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Anaesthetic management of labour and caesarean delivery for a morbidly obese parturient with subglottic stenosis

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Abstract

A 31-year-old parturient with body mass index of 52 kg/m^2 and subglottic stenosis, complicated with obstructive sleep apnoea and history of cardiac failure presented in labour. With prior multidisciplinary antenatal and anaesthetic assessment and counselling already in place, epidural was started in early labour via combined spinal-epidural (CSE) technique. The epidural was efficacious in providing labour analgesia and later successfully used for extension of anaesthesia for emergency caesarean delivery for failure to progress. Effective postoperative analgesia via multimodal non-opioid strategy enabled early mobilization and breathing exercises to prevent potential complications during the postpartum period. We present a case to highlight the versatility of the CSE technique in providing effective analgesia in various clinical situations, especially in patients with potential disastrous airway. Early multidisciplinary antenatal assessment and planning by obstetric, otorhinolaryngologic, cardiology, and anaesthetic teams facilitated optimal management of this complicated case.

Keywords: caesarean section, combined spinal epidural, labour analgesia, morbid obesity, subglottic stenosis

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Introduction

Managing a morbidly obese parturient with multiple comorbidities and airway anomalies is highly challenging. Although rare, the presence of subglottic stenosis may lead to a potentially disastrous airway crisis. Early involvement of multidisciplinary teams is important in managing complex cases such as this. Placing a functional epidural catheter for labour analgesia is advantageous, as it provides effective analgesia and can be utilized should any operative intervention required. We present a successful management of labour and caesarean delivery in a case of a morbidly obese parturient with difficult airway compounded with subglottic stenosis.

Case presentation

A 31-year-old gravida 2 para 1 woman with body mass index of 52 kg/m^2 (119 kg, 153 cm) presented to the labour ward at 38 weeks' gestation. She weighed 70 kg during her previous pregnancy and underwent an uncomplicated emergency caesarean section under spinal anaesthesia for foetal distress in 2015. In 2019, she was intubated for decompensated cardiac failure that was complicated with subglottic stenosis of Cotton-Myer Class II (50% stenosis). Her sleep study showed apnoea–hypopnoea index of 90.5. Otorhinolaryngologic (ORL) assessment revealed Friedman III, tonsillar enlargement grade 3 bilaterally, and adenoid enlargement with 80% covering the posterior choanae. She also had bronchial asthma, chronic hypertension, and gestational diabetes mellitus. Her latest echocardiography showed ejection fraction of 55%, dilated left ventricle, pulmonary artery systolic pressure of 18 mmHg, and normal regional wall motion. She tolerated this pregnancy well, without significant reduction in effort tolerance or hospitalization.

Normal vaginal delivery was planned after early assessments by multidisciplinary teams. She was counselled for early epidural during high-risk anaesthesia clinic review. In addition to the advantages of labour epidural, the possibility of technical difficulties during insertion of epidural, morbidities associated with intubation, and general anaesthesia were discussed.

During the first stage labour, when cervical os was 4 cm, a single attempt CSE was inserted. A standard 9-cm Tuohy needle was used with loss of resistance to saline technique. It was inserted at L3-L4 level using landmark technique with the patient in seated position. The skin-to-epidural-space distance was 7 cm and the catheter was secured at the 12-cm mark with 5 cm resting in the epidural space. The spinal dose was 0.5 ml of heavy bupivacaine 0.5% with fentanyl 10 mcg. Her labour analgesia was effectively maintained with patient-controlled epidural

analgesia (PCEA). The PCEA regime used 0.05% ropivacaine with fentanyl 2 µg/ml with settings as follows: bolus 10 ml, lockout interval 10 minutes, and basal infusion of 10 ml/hour. Her pain score was 1–3 assessed using the visual analogue scale.

Her labour failed to progress, and she was planned for emergency caesarean delivery. The ORL team was alerted due to the possibility of needing rescue front of neck access (FONA) should the scenario of "cannot intubate, cannot ventilate" ensue. PCEA was maintained for a duration of 10 hours until her arrival to the operating room.

An invasive blood pressure monitoring was inserted prior to epidural extension for surgical anaesthesia. Her epidural anchorage was rechecked before topping up with lignocaine 2% and adrenaline 1:200,000, given in 3-ml aliquots, with a total of 6 ml over 10 minutes to achieve sensory block up to T5 dermatome level. She required two top-ups, each 3 ml, approximately at 15 and 45 minutes after the start of the surgery. Intravenous phenylephrine infusion was initiated concurrently as prophylaxis against hypotension associated with neuraxial anaesthesia, at a dose of 250–500 µg/H. Her blood pressure was maintained around 100–130/55–75 mmHg. Nasal prong oxygen 3L/min was given as her oxygen saturation was 93–96% under room air in a supine position. The surgery was uneventful with delivery of a healthy baby girl of 2.82 kg with APGAR scores of 9 and 10.

Ten ml 0.2% ropivacaine was given via epidural catheter in the recovery unit prior to catheter removal. Removal of the catheter allowed timely commencement of subcutaneous enoxaparin for deep venous thromboprophylaxis. Her analgesia was maintained with oral paracetamol 1 g 6-hourly and mefenamic acid 500 mg 8-hourly. Patient-controlled-analgesia (PCA) or neuraxial opioid was avoided. Acute pain service assessment revealed a satisfactory pain score of 0–2. She ambulated and did breathing exercises on day 1 post-delivery. She was monitored in the maternal high-dependency unit and discharged well on day 5 post-delivery.

Discussion

Maternal obesity is a growing maternal health concern globally, affecting maternal care in various aspects. According to Malaysia's 2016 National Health Morbidity Survey, the prevalence of maternal obesity increased to 14.6%,[1] further straining the country's healthcare burden.

Super obesity (BMI ≥ 50 kg/m^2) and its comorbidities place the parturient and foetus at increased risk of complications related to pregnancy, surgery, and

anaesthesia with failed intubation and aspiration representing approximately two-thirds of the cause of deaths.[2] The incidence of difficult intubation was as high as 33% among parturients above 136 kg.[3] The risk was particularly high in this patient, who had subglottic stenosis Cotton-Myer II on top of the difficult airway anticipated in a super-obese parturient.

Early placement of a functional epidural catheter in labour can reduce the risk of complications related to general anaesthesia. The epidural catheter can be used to establish a desired level of anaesthesia in a short period of time in case of emergency caesarean delivery. The CSE technique provides a rapid onset dense spinal anaesthetic with the flexibility of an epidural extension and titration. Furthermore, the failure rate of epidural catheter inserted using the CSE technique is lower than using epidural-only technique.[4] The appearance of cerebrospinal fluid in the spinal needle indirectly confirms midline epidural space placement of the epidural needle, increasing the likelihood of a functional catheter.[4]

With the epidural catheter in place, surgical anaesthetic levels can be achieved within minutes in an emergency situation with stepwise incremental local anaesthetic (LA). Morbid obesity may result in an unpredictable, exaggerated spread of LA and significantly decreased epidural LA requirements, and increase the risk of a high neuraxial block,[3] which may necessitate emergent intubation. Additionally, super-obese parturients have approximately 20–40% longer surgical, anaesthesia, and total theatre times.[5] Epidural anaesthesia could overcome these problems by allowing flexible titration of level, density, and duration of anaesthesia.

Epidural placement might be technically difficult. The thick subcutaneous adipose tissue can make palpation of landmarks difficult.[6] Ultrasonography can be used to identify and estimate the depth of epidural space and midline. Morbidly obese parturients have a higher incidence of initial epidural failure rate of 42%, *versus* 6% in the general population.[6] Epidural catheter migration is more likely due to the sliding of skin over subcutaneous tissue. It is important to regularly reassess the analgesia provided by the epidural catheter. A poorly functioning labour epidural catheter requiring frequent top-up doses may fail to provide adequate surgical anaesthesia[7] and should be replaced early.

When general anaesthesia is unavoidable, the safest course of action is a planned awake fibre optic intubation, which along with topical anaesthesia may allow the patient to maintain oxygenation with spontaneous ventilation. The nasal mucosa in parturients is engorged despite topical anaesthesia and vasoconstriction, and may precipitate bleeding, leading to failed fibre optic intubation and compromised airway. Therefore, the oral route is preferred. However, the disadvantages include stimulation of the gag reflex, requiring denser airway anaesthesia and poorer

patient tolerance, as well as the risk of dental trauma.[8] It is also important to anticipate sudden loss of airway in the event of a high or total spinal block. The ORL team had been alerted beforehand in anticipation of a potential airway crisis.

The sedative effect of opioids could exacerbate the patient's condition of severe obstructive sleep apnoea. Routine neuraxial morphine was avoided due to the concern of not being able to safely secure the airway outside of the operating room setting should any airway loss occur postoperatively. Consequently, epidural ropivacaine was given, precluding the need for PCA opioid.

A multimodal analgesia strategy with neuraxial block in combination with non-opioids facilitates potentially early hospital discharge with minimal side effects on the mother and infant[9]. Early mobilization, compression stockings, and low molecular weight heparin should be used to prevent thromboembolic disease in these patients who are particularly at a higher risk.

Above all, the role of early assessment and advanced planning in managing a complicated super-obese parturient with airway anomaly is crucial. Multi-disciplinary consultation allows assessment of the risk and benefits of various management plans. Additionally, maternal decisional conflict scores were shown to be significantly lower with antenatal anaesthetic consultation.[10] In our case, a comprehensive early assessment and work-up by a multidisciplinary team offered essential insights for planning and thus contributed to the successful management of this case.

Conclusion

This report presents a successful case of anaesthetic management in a super-obese parturient with subglottic stenosis and multiple comorbidities. She was at high risk for both general and regional anaesthesia. Due to anticipated difficult airway, an airway strategy should be devised with the involvement of expert team for possible FONA. An early labour epidural using CSE technique provided effective labour analgesia. CSE is a reliable technique for indirectly confirming the correct positioning of the epidural needle with higher initial success rates, reducing the need for catheter re-siting, and ensuring successful extension for surgery. This avoids the need for hazardous intubation and airway catastrophe.

Declarations

Informed consent for publication
Informed consent form has been signed by the patient and available if requested by MyJA

Competing interests
None to declare.

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References

1. Institute for Public Health Malaysia. National Health and Morbidity Survey 2016: Maternal and Child Health (MCH) Volume Two: Maternal and Child Health Findings.
2. Lamon AM, Habib AS. Managing anaesthesia for caesarean section in obese patients: Current perspectives. Local Reg Anesth. 2016;(9):45-57. https://doi.org/0.2147/LRA.S64279
3. D'Angelo R, Habib A. Obesity. In: Chestnut DH. Obstetric Anaesthesia: Principles and Practice. 6th ed. Elsevier Mosby; 2020:1190-1202.
4. Miro M, Guasch E, Gilsanz F. Comparison of epidural analgesia with combined spinal-epidural analgesia for labour: a retrospective study of 6497 cases. Int J Obstet Anesth. 2008;17(1):15-19. https://doi.org/10.1016/j.ijoa.2007.07.003
5. Dennis AT, Lamb KE, Story D, et al. Associations between maternal size and health outcomes for women undergoing caesarean section: A multicentre prospective observational study (The MUM SIZE Study). BMJ Open. 2017;7(6):e015630. https://doi.org/10.1136/bmjopen-2016-015630
6. Singh S, Wirth KM, Phelps AL, Badve MH, Shah TH, Sah N, Vallejo MC. Epidural catheter placement in morbidly obese parturients with the use of an epidural depth equation prior to ultrasound visualization. ScientificWorldJournal. 2013 Jul 25;2013:695209. https://doi.org/10.1155/2013/695209
7. Bauer ME, Kountanis JA, Tsen LC, Greenfield ML, Mhyre JM. Risk factors for failed conversion of labour epidural analgesia to caesarean delivery anaesthesia: A systematic review and meta-analysis of observational trials. Int J Obstet Anesth. 2012;21(4):294-309. https://doi.org/10.1016/j.ijoa.2012.05.007
8. Carlos AA, Carin AH. Airway Management in the Adults. In: Michael AG, ed. Miller's Anaesthesia. 9th ed. Elsevier; 2020.
9. Arroyo-Fernández FJ, Calderón Seoane JE, Torres Morera LM. Strategies of analgesic treatment after caesarean delivery. Current state and new alternatives. Rev Esp Anestesiol Reanim (Engl Ed). 2020;67(3):167-175. https://doi.org/10.1016/j.redar.2019.11.005

10. Eley VA, Donovan K, Walters E, Brijball R, Eley DS. The effect of antenatal anaesthetic consultation on maternal decision-making, anxiety level and risk perception in obese pregnant women. Int J Obstet Anesth. 2014;23(2):118-124. https://doi.org/10.1016/j.ijoa.2013.10.010