

## Opioid and Hypnotic Free Anaesthetic Technique for Colonoscopy- Intravenous Lidocaine Infusion in a Frail Patient

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### Abstract

Opioids and hypnotic drugs have undesired side effects including sedation and respiratory depression, which makes these drugs unsuitable in some clinical situations. Lidocaine is a local analgesic with anti-inflammatory and anti-hyperalgetic properties, with a promissory applicability in everyday anaesthesia cases. Authors present a case of an urgent colonoscopy procedure on a 67-year-old patient with a pulmonary neoplasm and respiratory insufficiency, managed with lidocaine bolus and infusion, without additional anaesthetic drugs. Good analgesia was achieved and hemodynamic stability was maintained throughout the procedure. The technique was considered satisfactory to the patient and the medical team. This case report suggests that lidocaine seems to provide adequate level of consciousness and analgesia without respiratory depression for colonoscopy procedures, which might be crucial in a frail population.

**Keywords:** Case report; Intravenous lidocaine; Opioid-free; Sedation; Colonoscopy; Analgesia; Frailty

### Introduction

Opioids and hypnotic drugs have undesired side effects including sedation and respiratory depression, which makes these drugs unsuitable in some clinical situations. Lidocaine is a local analgesic with anti-inflammatory and anti-hyperalgetic properties [1]. Lidocaine infusion has been highly investigated and recent meta-analysis concluded that in some procedures (for instance open and laparoscopic abdominal) it reduces pain scores, opioid requirements, nausea, length of hospital stay and ileus [1,2]. However, its dosage, perfusion duration and patient selection are not totally defined. In our department the benefits of lidocaine usage in multiple procedures is recognized and is currently part of many clinical protocols, being in line with published data [3].

The authors describe a colonoscopy procedure on a patient with a pulmonary neoplasm and respiratory insufficiency, managed with intravenous lidocaine bolus and infusion, without additional anaesthetic drugs. Patient consent for writing and publication was obtained. The authors have declared no conflict of interests or financial support.

### Case Report

A 67-year-old man presented at the endoscopic centre for an urgent colonoscopy under sedation. Patient details: weight 84 kg, height 176 cm, adjusted body weight (ABW) 79.2 kg, body mass index 27.1 kg/m<sup>2</sup>. Clinical history: right pulmonary neoplasm (T1N3M1, ganglionic metastasis) under chemotherapy for two years, with a current deterioration of pulmonary function and diagnosis of a left pleural effusion, on domiciliary oxygen for 3 h/day. Other comorbidities

included essential hypertension, dyslipidemia, ischaemic heart disease (myocardial infarction and coronary artery bypass surgery in 2008), chronic obstructive pulmonary disease, active smoker (96 pack-year), prostate adenocarcynoma under surveillance (Gleason 7). Classification: ASA physical status IV, Clinical Frailty Scale 9. Medication: sertraline, bisoprolol, indacaterol, fenofibrate, acetylsalicylic acid, atorvastatin, prednisone, furosemide, tramadol, acetilcysteine. Arterial blood gas analysis showed a type 1 respiratory insufficiency (FiO<sub>2</sub> 0.28)-pH 7.489, pO<sub>2</sub> 53 mmHg, pCO<sub>2</sub> 33.1 mmHg, HCO<sub>3</sub> 25.1 mmol/L, SatO<sub>2</sub> 89%. Biochemistry and haematology had no disturbances. Chest X-ray revealed a massive left pleural effusion. Head computed tomography (CT) scan showed evidence of severe ischaemic leukoencephalopathy.

In order to exclude a colonic neoplasm a colonoscopy had to be performed emergently. Due to patient clinical situation it was decided to do the procedure under intravenous bolus and infusion of lidocaine. Patient and gastroenterologist were informed and consented the strategy.

The patient had a basal pulse oximetry of 74% in supine position, rising to 93% with oxygen supplementation with nasal cannula at 4 L/min and back elevation to 60°C. Monitoring was performed according to ASA standards of care, in addition to capnography.

An intravenous bolus of lidocaine of 2 mg/kg of ABW was administered and followed by a 2 mg/kg/h of ABW infusion. Pulse oximetry was never under 92% throughout the procedure. Vital signs remained between the following intervals: End-tidal CO<sub>2</sub> 22-36 mmHg, respiratory frequency 11-16 cpm, heart rate 65-82 bpm (sinus rhythm), systolic blood pressure 132-145 mmHg, diastolic blood pressure 75-95 mmHg. The Ramsey and Richmond scale during the procedure were 2 and 0, respectively. The anaesthesiologist registered a numerical pain rating scale (NPRS) of "0" consistently, except from 1

min while the gastroenterologist overcame the ileocecal valve, when NPRS was 1.

The procedure lasted 27 min and was uneventful. No colonic lesions were found. The patient was discharged 2 h after the end of the procedure without complications and, when questioned about repeating the same anaesthetic technique in future procedures he answered positively.

At 6 months follow up patient clinical situation remained stable, under nivolumab 3 mg/kg every 15 days. Bilateral pulmonary lesions were reported as having similar dimensions in last CT scan, without pleural effusion.

## Discussion

Our patient required a careful titration of drugs, as pulmonary function and hemodynamic stability needed to be maintained. Lidocaine presented as a good option regarding vast reports on its local anaesthetic, anti-inflammatory, antiarrhythmic, analgesic and bronchodilator properties. Mechanisms of action include sodium channel blockade, interaction on multiple channels ( $\text{Ca}^{2+}$ , NMDA,  $\text{K}^{+}$ ) and modulation of inflammatory signalling, with blockade of the release of cytokines and reactive oxygen species [1,4]. The authors' goal was to use the minimum drugs possible as to avoid interactions and side effects as well as sedation, providing an adequate level of analgesia. Some drugs with known interactions with lidocaine are volatile anaesthetics, propofol, magnesium sulphate, ketamine, clonidine or beta-blockers [5]. Literature recommends using bolus of 1-2 mg/kg of actual body weight [1,5]. Use of ideal body weight is recommended in patients with  $\text{BMI} > 30 \text{ kg/m}^2$  [6]. As this patient presents multiple comorbidities we decided to use the adjusted body weight as an intermediate measure. Given the short duration of the procedures, no additional adjustments were necessary, as toxicity was not expected using clinical doses in a period under 1 h.

Studies analysing IV lidocaine efficacy in endoscopy procedures are scarce. In a randomized controlled trial from 2016 IV lidocaine bolus followed by infusion reduced fentanyl requirements and patient movement during endoscopic submucosal dissection [7]. In this same study sedation and analgesia were obtained with the use of propofol and fentanyl, different from our case report, which did not include any hypnotic or opioid. Our case brings a new perspective to providing analgesia in an opioid and hypnotic free anaesthesia technique.

Being extensively metabolized in liver and with a high binding to plasma proteins, special attention should be given in patients with comorbidities such as liver disease, severe renal or heart failures and acid-base disturbances [8]. Concerning toxicity risk, literature refers that at clinical doses of lidocaine infusion the cardiac protective effect is superior to its possible cardiac toxicity [5].

## Conclusion

Lidocaine seems to provide adequate level of consciousness and analgesia without respiratory depression for colonoscopy procedures. Maintenance of analgesia and hemodynamic stability in awake patients is critical. The anaesthetic technique was suitable for our patient, the gastroenterologist and the anaesthetic team. More studies need to be developed in order to understand the value of intravenous lidocaine in providing adequate analgesia in ambulatory procedures such as gastrointestinal endoscopic procedures in patients with similar comorbidities.

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