



CASE REPORT

Epidural anesthesia and non-invasive ventilation for radical retropubic prostatectomy in two obese patients with chronic obstructive pulmonary disease

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Enfermedad pulmonar obstructiva crónica

Abstract We report two cases of anesthesia for radical retropubic prostatectomy (RRP) in obese-chronic obstructive pulmonary disease (COPD) patients using the combination of epidural anesthesia and non-invasive ventilation (NIV). This technique avoided intubation, general anesthesia and perioperative pulmonary complications.

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Anestesia epidural y ventilación no invasiva para prostatectomía radical retropúbica en dos pacientes obesos con broncopatía crónica obstructiva

Resumen Se describe el procedimiento anestésico en dos pacientes obesos con broncopatía crónica obstructiva que se llevó a cabo mediante la combinación de anestesia epidural y ventilación no invasiva. Esta técnica permitió evitar la intubación, la anestesia general y complicaciones pulmonares perioperatorias.

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Introduction

Radical prostatectomy is a surgical approach widely used for patients with non-metastatic carcinoma of the prostate. General anesthesia is the most frequent type of anesthesia used during RRP.¹ Several studies have shown that either epidural or spinal anesthesia are useful alternatives to

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general anesthesia in terms of clinical outcomes.² The patients present with several co-existing diseases such as obesity, coronary artery and cerebrovascular diseases, COPD, heart failure, and chronic renal failure.³ Obesity and COPD can increase the risk of pulmonary complications in the postoperative period, regardless of the type of anesthesia.^{4,5}

NIV has become an effective treatment to reduce morbidity and mortality in patients with either hypercapnic⁶ or non-hypercapnic⁷ acute respiratory failure. Its use has been restricted to critical care of intermediate care patients, and little data are available on its usefulness in the perioperative period. Several reports have suggested that NIV combined with regional anesthesia could avoid pulmonary complications in patients with acute or chronic respiratory failure.^{8–12}

We present two obese patients with COPD undergoing RRP in whom a combination of lumbar epidural anesthesia with NIV to assist spontaneous ventilation was successfully used.

Case reports

Case 1

A 66-yr-old obese man (110 kg, body mass index 38.5 kg m^{-2}) was scheduled for RRP of a prostate cancer. His medical history included moderate COPD, hypertension, hypercholesterolemia, and cerebrovascular disease with a transient ischemic accident six years ago. He was a heavy smoker (40-pack-yr). Preoperative respiratory function tests revealed forced vital capacity (FVC) = 3.23 L (78%), forced expired volume in 1 s (FEV1) = 1.77 L (57%), and FEV1/FVC = 54%. Preoperative clinical evaluation showed mild dyspnea that worsened in the supine position, and bilateral wheezing. The patient received no premedication before surgery. Standard noninvasive monitoring was applied, and a radial artery catheter was inserted. An epidural catheter was placed through an 18-gauge Tuohy needle at the L2–3 interspace in the sitting position. After a test dose of 2 ml 0.5% bupivacaine plus epinephrine 1:200,000, incremental doses of 5 ml 0.5% bupivacaine were injected until a T10 sensory block was achieved together with adequate motor block (total volume needed 10 ml). On arrival to the operating theatre, the patient was placed in the supine position with a 10° head-down tilt. NIV was applied with a BiPAP Vision ventilator (Respironics, Murrysville, PA, USA) via a facial mask (Fig. 1). The ventilator was initially set at spontaneous/time triggered (S/T) mode with an inspiratory/expiratory positive airway pressure (IPAP/EPAP) of 15/5 cm H_2O , a respiratory rate of 10 breaths min^{-1} , and an inspiratory/expiratory ratio of 1:2. Additional settings were an inspiratory time of 2 s, a rise time of inspiratory positive pressure of 0.2 s, and an inspiratory oxygen fraction ($F_{\text{I}}\text{O}_2$) of 0.30. IPAP and EPAP were adjusted during surgery, according to blood gases and clinical parameters. Sedation was maintained with a continuous infusion of remifentanyl $0.05 \mu\text{g}/\text{kg}/\text{min}$.



Figure 1 Patient in the supine position connected to a NIV ventilator in the operating room.

Case 2

A 63-yr-old obese man (110 kg, body mass index 39.4 kg m^{-2}) was scheduled for RRP of the prostate cancer. His medical history included moderate COPD, hypertension, and mental depression. He was a heavy smoker (30-pack-yr). No preoperative respiratory function tests were performed. Preoperative clinical evaluation showed bilateral pulmonary hypoventilation and SpO_2 of 92%.

An epidural catheter was inserted at the L1–2 interspace, and the anesthetic and ventilatory management were the same as stated before.

The anesthetic plan was thoroughly explained to the patients at the preoperative visit and accepted by patients.

In both cases arterial blood gas analysis were obtained at basal conditions in the supine position before NIV; at 30, 60 and 120 minutes during NIV; and 60 minutes after NIV in the postanesthesia care unit (PACU). Ventilatory requirements and gasometric results are shown in Table 1. The intraoperative course was uneventful in both cases. There were no instances of oxygen desaturation or upper airway obstruction. There were no complications related to NIV. Patients were discharged home on the fifth and seventh day after surgery, respectively, and rated their anesthetic experience as satisfactory.

Discussion

The anesthetic management of RRP in patients with severe co-morbidities can be complex. Patients with mild to severe COPD and obesity present with ventilatory dysfunction and are at high risk for pulmonary complications after surgery, regardless of the type of anesthesia. Obesity poses numerous challenges ranging from increased intubation difficulties, risk of aspiration of the gastric content, derangement of gas exchange, reduced chest compliance, and increased respiratory resistance. Furthermore, obese patients are often sensitive to the effects of sedative, opioid, and anesthetic drugs, slowing the recovery time and increasing the risk of prolonged mechanical ventilation after general anesthesia.⁴ In patients with COPD anesthesia can worsen ventilation–perfusion ratios, attenuates hypoxic pulmonary vasoconstriction, exacerbates bronchospasm, and could increase the intraoperative and postoperative

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