

Anaesthetic complication in a Morbidly Obese Patient

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ABSTRACT

We report the anaesthetic management of a 42yr old morbidly obese woman (BMI 55kg m2) who was diagnosed with chronic calculous cholecystitis and had open cholecystectomy.

There was difficult endotracheal intubation by conventional laryngoscopy. The patient was admitted into the Intensive Care Unit(ICU) due to poor oxygen saturation in the immediate post-operative period. In the intensive care unit, the patient had opioid induced respiratory depression and attempt at re-intubation resulted in cardiopulmonary arrest. There was return of spontaneous circulation on cardiopulmonary resuscitation but patient had mechanical ventilation for hours before return of spontaneous respiration. The patient was transferred to the ward on the 3rd postoperative day and was discharged home on the 9th postoperative.

The aim of this case report is to bring out the anaesthetic complications that occurred in this extremely obese patient and to serve as a precautionary measure for future anaesthesia in similar patients.

INTRODUCTION

Obesity is a condition in which there is 20% increase in weight greater than healthy body weight.¹ Obesity is classified according to body mass index (BMI) which is the weight in kilograms divided by the square of the height in meters.²

Obesity is classified as type I (Body mass index of 30-40.9 kg/m), morbid or type II (BMI 35-39.9kg/m²) and extreme or type III (BMI >40kg/m²).²

Though obesity is said to be common in the developed world, it is increasingly becoming common in adults in developing countries.³ In Nigeria the prevalence of overweight individuals ranges from 20.3% to 33.1% while the prevalence of obesity is from 8.1% -22.2%.⁴

Obesity is associated with many diseases, including type 11 diabetes mellitus, hypertension, coronary artery disease and cholelithiasis.⁵ These diseases along with a potentially difficult airway and pharmacologic alterations present a complex picture with a myriad of anaesthetic considerations. Obese patients have four times the incidence of respiratory complications preoperatively.⁶

Traditional open cholecystectomy is an upper abdominal surgery and can result in severe postoperative pain affecting

respiration and worsening hypoxia that occurs in the most obese patients.⁶ Also pulmonary atelectasis is common and lung capacities remain decreased at least 5 days after abdominal surgery.⁶ Patient control analgesia is a better method of administering opioids than the intravenous bolus or intramuscular injection.

This case report clearly illustrates the life threatening complications that can occur in anaesthesia for obese patients in centres without advance intubating equipment's like fiberoptic bronchoscope.

CASE PRESENTATION

A 42year old multiparous woman who presented with a history of colicky right upper abdominal pain, with severe exacerbations that occurred once every two or three days. Pain radiates to the back and aggregated by heavy meal but had no known relieving factor.

There was associated low grade continuous fever. Not a known hypertensive or diabetic. The patient was a shopkeeper and admitted to eating four times a day. She also ate snacks between the meals. She had appendectomy 20years prior to presentation under general anesthesia and had no anaesthetic complications.

The physical examination revealed an obese woman, not dysnoeic, afebrile, not pale, not cyanosed and not jaundiced. Her height was 1.63m and her weight was 146kg with a BMI of 55.0 kg/m². Her neck was short with an airway assessment of malampati class III.

The pulse rate was 86 per minute, regular and good volume, the blood pressure was 130/80mmHg and heart sounds were normal. Chest was clear clinically. The abdomen was full with marked tenderness in the right hypochondrium. Murphy's sign was positive.

Abdominal ultrasound revealed an enlarged gall bladder with thickened wall and multiple echogenic calculi. Her pulmonary function tests were of reduced peak expiratory flow rate (34.02/mm), forced expiratory volume in one second 3.4L/min and force vital capacity (4.5L). Chest X-ray, electrocardiogram and other investigations were normal. An assessment of calculus cholecystitis was made and was subsequently booked for elective open cholecystectomy. She was commenced on subcutaneous enoxaparin (low molecular weight heparin) at a dose of 40mg daily.

Pre anaesthetic assessment was done a day before surgery and based on the clinical findings of extreme obesity her physical status was assessed as ASA III (severe systemic disease). Three units of whole blood cross matched, informed consent was signed and fasting instructions were given. The last dose of enoxaparin was given 12hrs before surgery, ranitidine 150mg was administered orally the night before surgery and 50mg intravenously an hour before surgery. Intravenous metoclopramide 10mg was also given on the morning of surgery.

In the theatre, the anaesthetic items and equipment's were checked including a functional suction machine. Equipment's for difficult intubation were assembled such as laryngoscope blades of different types and sizes, nasal and oral airways, endotracheal tubes of various sizes, stylets, boogies, Magill forceps and laryngeal mask airways.

The blood pressure cuff, pulse oximeter and electrocardiograph leads were attached and the baseline values were a pulse rate of 92/minute, blood pressure of 130/80 mmHg, oxygen saturation of 95% on room air and the ECG indicated sinus rhythm. Intravenous access was achieved with a size 18G cannula on the fore arm after several attempts, through which 0.9% saline infusion was commenced. Drugs were drawn and labeled appropriately. The patient was placed supine on the operating table and a small pillow was placed under her shoulder to allow for better positioning of her head and neck. She was pre-oxygenated for 5 minutes with an FiO₂ of 1.0 using a Mapleson D circuit.

Intravenous atropine 0.6mg was given as a premedication.

Induction of anaesthesia with halothane starting from 0.5% to a maximum of 4.5%. When the patient was asleep, manual ventilation of the lung was tested and found to be possible. Intravenous suxamethonium 100mg was given. Two attempts to intubate the patient by a senior registrar failed and the patient de-saturated from 98% to 50%. A senior consultant anaesthetist was able to intubate on 2nd attempt using a straight blade laryngoscope with the aid of a boogie using size 7.0mm cuffed endotracheal tube. Confirmation of tracheal intubation was by detection of end tidal CO₂ and chest auscultation for good and equal bilateral air entry. The cuff was inflated and intermittent positive pressure ventilation using a Bain's circuit was commenced.

She was maintained on FiO₂ of 1 and isoflurane of 1 to 1.2%. Muscle relaxation was with atracurium 50mg with an additional 40mg given. Analgesia was with 100mg of fentanyl. Monitoring consisted of pulse rate, oxygen saturation, non-invasive blood pressure and ECG. The pulse rate ranged between 80 to 100 per minute, blood pressure of 130/80 to 110/70 mmHg, ECG showed normal sinus rhythm throughout the surgery. The oxygen saturation ranged between 97 to 100%.

Cholecystectomy was done through a right subcostal incision. The intraoperative finding was a distended gallbladder with peri-hepatic fibrous adhesions. There were multiple gallstones within the gallbladder with large stone impacted in the Hartmann's pouch. Pus was also aspirated from the gallbladder. The estimated blood loss was 300ml. The patient wasn't transfused but received 1500ml of 0.09% saline and 500ml of 5% dextrose saline. She made 600ml of urine over 2hrs of surgery.

At the end of the surgery, the wound edges were infiltrated with plain bupivacaine 0.5%. The residual muscle relaxant effect was reversed with 1.2mg atropine and 2.5mg neostigmine intravenously. Isoflurane was discontinued and the FiO₂ was maintained at 1.0.

The oral cavity was suctioned dry of secretions when patient's tidal volume was adequate, and when fully awake (she opened her eyes and could sustain head lift) she was extubated while in 45 degree head up position. She was maintained on an FiO₂ of 1.0 using face mask and when observed to be breathing adequately with no evidence of airway obstruction she was transferred to the post anaesthesia care (recovery) room.

In the recovery room, the patient continued with oxygen using a polymask. The respiratory rate, pulse rate and BP were adequate with oxygen saturation of 90 to 94%. In view of her oxygen saturation and her obesity patient was transferred to the intensive care unit for close monitoring.

Eight hours post operatively the fully conscious patient

complained of severe pains and a bolus dose of 50mg pethidine was prescribed by a resident doctor on call which was given.

Immediately after the opioid bolus, patient started desaturating and the respiratory rate dropped from 25cycles/minute to about 7cycles/min. The first attempt to intubate was not successful and the patient had cardiac arrest, CPR was started immediately and laryngeal mask airway(LMA) was passed with which Ambu bag ventilation was possible. Return of spontaneous circulation occurred shortly after a dose of IV 1mg adrenaline was given but no return of spontaneous respiration. The patient was later successfully intubated with the aid of a boogie. The patient was started on mechanical ventilator, SIMV mode. Intravenous naloxone 4mg was given.

The patient was given intercostal nerve block using plain bupivacaine and was placed on IV paracetamol and diclofenac. The patient was weaned from the ventilator 4hrs later with the return of spontaneous respiration of adequate rate and depth. Low molecular weight heparin(enoxaparin) and physiotherapy were started on the 2nd day in the ICU before transfer to the ward in the 3rd postoperative day and discharged home on the 9th postoperative

DISCUSSION

Obesity is a condition characterized by excessive accumulation of fat in the body. Obesity is classified according to body mass index (BMI) which is the weight in kilograms divided by the square of the height in meters.²

We are in the midst of an epidemic of obesity²In the united states 25-45% of the adult population are obese and 5% are morbidly obese.⁷

Many conditions are associated with obesity, some of which are diabetes (type II) hyperlipidaemia,cholelithiasis etc⁸.The patient had cholelithiasis with resultant cholecystitis. In the western countries gallstone are common and occur in 7% of males and 15% of females aged 18-65years, with an overall prevalence of 11%⁹. Patients with gallstone cholecystitis are described classically as female of forty, fair, fat and fertile¹⁰, and this patient fit this description.

A person who is 30% overweight has a 40% increase chance of dying of heart disease and a 50% increased chance of dying of stroke⁸. Obesity is also associated with greater perioperative morbidity and mortality such as deep vein thrombosis (DVT) and its consequences, most often as a result of inactivity.⁸The patient had prophylaxis for DVT with enoxaparin.

In FTH Gombe there are facilities for laparoscopic cholecystectomy but at the time of this surgery the laparoscopic equipment was faulty so the surgeon opted for open cholecystectomy with its high complications. Scheib et al¹¹observed that in obese patients, laparoscopy compared with laparotomy is associated with shorter hospital stay, less postoperative pain and fever wound complications but specific intra-abdominal access and trocar positioning is needed.

Moon et al¹² observed that obese patients are more likely to have difficult mask ventilation but in this patient, mask ventilation was not difficult as was evidence by chest expansion and good oxygen saturation.

The patient had a short neck and her mallampati test was III with a BMI of 55kg/m².It has been reported that BMI of 46 or more is associated with 13% risk of difficult intubation.¹³This patient had difficult endotracheal intubation as the intubation was successful only on 4th attempt with the aid of a boogie by an experience anaesthetist. Fibre-optic bronchoscope is the recommended equipment for intubating this type of patient but FTH Gombe has no fibreoptic bronchoscope. This patient's ventilation was controlled with FiO₂ of 1, because controlled ventilation with large tidal volumes often provides better oxygenation in obese patients than spontaneous ventilation. Analgesia was supplemented intra-operatively with fentanyl. Isoflurane which is cardiostablewas used to maintain anaesthesia instead of the halothane used for induction because halothane is associated with increased liver metabolism and a predisposition to hypoxia with increased incidence of halothane hepatitis in the obese patients⁵. At the end of the surgery the patient was extubated when totally reversed, fully awake in control of the airway and in a 45°head up position. A modified sitting position will unload the diaphragm and improve ventilation and oxygenation⁵. ICU care should be for higher risk patients with preexisting respiratory distress.⁵This patient's low O₂ saturation with mild respiratory distress post operatively warranted ICU admission.

Open cholecystectomy is associated with more postoperative pain compared with laparoscopic¹¹ and the need for strong opioid analgesia postoperatively. The best method for postoperative analgesia after cholecystectomy are titrated administration of the opioid using syringe or infusion pump, thoracic epidural steroid or patient control analgesia.⁶

Intravenous opioid is associated with good quality of analgesia in postoperative period but may be associated with respiratory

depression when given as bolus injection.⁶This patient had intravenous bolus of pethidine which resulted into respiratory depression and subsequent cardiopulmonary arrest. Effective cardiopulmonary resuscitation resulted in return of spontaneous circulation but not respiration and the patient had to be mechanically ventilated for hours. The delay in return of spontaneous respiration may not be unconnected with the delay in getting naloxone, the opioid antagonist.

Initial wound edges infiltration with plain bupivacaine and intercostal nerve blocks should always be considered for post-operative analgesia after open cholecystectomy in developing countries where there are no facilities for patient control analgesia. These two methods assisted in the analgesia for this patient.

CONCLUSION

Obesity is an increasingly common disease state, and in addition to being associated with much co-morbidity, presents a number of physiologic derangements on its own. The result is a complex picture for the anaesthesiologist. Proper pre-operative assessment, careful planning and familiarity with associated common problems during care of obese patients are vital to success and the avoidance of disaster.

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