



Anaesthetic Management of a Morbidly Obese Patient in Prone Position for Spine Fixation Surgery

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Abstract

Management of morbidly obese patients in prone position is challenging for anaesthesiologist. This case report describes the anaesthetic management of a morbidly obese patient in prone position planned for spine fixation surgery, successfully managed under general anaesthesia.

Keywords: obesity, prone position, general anaesthesia.

Introduction

Morbid obesity is an important health problem with constantly increasing incidence. It is associated with various morbidities that include impaired glucose tolerance and diabetes, hypertension, heart disease, dyslipidaemia, cerebrovascular disease, metabolic syndromes, pulmonary abnormalities osteoarthritis and psychosocial problems⁽¹⁾. The outcomes of these problems are closely associated with body mass index (BMI). A BMI of 25 kg/m² and below is considered as normal, 25-29.9 kg/m² as overweight, 30-34.9 class 1 obesity, 35-39.9 class 2 obesity and above 40 kg/m² as extreme/morbid obesity. Patients with morbid obesity are at extremely high disease risk.⁽²⁾ Prone positioning of patients during anaesthesia is associated with predictable changes in the physiology but also with a number of complications, and safe use of

the prone position in morbidly obese patients requires an understanding of both⁽³⁾.

Preoperative optimization is very important for the success of anaesthetic intervention and safety of morbidly obese patients⁽⁴⁾. We wish to elaborate our perioperative experience in a morbidly obese patient (BMI = 45.2 kg/m²) in prone position.

Case Report

A 55-year-old woman weighing 110 kg with a height of 156 cm (BMI = 45.2 kg/m²) was scheduled to undergo decompression and fixation of lumbar spine. Preoperative evaluation revealed that she was breathless in supine position and was used to sleep in a recumbent position. She had hypertension, asthma, as well as limited effort capacity because of her obesity. Her blood pressure was within normal limits with antihypertensive agents (metoprolol 50mg,

losartan 50mg) and she gave history of snoring and symptoms of obstructive sleep apnoea. Her heart rate was 68 beats/min and blood pressure in recumbent position was 130/80 mmHg. On auscultation, heart sounds were normal. Air entry was bilaterally decreased at the bases with a respiratory rate of 24–26/min at rest with oxygen saturation (SpO₂) of 96% on air. Her Mallampati score was class 3, mouth opening was adequate, and she had a short neck (thyromental distance was <6 cm) and a thick pad of fat all around her neck with a neck circumference of 42 cm. Routine biochemical results were within normal limits. The electrocardiogram showed a sinus rhythm. Preoperative echocardiogram showed a concentric hypertrophy of the left ventricle. Left ventricular ejection fraction was 55% with no regional wall motion abnormality.

On the morning of the surgery, the patient was transferred to the operating room on her large-sized ICU bed. Difficult intubation cart was kept ready. After attaching monitors, such as, pulse oximeter, and noninvasive blood pressure (large size cuff) monitor, 3 lead ECG, patient was preoxygenated with 100% oxygen for 5 minutes and premedicated with fentanyl 1 µg/kg i.v., midazolam 0.03 mg/kg i.v., ondansetron 4mg iv and glycopyrrolate 0.2 mg i.v. The patient was given xylocard 1.5 mg/kg iv and induced with propofol 2 mg/kg i.v. We were able to mask ventilate the patient adequately, patient was precurarised with vecuronium 1mg iv and paralysed with succinylcholine 1.5 mg/kg. On direct laryngoscopy with stubby handle and Macintosh blade, Cormack Lehane view IV was found and difficulty was encountered in intubating the patient so senior anaesthesiologist took over immediately intubated with bougie and 7-mm cuffed flexometallic endotracheal tube guided. Proper tube placement was confirmed with end-tidal carbon dioxide (ETCO₂) and bilateral auscultation of chest being equal and clear. The eyes were taped shut and padded. The patient was shifted to prone position; taking care that the bolsters were placed far enough to prevent

abdominal compression. Proper positioning of head and neck confirmed. All pressure points were padded with cotton rolls to avoid pressure injuries to the peripheral nerves. Her head was placed on a gel head support avoiding eye compression.

Anaesthesia was maintained with O₂:N₂O::40:60, fentanyl 1 µg/kg/hr, isoflurane 1MAC., and vecuronium 0.01 mg/kg/h i.v. The patient was ventilated with volume control mode with a tidal volume of 550 mL at 16 breaths per min. Initial reading of ETCO₂ was 36–38 mmHg, which was constantly monitored to diagnose any embolism. Operative procedure lasted for 3.5 h. Intraoperative course was uneventful. At the end of the surgery, N₂O was stopped 10 min prior and xylocard 1mg/kg iv was given. Neuromuscular blockade was reversed with neostigmine 2.5mg and glycopyrrolate 0.5 mg and patient was extubated after thorough suctioning after she is fully awake and obeying commands. After extubation patient was observed on the table 20 minutes for any untoward event, but her vitals remained stable. She was transferred to the ICU for monitoring and put in propped up position and was encouraged to do spirometry. Post op analgesia was maintained with diclofenac 75mg iv bd. After 2 days she was transferred back to the ward and further postop period was uneventful and she went home on postop day 7.

Discussion

Obesity is associated with diseases of many organ systems. Systemic hypertension, pulmonary hypertension, left or right ventricular deficiency, ischemic heart disease, and similar cardiac problems, dyspnoea, orthopnoea, and similar respiratory signs and problems should be assessed and airway should be paid attention to in the preoperative evaluation of morbidly obese patient. The possibility of a difficult intubation should be anticipated. The probability of a problematic intubation was approximately 5% with a 40 cm neck circumference compared with a 35% probability at 60 cm neck circumference⁽⁵⁾. In our case neck circumference was 42 cm with

mallampati class 3 with thyromental distance <6 difficulty in intubation was encountered and was intubated by a senior anaesthesiologist with the help of bougie.

Morbidly obese patients carry more problems when immobilized. The most important problems being chest infection and deep vein thrombosis. Due to severe low back pain, our patient was confined to bed for almost 4 months.

The prone position has a key role in posterior approach in spinal surgery ophthalmic complications range from corneal abrasions to devastating postoperative visual loss. There are two mechanisms, with differing aetiology. Direct pressure on the eye can lead to central retinal artery occlusion, whereas ischemic optic neuropathy can occur without any pressure on the globe or orbit⁽⁶⁾. In the postoperative period, hypoventilation and hypoxia with hypercarbia may occur in morbidly obese patients due to the residual influence of general anaesthesia drugs, postoperative atelectasis, and postoperative pain⁽⁷⁾. Therefore, tracheal extubation is considered in obese patients when they are fully awake and have recovered from the depressant effects of anaesthetic agents. Re-intubation is more difficult and urgent than initial intubation.

Conclusion

Successful anaesthetic management of morbidly obese patients in prone position includes good understanding of physiological changes, airway management and proper position. The importance of preoperative preparation and optimization of the patient before surgery on one hand and the constant vigil for unusual events along with the availability of a senior anaesthesiologist and the potential hazards surrounding obese patients in this position, resulting in a successful and satisfactory outcome.

References

1. Segula D. Complications of obesity in adults: A short review of the literature. Malawi Medical Journal 2014;26(1):20-24

2. https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmi_dis.htm
3. BJA: British Journal of Anaesthesia, Volume 100, Issue 2, 1 February 2008, Pages 165–183,
4. Continuing Education in Anaesthesia Critical Care & Pain, Volume 8, Issue 5, 1 October 2008, Pages 151-156, <https://doi.org/10.1093/bjaceaccp/mkn030>
5. [http://www.trendsanaesthesiacriticalcare.com/article/S0953-7112\(09\)00126-4/fulltext](http://www.trendsanaesthesiacriticalcare.com/article/S0953-7112(09)00126-4/fulltext)
6. Continuing Education in Anaesthesia Critical Care & Pain, Volume 14, Issue 6, 1 December 2014, Pages 291-297 <https://doi.org/10.1093/bjaceaccp/mku001>
7. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4454851/>