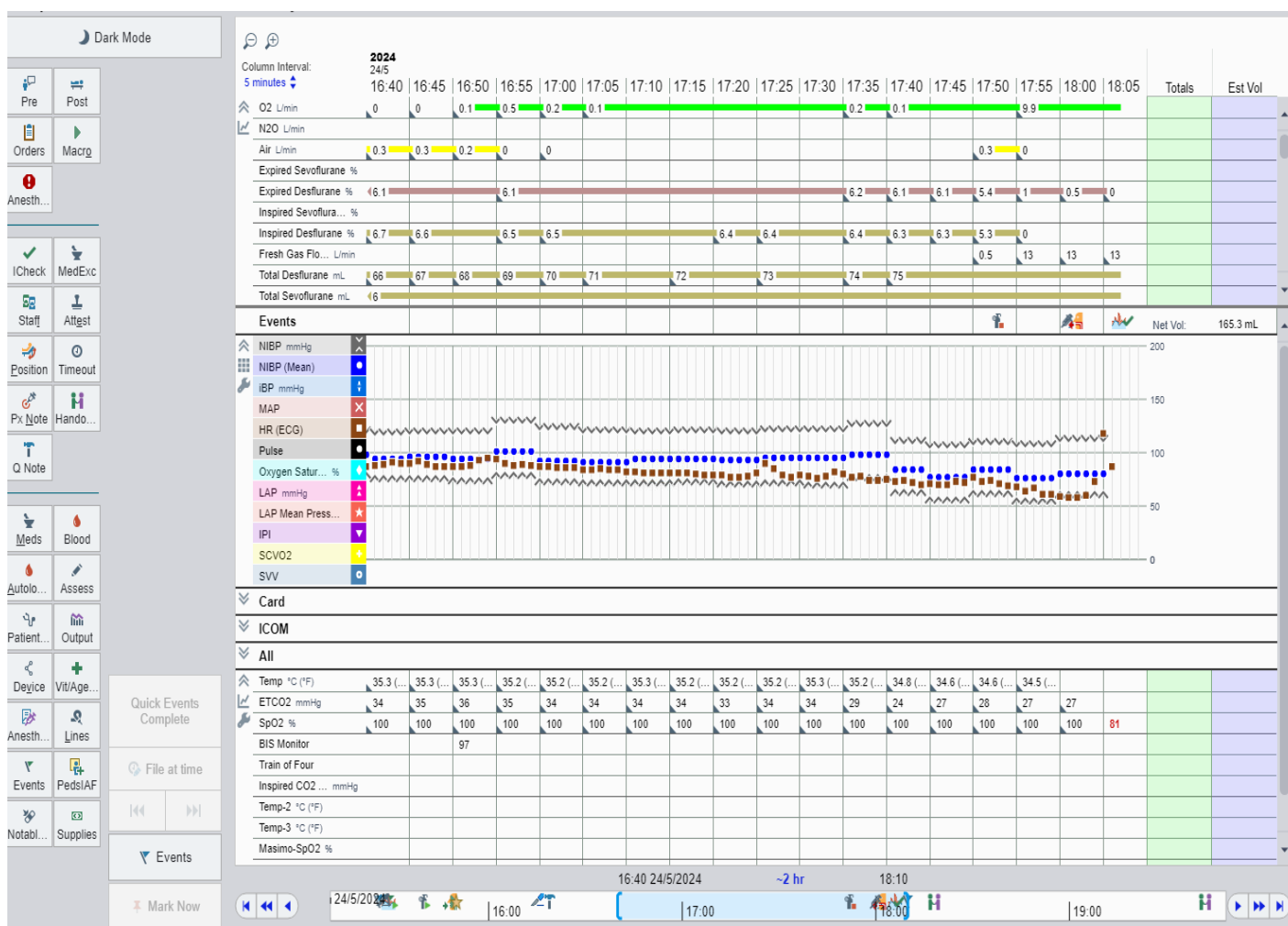


Figure 1 Anesthesia monitoring chart showing intraoperative hemodynamic stability and consistent vital signs Postoperative Management.

In the Post-Anesthesia Care Unit (PACU), the patient reported no pain, nausea, or vomiting. She was discharged from PACU to the ward with regular IV doses of Paracetamol (15mg/kg) IV four times per day for two days, and Parecoxib 40 mg IV twice daily for two days for postoperative analgesia. The patient summary notes (Figure 2) document the initial adverse reaction to Fentanyl and the subsequent management plan.

Chart Review

Encounters Anesthesia Surgeries Notes Labs Imaging Cardiac Tests Procedures Medications LDAs Media Letters Episodes Referrals Other Orders SnapShot

Refresh (22:17) Route Review Selected Preview Encounter Add to Bookmarks Lifetime

Filters Me

When

Recent Visits

24/05/2024

Patient summary reviewed and Nursing notes reviewed

Airway Mallampati: II TM distance: >3 FB Neck ROM: full Mouth opening: normal	Dental - normal exam
Pulmonary - negative ROS and normal exam breath sounds clear to auscultation	Cardiovascular - negative ROS and normal exam Rhythm: regular Rate: normal
Neuro/Psych - negative ROS Best Eye Response: 4 Best Verbal Response: 5 Best Motor Response: 6 GCS Total: 15	GI/Hepatic/Renal Comments: Acute appendicitis
Endo/Other - negative ROS	Abdominal

19 yr old female patient posted for appendectomy.

Denied any previous medical or surgical hx

Received 50mcg fentanyl after that she developed rash, lip numbness, itching and some breathing difficulty.

Smoker 8 cig./day
Drinks alcohol

LMP 19/5/24

Last oral intake on 24/5/24 at 0200H

Comments: |-----|
| 24/05/24 |

Figure 2 Patient summary notes showing the initial adverse reaction to Fentanyl and the subsequent management plan

DISCUSSION:

This case illustrates the successful management of a laparoscopic appendectomy in a patient with a known Fentanyl allergy using an OFA approach. The decision to employ OFA was pivotal in preventing further allergic reactions and ensuring patient safety. The patient's stable hemodynamics and smooth extubation align with findings from studies that have shown the effectiveness of OFA in maintaining intraoperative stability and reducing postoperative complications [9, 10].

The use of Dexmedetomidine as part of the induction protocol played a crucial role in this case. Dexmedetomidine, a selective alpha-2 adrenergic agonist, has been shown to provide adequate sedation and analgesia while maintaining cardiovascular stability. In a study by Reddy et al., Dexmedetomidine was found to enhance perioperative hemodynamic stability and reduce the need for additional analgesics,

supporting its use in OFA protocols [11]. This aligns with our findings, where the patient exhibited stable hemodynamics throughout the procedure.

Lidocaine and Propofol were also integral to the anesthetic management in this case. Lidocaine, known for its analgesic and anti-inflammatory properties, has been used successfully in OFA to blunt the stress response to intubation and reduce postoperative pain and opioid consumption [12]. A study by Xie et al. demonstrated that perioperative systemic Lidocaine reduced postoperative pain and accelerated recovery in patients undergoing various surgical procedures [13]. Similarly, Propofol, a widely used induction agent, ensured smooth induction and maintenance of anesthesia without opioid-related side effects, consistent with the outcomes reported in this case [14]. The multimodal analgesia approach, incorporating Paracetamol (acetaminophen), Parecoxib, and Ketamine, further highlights the efficacy of non-opioid

analgesics in managing postoperative pain. Studies have shown that combining different analgesic modalities can enhance pain control while minimizing opioid use. For instance, a study by Bhatia et al. demonstrated that multimodal analgesia significantly improved postoperative pain management and reduced opioid consumption in surgical patients [15]. Our patient's experience of no pain, nausea, or vomiting in the PACU underscores the benefits of this approach.

The absence of postoperative nausea and vomiting (PONV) in this case is particularly noteworthy. PONV is a common complication associated with opioid use in anesthesia. The opioid-free regimen likely contributed to the patient's lack of PONV, aligning with findings from various studies indicating that OFA reduces the incidence of PONV. A study by Zhang et al. found that OFA significantly decreased the incidence of PONV compared to traditional opioid-based anesthesia, enhancing overall patient satisfaction and recovery [16].

The successful implementation of OFA in this case demonstrates significant clinical implications for managing patients with opioid allergies or those at risk of opioid-induced adverse effects. By utilizing non-opioid agents such as Dexmedetomidine, Lidocaine, Ketamine, and multimodal analgesia, healthcare providers can effectively maintain hemodynamic stability, ensure adequate pain control, and minimize postoperative complications like nausea and vomiting. This approach not only enhances patient safety and comfort but also supports the growing movement towards reducing opioid use in perioperative care, aligning with current best practices and guidelines for improving surgical outcomes and patient satisfaction [17].

CONCLUSION:

This case highlights the effective use of OFA in managing a 19-year-old female patient with a known Fentanyl allergy who underwent a laparoscopic appendectomy. By employing alternative agents such as Dexmedetomidine, Lidocaine, Ketamine, Propofol, and multimodal analgesia, the anesthesia team successfully maintained hemodynamic stability, provided effective pain control, and avoided the complications associated with opioid use. The patient's smooth intraoperative and postoperative course, as evidenced by the absence of pain, nausea, or vomiting, underscores the feasibility and benefits of OFA in patients with opioid allergies, demonstrating a safe and effective approach to anesthesia management in such cases.

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