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Anaesthetic management of a young boy with a large exophytic mass undergoing MRI-A case report

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Abstract
The difficulties associated with non-operating room anaesthesia (NORA) include an unfamiliar setting, lack of specialized staff and limited equipment. We present anaesthetic care of a 16-year-old boy with a massive, exophytic lump in his left sacral area, posted for MRI under general anaesthesia. This patient had anaemia, low albumin levels, and anticipated difficult airway due to the lump's size, which stopped him from lying supine. We ensured he was pain free and were prepared for possible hypotensive episodes during the procedure. Airway was secured with a supraglottic airway, I-gel inserted in lateral position, used muscle relaxants for clear images, and used vasopressors when he had hemodynamic instability. The MRI was uneventful, and was consistent with findings of metastatic melanoma. This case teaches us how vital planning and quick thinking are crucial in NORA for such complicated patients.

Keywords: NORA, MRI, exophytic mass, difficult airway, haemodynamic instability

Introduction
Currently, non-operating room anaesthesia (NORA) is picking up pace because of all the new technology pushing procedures beyond the usual operation theatre setup. But it's not simple working in unfamiliar places, with less equipment in hand, and handling patients with complicated conditions requires, real skill [2]. This case report details the management of a 16-year-old boy with a large exophytic mass in his left sacral area, posted for an MRI under general anaesthesia. The case was challenging due to difficult airway, multisystem involvement, and positioning complexities, rendering it a noteworthy case. This case report shows how careful planning and quick adjustments during NORA can make a difference, especially for young patients with serious disease.

Case presentation
This 16-year-old boy weighing 45 kg, American Society of Anaesthesiologists (ASA) physical status III (due to the large mass, anaemia, severe hypoalbuminemia, impending sepsis), was admitted to the emergency room with a two-year history of progressively enlarging mass in the left sacral region, accompanied by intermittent bleeding and pus discharge. He had no significant past medical or family history. On admission, the patient was anaemic with haemoglobin of 9g/dL, and local examination revealed a large, exophytic growth with foul-smelling discharge. Systemic examination showed no notable abnormalities, though he reported pain of 5/10 on the visual analogue scale. His vital signs were borderline stable heart rate 110 beats/min, blood pressure 110/70 mmHg, and oxygen saturation 97% on room air. The mass prevented him from lying supine, a concern noted for over two years, complicating airway management. At the ICU, for pain control, the patient received a fentanyl transdermal patch (25 mcg) and was started on Dexmeditomidine infusion (1 mcg/kg bolus, followed by 0.5 mcg/kg/h). The following day, an FDG-PET CT covering the body from vertex to feet revealed a massive 16.5×4.0×34.0 cm heterogeneously enhancing pedunculated soft tissue mass arising from the left paravertebral muscles namely spinalis thoracis, longissimus thoracis, ilio-costalis, and quadratus lumborum eroding the 12th rib and elevating the 11th rib's periosteum, confined to the abdominal wall with no intra-abdominal or intra-thoracic spread. Hepatosplenomegaly was noted without ascites.

Additionally, a heterogeneously enhancing lobular mass (5.0 × 4.6 cm) in the left parieto-occipital region with significant peri-lesional oedema was seen with a 5-mm midline shift to the right. FDG uptake in the left posterior parieto-occipital and medial temporal cortex (7.2 × 6.9 × 5.7 cm) was also seen. The boy had moderate pericardial effusion without pleural effusion. Specialist opinion was taken for pericardial effusion and was cleared under intermediate risk. With stable vitals, the patient was posted for MRI under general anaesthesia. Pre-anaesthetic check-up showed borderline normal investigations, and he was accepted under ASA III. High-risk informed consent was obtained from the family, detailing potential peri-operative haemorrhage, major adverse cardiac events, prolonged ICU care, and post-operative pulmonary complications, with the anaesthetic plan involving controlled mechanical ventilation using a supraglottic airway device (SGA) with or without muscle relaxant. In MRI zone 3, standard ASA monitors were connected, and anaesthesia was induced with fentanyl (2 mcg/kg), low dose propofol (1 mg/kg) to counter anticipated hypotension, ketamine (1 mg/kg), and Dexmeditomidine infusion at (0.5 mcg/kg/h). Sevoflurane was titrated as needed, 1:1 air-oxygen mixture was set. Bag-mask ventilation was easy, and after confirming positive end-tidal CO2 (ETCO2), a size 3 I-gel SGA was inserted laterally with a suction catheter in the gastric port to decompress the stomach. Following chest rise and ETCO2 confirmation, the patient was carefully transferred to the MRI Zone 4. We ensured adequate tidal volume delivery before starting. A propofol infusion (50 mcg/kg/min) was initiated, but repeated movements caused image artefacts, necessitating atracurium (0.5 mg/kg) to prevent image artefacts. During MRI, patient developed haemodynamic instability-tachycardia to 142 beats/min, blood pressure fell to 58/36 mmHg, and oxygen saturation dropped to 94% prompting an immediate halt. We administered 100% oxygen, discontinued sevoflurane, administered 250ml bolus of ringer lactate solution, followed by boluses of phenylephrine (1 mcg/kg). Nor-adrenaline infusion (0.025 mcg/kg/min) was started to encounter further hypotensive episodes. Minor bleeding from the mass was observed. The MRI of brain, spine, and pelvis was completed without contrast due to haemodynamic concerns. The patient received ondansetron (0.1 mg/kg), and neuromuscular blockade was reversed with neostigmine (50 mcg/kg) and glycopyrrolate (0.15 mg/kg); once extubation criteria were met, the SGA and suction catheter were removed, oral toileting performed, and he was shifted to the ICU with minimal vasopressor and stable vitals. In the ICU, 1 L of Ringer's lactate was given which stabilised him, and vasopressors were tapered to baseline vitals. Repeat investigations showed worsening anaemia, which was managed with blood transfusion raising haemoglobin to 9.7 g/dL the next day. Histopathology confirmed giant nodular melanoma with metastases, and debulking surgery was planned to improve quality of life on a later date. The patient remained in the ICU isolation room on high-end antibiotics for gram-negative bacterial growth from the lesion, and is being stabilised for the upcoming surgery.

Discussion

This case highlights the complexities of NORA in managing a young patient with a large exophytic mass, difficult airway, and complex physical status posted for MRI. NORA's challenges unfamiliar settings, limited resources, and patient complexity are well-documented [1, 2]. The mass's size (16.5 × 24.0 × 34.0 cm) and location precluded supine positioning, aligning with prior reports of positioning difficulties in NORA [3]. Lateral SGA insertion was a pragmatic solution, supported by literature advocating supraglottic devices in difficult airways [4] Haemodynamic instability, a known risk in NORA, [5] was promptly addressed with vasopressors, reflecting the need for vigilance highlighted by Youn *et al*. [3] Muscle relaxation with atracurium, though uncommon in MRI settings, ensured imaging clarity, a decision backed by studies on movement artefacts [6].

Limitations include the lack of contrast MRI due to hemodynamic instability, potentially missing diagnostic details, and the absence of invasive monitoring. Strengths lie in the multidisciplinary approach and pre-operative optimisation, aligning with ASA guidelines [7]. Literature from Maddirala *et al*. [1] and Wong *et al*. [8] stresses NORA's higher ASA III-IV patient burden, as seen here, necessitating tailored anaesthetic strategies. The brain metastases and pericardial effusion further complicated management, requiring judicious administration of drugs causing increased intracranial pressure [9]. The key takeaway is that NORA demands thorough preparation, adaptability, and teamwork to ensure safety in complex cases. This report reinforces the need for anaesthesiologists to anticipate and mitigate risks in non-traditional settings.

Fig 1: PET-CT

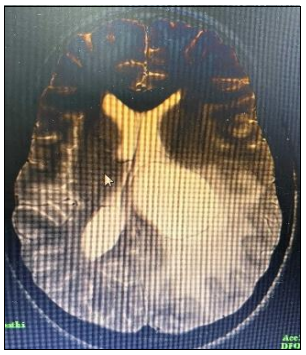

Fig 2: MRI brain with mid-line shift

Fig 3: Large Exophytic Growth

Fig 4: Showing temporal cortex le**sion**

Fig 5: Raw MRI Image

Fig 6: X-Ray showing pericardial effusion

Conclusion

This case underscores the importance of preparedness and adaptability in managing complex cases in non-operating room environments. Despite the unique challenges posed by the MRI setting and the patient's condition, the anaesthesia team was able to successfully complete the procedure and ensure patient safety. This case serves as a valuable learning experience, highlighting the need for continuous training and improvement in NORA practices.

Declaration of patient consent

The authors confirm that they have gotten the necessary consent from the patient involved. In the form, the patient's parent/guardian has given consent for his images and other clinical information to be reported in the journal. The patient and his parent/guardian understand that his name and initials will not be published, and due efforts will be made to conceal his identity; however, anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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