

## Anesthetic considerations in a morbidly obese transgender patient for bariatric surgery: a case report

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### Introduction

Patients with morbid obesity suffer from metabolic syndrome, obstructive sleep apnea, or obesity hypoventilation syndrome receiving ventilator support at home. Difficult venous access, airway maintenance, and difficult intubation are the main concerns in obese, necessitating comprehensive preoperative evaluation<sup>(1)</sup>. Transgender patients are usually put on Hormone Replacement Therapy (HRT), which imposes a higher risk of deep vein thrombosis and thromboembolism. Experienced medical teams, appropriate equipment, adequate monitoring and careful anesthetic management improves postoperative outcomes. A trans-feminine morbidly obese patient was posted for gastric sleeve operation. We are reporting this case as it is the first of its kind in the Indian context.

### Case report

A 30-year-old female was posted for gastric sleeve operation as a bariatric surgical procedure for weight reduction. She was hypertensive on regular medication. She has a history of gaining excess weight over the past ten years. She could not even climb one flight of stairs without dyspnoea. (NYHA grade 3). Although she had snoring and daytime sleepiness complaints, she did not have sleep fragmentation or a morning headache, indicating obstructive sleep apnoea (OSA). She had undergone gender reassignment surgery 14 years back from male to female. She was on Estradiol 2 mg/day for hormonal replacement following gender reassignment. Her vitals were stable. She was 167 cm tall and weighed 157 kg, with a BMI of 56.2; Systemic examination was

unremarkable, with a heart rate of 88/min and blood pressure of 132/88 mm Hg. Her mouth opening was adequate, with Mallampati of 3. Her neck circumference is 39 cm. The thyromental distance was 6.5 cm. six-minute walk test was performed to check her cardio-respiratory reserve (VO<sub>2</sub>). She covered a distance of 420 m and walked for 4 min 33 seconds. There was no desaturation during the walk. A stair-climbing test could not be performed as she refused to climb the stairs. Her laboratory investigations, including routine blood count, sugar, renal and liver function tests, and serology, were unremarkable. Preoperative ECG showed sinus tachycardia, and ECHO cardiogram showed mild pulmonary hypertension with EF of 58%. PFT (Pulmonary function test) results showed FVC – 54%, FEV<sub>1</sub> – 51%, FEV<sub>1</sub>/FVC – 94%, indicating moderate restrictive lung disease. Her ABG had a normal pH with a mild elevation in PaCO<sub>2</sub> (43 mmHg). Her obesity Surgery-Mortality score was four coming under category C with a predicted mortality of 2.4%<sup>(2)</sup>. She was assessed under ASA 3 for gastric sleeve resection under general anesthesia.



**Fig 1: Patient placed on ramp. Notice that external ear canal and sternal angle are in same horizontal plane; which ensures easy airway management**

### Prehabilitation

We started interacting with pulmonology, psychiatry, and surgical specialists and charted out a month-long plan to get the patient ready for surgery. She was advised to start a 20-minute compulsory daily walk. To improve her respiratory reserve, she was started on incentive spirometry and deep breathing exercises. A psychiatric evaluation was carried out where she was examined by two consultants who ruled out any psychiatric issues, resulting in gender reassignment. HRT was stopped Estradiol four weeks to surgery by an endocrinologist; to reduce the risk of thromboembolic complications and perioperative nausea and vomiting. The routine procedure of urinary Catheterization can become challenging due to previous gender-confirming surgery involving the urethra, and Urology and Gynecology evaluation was done in the presence of a bystander of sex of the patient's choice (Female). One week before the procedure, she was admitted and was started on a diet as advised by the hospital dietician in consultation with a surgeon. Prophylaxis to prevent venous thromboembolism was done by starting Enoxaparin 0.6 mg once a day, three days before the surgery. An extra-large BP cuff was procured after measuring the mid-arm circumference. The ramp was made ready to help in easy management of the airway. A high-capacity OT table was arranged with arm boards, leg and foot support. Consent for anesthesia and surgery was also taken, also explaining the need for Catheterization of the bladder if the need arises.

### Conduct of the case

On the day of surgery, the patient received Ondansetron and Pantoprazole half an hour before induction. IV access was obtained. Difficult intubation cart with airway adjuncts like oropharyngeal and nasopharyngeal airways, bougie, stylet. LMA and various sized tubes were arranged. Before induction of anesthesia, routine monitoring was established inside the operating room with pulse oximetry, electrocardiogram, invasive arterial blood pressure, and end-tidal carbon dioxide. Anesthesia was induced with fentanyl 2 mcg/kg and Propofol 2 mg/kg (titrated to loss of eyelash reflex) lean body weight<sup>(3)</sup>. Her calculated

lean body weight was 98.3 kg. After confirming ventilation, Succinylcholine (1 mg/kg total body weight) was administered for muscle relaxation. Using C-MAC video laryngoscope trachea was tubed using Number 8 Portex cuffed ET. Bilateral TAP block was performed under USG guidance with 20 ml 0.375% Ropivacaine with 4 mg Dexamethasone on each side. 6 ml 0.375% Ropivacaine was used for port-site infiltration. Ventilation was established using a closed circuit with parameters adjusted to target an end-tidal carbon dioxide between 35 and 45mm Hg. (Tidal volume 550ml, PEEP 4cm H<sub>2</sub>O and RR 16/min). Patients were ventilated with oxygen, air (30:70 ratio), and Sevoflurane to maintain end-tidal Sevoflurane (ETS) concentration of 0.7-2 MAC. Anesthesia was maintained with Fentanyl (0.5-1µg/kg/hour) and Atracurium (0.1 mg/kg) every 15-20 min or as prompted by end-tidal carbon dioxide. As per Holliday & Segar rule, Fluids were administered with allowance for third space loss as 2 ml/kg/h. Tolerable blood loss was calculated and replaced with crystalloids. The total duration of surgery was 7 min. At the end of procedure, Sevoflurane was stopped. Nitrous oxide was stopped once ETS concentration became zero. The neuromuscular blockage was reversed with Neostigmine 0.05 mg/kg once TOF count was 0.9 and extubated after confirming head lift for >5 sec.

Patient was shifted to PACU. NIV support was kept ready, but the patient maintained the airway naturally. Adequate pain relief was achieved using Paracetamol 1g TDS. Our patient had received TAP block and did not need any additional dose of analgesic. She was mobilized on the same day and started on orals on day 2.

### Discussion

Transgender health has been receiving a lot of attention in recent years. Transgender people are a different population. Trans-women (assigned male at birth but transitioning to female) undergo hormonal therapy after gender reassignment surgery. The most common formulation of Estrogen taken by trans-women, were estradiol, at an average maximum daily dose of 4.1 mg. Getahun et al.<sup>(4)</sup> reported that trans-women are at increased risk for VTE and ischemic stroke, particularly

if they initiate some form of Estrogen therapy. In a cohort of 853 trans- women, the adjusted hazard ratio (aHR) for VTE was between 1.5 - and 3.2 - fold higher than cisgender men and between 1.7 - and 2.5 - fold higher compared with cisgender women. For ischemic stroke<sup>(4)</sup>. In Trans- women who had taken Estrogen, there was an almost 10-fold higher risk of ischemic stroke than cisgender men and a more than 4-fold higher risk compared with cisgender women. Prophylaxis for the same in the form of anticoagulants and compression stockings should be considered depending on other risk factors such as smoking, coagulopathies, and duration, nature of surgery. The chance of our patient developing VTE was anticipated, and LMWH was initiated three days before and continued for two days until a time patient became fully active. Connelly et al.<sup>(5)</sup> in their review explored the associations between gender-affirming hormones and cardiovascular events such as coronary artery disease, stroke, hypertension, thrombosis, lipid abnormalities, and diabetes mellitus. They concluded that the use of Estrogen in transgender females confers an increased risk of myocardial infarction and ischemic stroke.

Murad et al.<sup>(6)</sup> did a systematic review on psychosocial outcomes of transgender individuals after sex reassignment<sup>(6)</sup>. He found a striking improvement in gender identity disorder, psychological symptoms, and Quality of life after sex reassignment. Sex reassignment was associated with a reduction in the rate of suicide attempts, although suicide attempts remained higher compared with cisgender individuals. As part of preoperative assessment, two psychiatrists examined our patient and found her to have good mental health.

In a study by Lundstorm et al.<sup>(7)</sup> high BMI was a weak but statistically significant predictor of difficult mask ventilation and intubation<sup>(7)</sup>. Morbidly obese patients present with extra fatty tissue on the breast, neck, thoracic wall, and abdomen and internally in the mouth and pharynx. During ventilation, decreased residual capacity and worsening ventilation-perfusion mismatch impair lung function compared with patients with normal BMI. We anticipated the problem and attended to each one effectively. Custom made ramp

was prepared, elevating the patient's upper body and head until the external auditory meatus and the sternal notch were in the same horizontal plane. Using a video laryngoscope is recommended as a part of routine practice in anesthesia for intubating morbidly obese patients. We used the C-Mac (C blade), which improves laryngeal view in morbidly obese patients and allows fast endotracheal intubation<sup>(8)</sup>. Extubation is equally important and challenging and we ramped up the patient during extubation also for easy maintenance of the airway to prevent postoperative desaturation<sup>(9,10)</sup>.

Airway management in transgenders may be operated for laryngoplasty or chondroplasty to alter the voice pitch, resulting in vocal cord damage or tracheal stenosis. Some transgender men may be using breast binders or chest wraps, which may be advisable to remove to prevent restrictive respiratory compromise<sup>(11)</sup>.

Morbid obesity is defined as a body mass index (BMI) greater than 40 or greater than 35 with associated comorbidities such as diabetes mellitus and hypertension. Although total body weight is used (TBW) to calculate BMI, the ideal weight scalar for drug administration in morbidly obese patients for many drugs is Lean body weight (LBW is the difference between TBW and fat mass). The LBM of our patient was found to be 89.3 kg. The dose of Propofol for induction and Fentanyl for pain relief was calculated from her LBW. Regarding muscle relaxants, Succinylcholine was administered as per TBW, and Atracurium was administered as per her Ideal body weight ( $IBW = 45.5 + (0.91 \times [167 - 152.4])$ ) as the duration of action is prolonged in obese subjects when given on the basis TBW. 11 Bilateral TAP block given ensured adequate pain relief in the patient for 24 h after surgery. (VAS  $\leq$  3).

Smolders et al.<sup>(12)</sup> in their study in post-menopausal women, found a significant reduction in serum albumin in patients on long-term HRT. Reduced serum albumin leads to an increase in the availability of free drugs in plasma, adjusting doses of medications like Propofol and Fentanyl is necessary. Lemmens et al.<sup>(13)</sup> studied 45 morbidly obese women and tried to find the appropriate

dose of Succinylcholine (SCH) for intubation. In a randomized, double-blind fashion; patients were assigned to one of three study groups. In Group I, patients received SCH 1 mg/kg ideal body weight (IBW), in Group II 1 mg/kg lean body weight (LBW), and in Group III 1 mg/kg total body weight (TBW). They found no difference in the onset time of maximum neuromuscular blockade among groups, and excellent intubating conditions with complete neuromuscular paralysis were obtained with SCH 1 mg/kg; TBW. The recovery intervals were significantly longer, but all patients recovered within 20 min. In addition, Trans genders on HRT are prone to reduce plasma choline esterase activity making neuromuscular monitoring mandatory; and simultaneously ensure the return of respiration administration of non-depolarizing muscle relaxant (NDR)<sup>(14)</sup>. Lung rehabilitation was started the next day with incentive spirometry, lung physiotherapy and deep breathing exercises. Our patient had snoring but did not have nocturnal hypoventilation or apnoea as checked by overnight oximetry. The patient was nursed on the first post-op day in a beach chair position for improving oxygenation.

### Conclusion

Anesthetic management of a morbidly obese patient is challenging. Here we had to attend to an additional set of problems as the patient was trans-female on HRT. Familiarizing with the bio psychological dynamics and ruling out complications associated with HRT is extremely important for any perioperative physician dealing with transgender people.

The author obtained Institutional Ethics Committee approval.

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