Peertechz

Medical Group

Global Journal of Anesthesiology

ISSN: 2455-3476 DOI CC By

Manuel Wenk[1]*, Christina Massoth[1], Daniel Pöpping[1] and Michael Möllmann[2]

[1]Department of Anesthesiology and Intensive Care, University Hospital Muenster, Muenster, Germany
[2]Department of Anesthesiology and Intensive Care Medicine, St. Franziskus Hospital Muenster, Muenster, Germany

Dates: Received: 08 March, 2017; **Accepted:** 01 April, 2017; **Published:** 03 April, 2017

***Corresponding author:** Dr Manuel Wenk, Department of Anesthesiology and Intensive Care, Albert-Schweitzer-Campus 1, A1, 48149 Münster, Germany, Tel: +49 (0)251–8347252; E-Mail: manuelwenk@uni-muenster.de

https://www.peertechz.com

Case Report

Awake Open Atypical Gastric Resection under Combined Lumbar Spinal Anesthesia and Thoracic Epidural Neuroaxial Block in a High-Risk Patient

Abstract

Modern day general anesthesia has a convincing safety record in any age group presenting with or without severe co-morbidities, hence allowing surgeons to introduce a broad range of patients to surgical procedures. However, sometimes patients present with the most significant co-morbidities and organ function impairment where then general anesthesia becomes a major risk in itself. Awake surgery under regional/neuroaxial anesthesia is a possible alternative in chosen cases and has been described in cardiac and lower abdominal surgery.

In this report we describe the case of a 70yr old male patient with severe chronic obstructive pulmonary disease (GOLD Stage IV) under continuous oxygen home therapy who was scheduled for open atypical gastric resection. We present the management of this case as awake surgery with the combination of a lumbar spinal anesthesia and a thoracic epidural catheter block.

The combination of a lumbar spinal and a thoracic epidural anesthesia technique up to a T2-4 level can be safely used to provide sufficient segmental block for upper abdominal surgery in a high risk patient. No additional sedative and analgesic medication was required. Although thoracic epidural block may decrease intercostal muscle activity, this did not cause any major respiratory impairment.

Introduction

Modern general anesthesia spoils patients and anesthetists alike with a mesmerizing safety record in any age group presenting with and without severe co-morbidities [1-3]. This development allows the operating surgeon to introduce a wide range of patients to virtually any intervention. However, besides all recent achievements we occasionally encounter those patients that still present significant intraoperative and recovery-associated challenges to the anesthetist due to severe co-morbidities and impaired organ function to an extent where anesthetists tend to rather not give a general anesthesia and the patient is "at risk" of being significantly delayed due to preoperative optimization efforts or even cancelled from surgery [4].

Regional and neuroaxial anesthesia such as epidural catheters and nerve blocks are usually used as an addition to general anesthesia in order to minimize intraoperative opioid use, provide sufficient postoperative analgesia and improve "fast-tracked" recovery [5, 6]. If general anesthesia should best be avoided, conscious (awake) surgery under regional anesthesia can sometimes be a valid alternative for these patients [7-9]. However, for performing (upper) abdominal surgery, a wide area of spinal cord segments needs to be blocked profoundly which is difficult to achieve with a single epidural catheter, a (one-shot) spinal anesthesia or a combined lumbar spinal-epidural (CSE).

We report on a technique of the management of a patient with severe pulmonary impairment who successfully underwent open atypical gastric resection under lumbar spinal anesthesia combined with a thoracic epidural catheter neuroaxial blockade. Clinical and physiological consequences of such an approach and current literature are discussed.

Case Presentation

The patient (male, 70 yr, 72 kg, 172 cm) had a severe chronic obstructive pulmonary disease (Grade 4 according to

Citation: Wenk M, Massoth C, Pöpping D, Möllmann M (2017) Awake Open Atypical Gastric Resection under Combined Lumbar Spinal Anesthesia and Thoracic Epidural Neuroaxial Block in a High-Risk Patient. Glob J Anesth 4(2): 013-015. DOI: http://doi.org/10.17352/2455-3476.000031

Global Initiative for Chronic Obstructive Lung Disease (GOLD)) with emphysema. He suffered from frequent respiratory tract infections (pseudomonas) and required continuous oxygen therapy. Dyspnea was present at rest and minimal activity caused significant dyspnea. Pulmonary function tests showed a severely obstructive pattern (Table 1). Pre-operative arterial blood gas (ABG) measurements showed baseline hypercapnia with a pCO2 of 51 mmHg, pO2 of 66 mmHg and a pH of 7,34. A pre-operative transthoracic echocardiography showed an ejection fraction (EF) of 28% corresponding with the pre-existing chronic coronary heart disease. The patient presented to the surgical department with an adenocarcinoma of the stomach (pT1, N0, M0, G2) and was scheduled for open atypical gastric resection.

After considering the anesthetic options and discussing the risks and benefits with both the surgeons and the patient, a decision was made to perform awake surgery under spontaneous breathing under a lumbar spinal anesthesia in combination with a thoracic epidural anesthesia. Both, the surgeon and patient agreed to this approach.

No premedication was given. On arrival in the anesthetic room the patient was prepared for extended invasive monitoring. An arterial line was placed in the left radial artery and a 3-lumen central venous catheter was inserted into the patient's right internal jugular vein without any complications. The patient was positioned in the left lateral position and -after local infiltration of the skin- an epidural needle was inserted at the 10th thoracic interspace without discomfort using a paramedian approach and a catheter was inserted and taped to the back of the patient. 10 mcg of sufentanil and 3 ml plain isobaric 0.5% bupivacaine solution were injected via the epidural catheter as a testing dose. Next, a spinal needle was inserted at the L3/L4 interspace without discomfort using a midline approach and a free flow of CSF obtained before 4 ml plain isobaric 0.5% bupivacaine was injected and the patient was then turned supine. Within 3 minutes a sensory and motor block developed and remained static after 10 min extending from the toes to T3/T4 dermatome without any hint of respiratory distress. Blood pressure decreased from 180/90 mmHg to 96/59 mmHg and heart rate from 74 to 61 beats min-1. There was no nausea or vomiting. The hypotension responded well to a single i.v. injection of 1 ml Theodrenalin/cafedrin 1:20 in 10 ml saline (Akrinor). Following hemodynamic stabilization, a further 10 ml of 0.25% plain bupivacaine and 10 mcg sufentanil were injected via the epidural catheter. After 15 minutes, the operation was started.

Table 1: Preoperative lung function test results corresponding to Stage IV (very severe COPD) according to Global Initiative for Obstructive Lung Disease (GOLD).

	Measured (litre)	% of predicted
FVC	1.7	46
FEV1	0.71	25
FEV1/FVC	39	52
TLC	7.62	114

FVC=forced vital capacity; FEV1=forced expiratory volume in 1 s; TLC=total lung capacity.

Intraoperatively, circulation remained stable, no further administration of vasopressors was necessary. No additional sedation and analgesia was given. The patient was breathing spontaneously while receiving 6 liters of oxygen min-1 via a face mask. Surgery was performed uneventfully (duration 89 min) causing no respiratory distress or other difficulty to the patient who followed the whole operation while talking to the anesthetist and surgeons. Intraoperative blood loss was 200 ml. A total of 1500 ml of crystalloid solution was administered. A continuous epidural infusion of ropivacaine 2 mg ml-1 was started at 5 ml/h at the end of the operation and continued for 2 days. The patient was admitted to the intensive care unit for postoperative observation. In the following 24 hours, two units of blood were transfused intraoperatively due to a decreased Hb of 8.2 g/dl. Postoperative recovery was uneventful, specifically there were no neurological sequelae. There was no further deterioration in pulmonary function allowing the patient to be discharged from ICU on postoperative day [1].

Discussion

Our report shows that the combination of a lumbar spinal and a thoracic epidural anesthesia technique can be safely used to provide sufficient segmental block to allow open atypical gastric resection in a high-risk patient with severely impaired respiratory function. A combination of a lumbar spinal and a thoracic epidural was chosen to provide a fast-onset, profound block with a wide range of blocked spinal segments while –at the same time- keeping the required amount of local anesthetic low. The combination of a lumbar spinal and a thoracic epidural provided profound block and a surgically acceptable situs thus minimizing the need for further intraoperative sedation and analgesics. Additionally, the epidural catheter was then used to provide further sufficient analgesia in the postoperative setting without the need for additional analgesics which probably enhanced the postoperative recovery. To our knowledge this is the first case describing this technique for such surgery.

"Awake surgery" as a method of performing invasive surgery under regional anesthesia that is usually performed under general anesthesia including artificial ventilation is an emerging area in the medical field: In the recent past, several case reports and case series have introduced awake cardiac bypass surgery under high thoracic epidurals as well as minor (lower) abdominal surgery, such as appendectomy or cholecystectomy with positive and promising results [7,9,10]. Particularly in patients with respiratory problems such as COPD as described in our case, avoiding general anesthesia may be highly beneficial because that decreases the incidence of perioperative bronchospasm, avoids risk of expiratory flow interruptions due to Auto-PEEP, reduces the incidence of atelectasis and most importantly, may lead to greater hemodynamic stability because venous return is not decreased by positive pressure ventilation [11].

The anesthetic approach is this case raises one major concern: An extensive thoracic segmental blockade may produce respiratory impairment. The diaphragm as the main respiratory muscle is innervated from the cervical levels C3-C5 and thus is unlikely to be affected by the epidural block.

Citation: Wenk M, Massoth C, Pöpping D, Möllmann M (2017) Awake Open Atypical Gastric Resection under Combined Lumbar Spinal Anesthesia and Thoracic Epidural Neuroaxial Block in a High-Risk Patient. Glob J Anesth 4(2): 013-015. DOI: http://doi.org/10.17352/2455-3476.000031

However, the intercostal as well as the muscles of the anterior abdominal wall will be affected. They are innervated by the thoracic nerves and thus forceful expiration as well as coughing could be further affected which could be deleterious in a patient with pre-existing obstructive respiratory impairment who is dependant on his accessory respiratory muscles. However, the use of low doses of local anesthetics in combination with epidural opioid administration minimizes the degree of nerve block -similar to walking epidurals in labour anesthesia- and worked out extraordinary well in our case [12-14].

From a surgical point of view, the surgical field "looked and felt" comparable with a patient paralyzed under general anesthesia. The spinal anesthesia provided sufficient motor block to mimick a fully paralyzed patient. Surgeons were reminded to exert some degree of caution of not overstimulating the diaphragma of the spontaneously breathing patient. This could easily be achieved by the operating team.

We acknowledge that approaches like this require a new mindset for surgeons and anesthetists alike who suddenly have to cope with an awake and conscious patient in a setting where they usually face well anesthetized patients. However, the method described here may be the safest if not the only option for a small group of patients. Clearly, careful patient selection and management is paramount and these patients should only be managed by experienced anesthetists and surgeons that are able to closely cooperate and be able to perform the procedure in the shortest possible time at a high safety level.

It is not inconceivable that for select patients, awake open abdominal surgery may be preferred to either general anesthesia or combined general anesthesia plus thoracic epidural anesthesia.

Acknowledgements

We would like to thank the patient for his permission to publish details of his case.

References

1. Staender SE (2010) Patient safety in anesthesia. Minerva Anestesiol 76: 45-50. Link: https://goo.gl/6QiOeq

2. Kaafarani HM, Itani KM, Rosen AK, Zhao S, Hartmann CW, et al. (2009) How does patient safety culture in the operating room and post-anesthesia care unit compare to the rest of the hospital? Am J Surg 198: 70-75. Link: https://goo.gl/qcReLD

3. Botney R (2008) Improving patient safety in anesthesia: a success story? Int J Radiat Oncol Biol Phys 71: S182-186. Link: https://goo.gl/gKvOqO

4. Lefaivre KA, Macadam SA, Davidson DJ, Gandhi R, Chan H, et al.(2009) Length of stay, mortality, morbidity and delay to surgery in hip fractures. J Bone Joint Surg Br 91: 922-927. Link: https://goo.gl/ZQG6Rn

5. Kehlet H (2007) Epidural analgesia and recovery after abdominal surgery. American Journal of Surgery 193: 291. Link: https://goo.gl/LLYotq

6. Kehlet H (2007) Epidural analgesia and recovery after abdominal surgery. American Journal of Surgery 193: 291.

7. Knapik P, Przybylski R, Nadziakiewicz P, Zembala M (2008) Awake heart valve surgery in a patient with severe pulmonary disease. Ann Thorac Surg 86: 293-295. Link: https://goo.gl/hr6zS0

8. Guarracino F, Gemignani R, Pratesi G, Melfi F, Ambrosino N (2008) Awake palliative thoracic surgery in a high-risk patient: one-lung, non-invasive ventilation combined with epidural blockade. Anaesthesia 63: 761-763. Link: https://goo.gl/d2GTWs

9. Mineo TC (2007) Epidural anesthesia in awake thoracic surgery. Eur J Cardiothorac Surg 32: 13-19. Link: https://goo.gl/BTizD9

10. Rocco G, Romano V, Accardo R, Tempesta A, La Manna C, et al. (2010) Awake single-access (uniportal) video-assisted thoracoscopic surgery for peripheral pulmonary nodules in a complete ambulatory setting. Ann Thorac Surg 89: 1625-1627. Link: https://goo.gl/GMN1pk

11. Duggappa DR, Rao GV, Kannan S (2015) Anaesthesia for patient with chronic obstructive pulmonary disease. Indian J Anaesth. 59: 574-583. Link: https://goo.gl/HKcQu3

12. Popping DM, Zahn PK, Van Aken HK, Dasch B, Boche R, et al. (2008) Effectiveness and safety of postoperative pain management: a survey of 18 925 consecutive patients between 1998 and 2006 (2nd revision): a database analysis of prospectively raised data. Br J Anaesth 101: 832-840. Link: https://goo.gl/UCGSxE

13. Popping DM, Elia N, Marret E, Remy C, Tramer MR (2008) Protective effects of epidural analgesia on pulmonary complications after abdominal and thoracic surgery: a meta-analysis. Arch Surg 143: 990-999. Link: https://goo.gl/IhS1qH

14. Douglas MJ (1998) Walking epidural analgesia in labour. Can J Anaesth 45: 607-611. Link: https://goo.gl/pHua2G

Citation: Wenk M, Massoth C, Pöpping D, Möllmann M (2017) Awake Open Atypical Gastric Resection under Combined Lumbar Spinal Anesthesia and Thoracic Epidural Neuroaxial Block in a High-Risk Patient. Glob J Anesth 4(2): 013-015. DOI: http://doi.org/10.17352/2455-3476.000031