ECRONICON OPEN ACCESS

EC ANAESTHESIA
Case Report

Iatrogenic Accidental Remifentanil Bolus

Monkez Almasri*

Obstetric Anesthesia Consultant, Anesthesia Department, Women's Hospital, Hamad Medical Corporation, Doha, Qatar

***Corresponding Author:** Monkez Almasri, Obstetric Anesthesia Consultant, Anesthesia Department, Women's Hospital, Hamad Medical Corporations, Doha, Qatar.

Received: March 28, 2018; **Published:** June 13, 2018

Abstract

This case discusses a super obese patient underwent laparoscopic assisted vaginal hysterectomy. unintentional remifentanil bolus of unknown volume given to the patient at the end of surgery due to technical error, patient developed hypotension bradycardia and delayed recovery.

Keywords: *Iatrogenic; Remifentanil Bolus; Laparoscopic Assisted Vaginal Hysterectomy*

Introduction

When using infusion pumps, it is essential that clinical staff know how to use them, and their limitations. Safe and effective management of continuous drug infusions depends on the understanding of the dynamics of the delivery system.

Remifentanil is an ultra-short acting opioid, it has been established as the drug of choice for TIVA with Propofol. Its pharmacokinetic profile is best described by a 3 compartment model and is characterized by a small volume of distribution at steady state (Vss) of 0.3 - 0.4 L/kg. This explains its short-acting effect and is reflected by its very short context-sensitive half-time (3-4 min) that is independent of infusion duration. It has a rapid clearance (2.5 - 3.0 L/min), a short elimination half-life (50 - 60 minutes) and is easily titrable.

Depth of Anaesthesia monitoring such as BIS, Entropy and AEP, can reduce the incidence of intraoperative awareness, but is not mandatory for all patients.

Drug dosage should always be adjusted according to the response of the patient. Post-operative rescue analgesia is required once a remifentanil infusion has been switched off.

Case Report

54 y old HTN, on bisoprolol, well controlled, super Obese, WT 131.5, Ht 161, BMI 50.7, STOP BANG score 4/8 (intermediate risk of OSA). Patient scheduled for Laparoscopic assisted vaginal hysterectomy +- laparotomy.

Anaesthesia Technique

General anesthesia planned, routine monitoring of noninvasive blood pressure, electrocardiography (ECG) and pulse oximetry (SpO_2) was initiated, BIS and TOF monitor connected.

Patient has 2 cannula sizes 18 first cannula (Rt hand dorsum) connected to 3 way with Ringer lactate slow infusion AND Remifentanil (both infusion has no one way valve connected).

The other cannula (Rt forearm) was the main canula for fluid management. Left radial Invasive arterial line inserted.

Induction

Patient induced with 100 Mcg Fentanyl 100 mg Propofol 200 mg, Rocuronium 80 mg, ventilation and intubation was easy, Cormack-Lehane grade II.

Maintenance

- Desflurane 6%, air/O_2 50%, Remifentanil connected to the 3 way and 10 ml/hour infusion started, Rocuronium 10 mg intermittent doses,
- And phenylephrine around 1000 - 1500 mcg (10 - 15 ml)/hour started due to post induction hypotension.
- Patient positioned for laparoscopy her both hands were tucked on her side wrapped with a sheet.
- Laparoscopy was difficult and converted to laparotomy.
- At this time Anesthesia shfit changed, handover done to another anesthetist.
- Intraoperative depth of anesthesia was monitored by BIS, muscle relaxation monitored by TOF.
- Patient was vitally stable, 10 minutes later patient desaturated, bilateral air entry confirmed, recruitment maneuver done, spo_2 increased and saturation maintained above 95% on 45% Fio_2.
- At the end of the surgery remifentanil infusion discontinued, fentanyl 50 mcg IV given, Total intraoperative drug doses: Propofol 200 mg rocuronium 130 mg Fentanyl 150 Mcg ondansetron 4 mg, dexamethasone 8 mg, paracetamol 2g, diclofenac 75 mg.

Recovery

- Desflurane discontinued, muscle relaxant reversal (Sugamadex) given.
- Drapes and sheet removed, the technician noticed the line of remifentanil locked, patient developed hypotension and bradycardia (51/min) when the lock opened the lock, retrograde flow to the ringer lactate fluid noticed. The bag and iv set removed, Glycopyrrolate 0.2 mg IV given. Delayed recovery for around 15 minutes due to accidental remifentanil dose.
- Patient extubated successfully after 800 mg sugammadex and 100 mg Doxapram.

Recovery

This near miss incidence occurred due to multiple factors:

- Not using One-way valve during remifentanil infusion.
- Iv lines were not visible intraop.
- Shift change is critical period it need proper thorough handover.
- No checklist for infused drugs, TCI, TIVA.

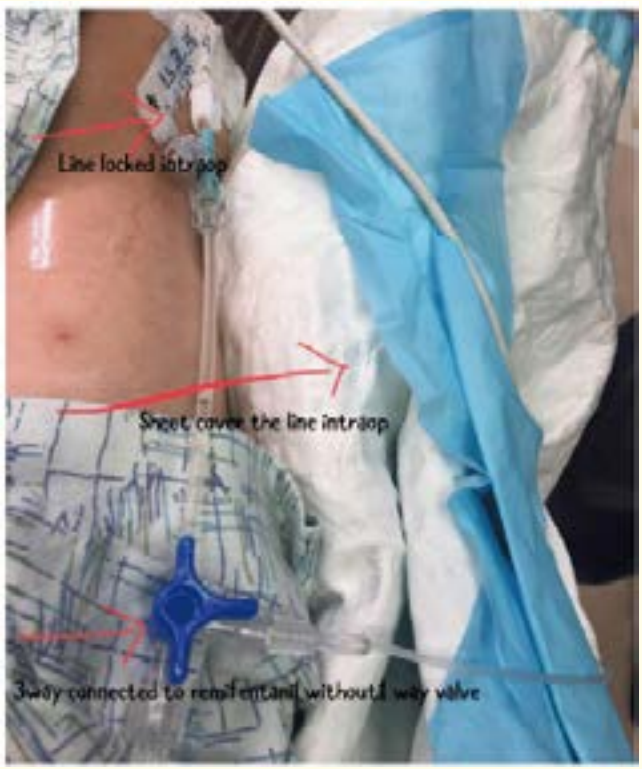
Previously there were many remifentanil overdose case reports related to pump malfunction or human error.

Steffen M., *et al*. [1] published in 2017 a life-threatening remifentanil overdose resulting from the misuse of a syringe pump.

Another case report published by Bakan M., *et al*. [2] in 2006 a case of Inadvertent bolus administration of high-dose remifentanil during anesthesia in a 6-year-old girl.

Montserrat., *et al*. [3] in 2011 published a case of Remifentanil overdose in obstetric analgesia caused by a defective syringe in a patient-controlled analgesia system.

Our case report highlights the importance of using non-return valve during intravenous medication infusion [4-7].


Line locked intraop
Sheet cover the line intraop
3way connected to remifentanil without 1 way valve


Line locked intraop
Sheet cover the line intraop
3way connected to remifentanil without way valve


Remifentanil bolus flow

Conclusion

Drug infusion can lead to catastrophic consequences like inadequate analgesia, awareness, near miss, and death. It needs careful setup and management.

Suggested checklist minimizes errors during TIVA

1. Conduct an apparatus checkout before administration of Anaesthesia.
2. Ensure that the batteries of the pumps are charged.
3. Ensure the occlusion alarm has been set.
4. Use non-return/one-way valves on any intravenous line.
5. If a one-way valve is not available, use a dedicated intravenous cannula G20 and above for TCI.
6. Use Luer Lock systems.
7. Clearly label intravenous connectors and valves.
8. Minimize dead space.
9. Avoid non-invasive blood pressure (NIBP) monitoring on the same arm as the intravenous infusion.
10. Sites of intravenous infusions should be visible and intermittently monitored for dislodgement or extravasation.
11. Do not run vasoactive drugs and TCI through the same intravenous line. 18. Avoid high concentrations of drugs running at low speeds.

Bibliography

1. Steffen M., *et al.* "Critical infusion incident caused by incorrect use of a patientcontrolled analgesia pump". *Anaesthesiologie Und Reanimation* 27.4 (2002): 107-110.

2. Bakan M., *et al*. "Inadvertent bolus administration of high-dose remifentanil during anesthesia in a 6-year-old girl". *Pediatric Anaesthesia* 16.11 (2006): 1202.

3. Montserrat JM and Pérez-Hick PA, "Remifentanil overdose in obstetric analgesia caused by a defective syringe in a patient-controlled analgesia system". *Revista Española de Anestesiología y Reanimación* 58.8 (2011): 530-531.

4. Keay S., *et al.* "The safe use of infusion devices". *Continuing Education in Anaesthesia, Critical Care and Pain* 4.3 (2004): 81-85.

5. Lovich MA., *et al.* "The impact of carrier flow rate and infusion set dead-volume on the dynamics of intravenous drug delivery". *Anesthesia and Analgesi*a 100.4 (2005): 1048-1055.

6. Schraag S and Flaschar J., "Delivery performance of commercial target-controlled infusion devices with Diprifusor (R) module". *European Journal of Anaesthesiology* 19.5 (2002): 357-360.

7. Total Intravenous Anaesthesia (Pocket Reference - 2nd Edition).

Volume 4 Issue 7 July 2018