

## **CASE REPORT: OPIOID FREE ANESTHESIA IN LAPAROSCOPIC RIGHT HEMICOLECTOMY WITH ILEO-TRANSVERSAL EXTRACORPOREAL ANASTOMOSIS**

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### **Abstract**

Lately, anesthesiologists tend to reduce the use of opioids due to their side effects whether it is during surgery or in post-surgery period. This case shows that the use of opioid free anesthesia consisting of a combination of magnesium sulfate, ketamine and lidocaine in a patient undergoing laparoscopic abdominal surgery, also reduces the post operative use of opioids.

**Key Words:** *magnesium, multimodal approach, laparoscopic surgery, lidocaine, ketamine, opioid free anesthesia.*

### **Introduction**

Laparoscopy is a type of surgical procedure that allows a surgeon to access the inside of the abdomen and pelvis without making large incisions in the skin. This procedure is also known as minimally invasive surgery. The advantages of this technique versus open surgery include: a shorter hospital stay and faster recovery time, less pain and bleeding after the operation and reduced scarring. Though laparoscopic surgeries are considered relatively painless and are associated with early recovery and lesser duration of hospital stay, they can cause severe pain, especially in the first 4 hours of the immediate post-operative period due to carbon dioxide intraperitoneal inflation resulting in abdominal distension and increased abdominal pressure (1).

Laparoscopic surgeries are usually performed in general anesthesia. It is up to the anesthesiologist to decide whether it will be a combination of inhaled anesthetics with intravenous anesthetics or only TIVA. Intravenous opioids are commonly used to provide analgesia and supplement sedation during general anesthesia or monitored anesthesia care. Even though they provide analgesia, opioids have been associated with significant side effects such as dizziness, sedation, nausea, constipation, vomiting, physical dependence, muscle rigidity, tolerance, respiratory depression and addiction (2). Acute surgical pain in the immediate post-operative period is a significant risk factor for the development of chronic pain and its controlling is crucial for reducing the risk of chronic post-operative pain (3). Anesthesiologists play an important role in identifying at-risk patients for long-term opioid use, and that is why it is important to reduce perioperative opioid administration and decrease related side effects (4).

In this case we would like to provide multimodal analgesia with drugs other than opioids such as lidocaine, magnesium sulfate and ketamine for perioperative analgesia with an aim to reduce opioid requirement and its associated adverse effects.

### **Case Report**

A 76-years-old woman underwent a cecum polypectomy several years ago. On a scheduled total colonoscopy, for the second time there had been a polyp with a diameter of 2cm present on the cecum. Another polyp with 1cm diameter was presented on the right flexure, and along the large intestine several diverticula predominantly in the left colon were present. Hemorrhoids piles of I-II grade were present in the anus. After the exam, the given diagnose was polyp on the coecum perpendicular polyp, hemorrhoids grade I-IV, st after polypectomy aa V. The patient was scheduled for elective colonoscopy polypectomy the next day. Since it was not successful, the patient was submitted for elective laparoscopic surgery. As with all standard elective surgeries, the patient came into the anesthesiology pre-operation checkup. The patient was ASA 4 classification with history of hypertension, COPD and heavy smoker, gallstones, renal cyst, glaucoma, DM type II with a long list of allergies on different medications, such as acetylsalicylic acid, diclofenac and grass. The patient had a normal ECG with no abnormalities, TA 160/60, HR 60 beats/min, SaO<sub>2</sub> 98%, body weight 70 kilograms, vesicular auscultation on both lungs during the exam. Blood work analysis preoperatively showed Hbg 123, RBC 3.84, HCT 0.360, WBC 7.5, PLT 328, CRP 1.9, normal serum protein status, normal electrolytes status, normal AST and ALT levels and normal urea and creatinine levels, Glu 9.8. Patient was advised to fast from 18h in the afternoon until the time of the surgery. On the day of the surgery, the patient was given a sedative (diazepam 5mg) preoperatively and was submitted in the OR a couple of hours later. After the standard monitoring of vital parameters, the anesthesiologist proceeded with preoxygenation with 100% oxygen with high flow of 10l/min for several minutes while induction in anesthesia. For induction it was used a multimodal approach: diazepam 2.5mg; opioid (fentanyl 0.15mcg/kg = 100mcg); ketamine 35mg; lidocaine (1mg/kg = 70mg); dexamethasone 4mg; propofol (2mg/kg=140mg): long lasting muscle relaxant pancuronium 1mg, succinylcholine 100mg and after intubation with endotracheal tube number 7.5, another dose of long-lasting muscle relaxant pancuronium 5mg. Inhaled anesthetic sevoflurane was administrated with 2%. Since the goal was opioid free perioperative anesthesia, in a 50ml syringe were combined magnesium sulfate 3g (25-50mg/kg), lidocaine 2% 140mg (2mg/kg) and ketamine 42mg (0.2mg/kg/h) for continuous infusion for maintenance of anesthesia combined with sevoflurane 3%. During the surgery, the patient was hemodynamically stable with BP 100-150 systolic and steady HR of 60 beats/min and SaO<sub>2</sub> of 100% with MAC 0.9-1.1. No extra opioids were required. Intravenous continuous crystalloid fluids 3000ml were administrated and diuresis was normal with 900ml urine at the end of the 5 hours long surgery. After extubation, the patient was sent in PACU. Pain scores, vital signs and monitoring were done at 0, 2, 4, 6, 12, 24 hours postoperatively and rescue non-opioid analgesic paracetamol of 1g was given if pain score was >5 and if pain score was >8 tramadol 100mg was given.

## **Discussion**

The purpose of this abstract is to show the beneficial side of opioid free perioperative anesthesia. Opioids as a group of drugs are used in perioperative pain management and acute postoperative pain. They act as blockers on the sympathetic nervous system in order to block the pathway of nociceptive signals. Many studies have shown that patients who underwent opioid perioperative pain management seem to require up to 25-30% more opioids in the postoperative period. Even though opioids offer fast onset of action, and they are great for analgesia, they also have side effects. One of them is acute tolerance, postoperative nausea and vomiting, sleep deprivation, euphoria, urinary retention, pupillary constriction and respiratory depression. In order to bypass all these side effect, but still manage to secure adequate pain control, a new approach has been suggested not long ago called multimodal general anesthesia. It represents a combination of inhaled anesthetics with non-opioid drugs which block the nociceptive signal pathways such as ketamine, lidocaine, magnesium sulfate,

dexmedetomidine. In this specific case, ketamine (0.2mg/kg/h), lidocaine (2% - 2mg/kg), magnesium sulfate (25-20mg/kg) were placed in a 50ml syringe for continuous infusion for anesthesia maintenance combined with 2% sevoflurane in perioperative pain management as opposed to opioids.

Lidocaine is a local anesthetic which has found its place in general anesthesia due to its effects: reversible blockage of impulse transfer through nerve fibers important for regional anesthesia, antiarrhythmic, anti-inflammatory and antibacterial action. Lidocaine's most important action is the anti-nociceptive one with blocking the sodium and potassium channels in the medulla spinalis. With its fast onset of action and lesser toxicity, it has become a drug of choice for opioid-free anesthesia. The second drug used is ketamine. It is a dissociative anesthetic used for induction and maintenance of anesthesia, a hypnotic drug but in contrary to opioids it does not cause respiratory depression, but it causes involuntary movement and amnesia. Positive effects and actions of ketamine are analgesia, antidepressant and bronchodilator. Ketamine is proven useful in postoperative nausea and vomiting, but only if administered in sub anesthetic doses. Magnesium sulfate took its place in perioperative use not long ago. It has a wide spectrum of use, the most commonly in pregnancy regarding preeclampsia. Magnesium sulfate has also antiarrhythmic, anti-inflammatory, neuroprotective role, and it was proven to be useful in treatment of asthma and postoperative tremor and hypercoagulability. By itself, magnesium sulfate is not a potent analgesic, however it does enhance the time of action of the non-depolarizing muscle relaxants, and also blocks the nociceptive signal pathways.

### **Conclusion**

Continuous infusion of this solution during perioperative period, combined with sevoflurane 2% and single dose of steroid dexamethasone achieve co-analgesia, without the use of opioids (5,6) resulting in opioid free acute postoperative pain management within the first 24 hours and no postoperative nausea and vomiting.

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