






Anesthetic Management of Transoral Odontoidectomy in a Child with Multiple Drugs Intolerance Syndrome

Neeraja Ajayan¹ Ajay P. Hrishi² Ganesh Divakar³

¹Neuroanesthesia and Critical Care, National Institute for Neurology and Neurosurgery, University College of London NHS Hospital Trust, London, United Kingdom

²Neuroanesthesia and Critical Care Division, Department of Anesthesiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India

³Department of Neurosurgery, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, India

Address for correspondence Ajay P. Hrishi, MD, DM, EDAIC, Neuroanesthesia and Critical Care Division, Department of Anesthesiology, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Trivandrum, Kerala 695011, India (e-mail: drajay@sctimst.ac.in).

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Abstract

Keywords

- ▶ multiple drug intolerance syndrome
- ▶ regional anesthesia
- ▶ transoral odontoidectomy

Patients with an adverse reaction to more than three groups of drugs have multiple drug intolerance syndrome (MDIS). Regional anesthesia can be an attractive alternative when patients presenting for surgery are diagnosed with MDIS for opioids and nonsteroidal anti-inflammatory drugs (NSAIDs). Moreover, supplementary regional anesthetic techniques reduce exposure to multiple anesthetic medications, reducing the incidence of allergic reactions. We report the case of a pediatric patient diagnosed with MDIS presenting for transoral odontoidectomy and tracheostomy, wherein regional anesthesia techniques aided us in providing perioperative analgesia and maintaining hemodynamic stability.

Introduction

Patients with an adverse reaction to more than three groups of drugs have multiple drug intolerance syndrome (MDIS).¹ Conversely, a reported allergy to two or more chemically distinct drugs is termed multiple drug hypersensitivity syndrome.² We report the case of a pediatric patient diagnosed with MDIS presenting for transoral odontoidectomy and tracheostomy, wherein regional anesthesia techniques aided us in providing perioperative analgesia and maintaining hemodynamic stability.

Case Report

Written informed consent from the parents was taken before submission of the manuscript. An 8-year-old girl weighing 31 kg diagnosed with retroflexed odontoid was scheduled for

transoral odontoidectomy and tracheostomy. Her preanesthetic evaluation revealed an episode of erythematous rash and bronchospasm during general anesthesia for diagnostic magnetic resonance imaging (MRI). The diagnosis of MDIS was made by the immunologist based on clinical evaluation, immunology tests, and intradermal skin testing, which yielded positive results with thiopentone sodium, propofol, diclofenac, ketamine, morphine, fentanyl, pethidine, atracurium, and multiple antibiotics. The rest of the anesthetic medications, including local anesthetic agents, tested negative for allergy. Another anesthetic concern was an anticipated difficult airway owing to retroflexed odontoid and limited neck extension.

On the day of surgery, as per standard American Society of Anesthesiologists monitoring practice, preinduction monitors consisting of pulse oximetry, electrocardiography, and

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noninvasive blood pressure were attached. Peripheral intravenous access was obtained after inhalational induction with 8% sevoflurane in oxygen.

After confirmation of the adequacy of mask ventilation, 0.1 mg/kg of vecuronium was administered and the child was intubated with a 6.0 cuffed flexometallic endotracheal tube under fiberoptic guidance. Postintubation, bispectral index (BIS), invasive blood pressure, end-tidal carbon dioxide, temperature, train of four, and urine output were monitored. Anesthesia was maintained with air:oxygen mixture (50:50) and sevoflurane of minimal alveolar concentration of 0.7 to 1.0 to target a BIS of 40 to 45, along with intermittent boluses of vecuronium (0.04 mg/kg). Dexmedetomidine was used as an adjuvant after an initial bolus dose of 1 µg/kg over 20 minutes, followed by an infusion of 0.4 to 0.7 µg/kg/h. Paracetamol 20 mg/kg was administered for intraoperative analgesia. A local anesthetic cocktail consisting of 5 mg/kg of 2% lignocaine with adrenaline (1:1,00,000), 3 mg/kg of 0.25% bupivacaine, and 30 µg of dexmedetomidine was prepared to provide the regional nerve blocks. Bilateral glossopharyngeal nerve block, ultrasound-guided bilateral maxillary nerve block, and bilateral superficial and deep cervical plexus block were performed. The child was tracheostomized with a 6-mm cuffed silicone tracheostomy tube prior to the surgical procedure, after which the endotracheal tube was removed. The child received cefuroxime 50 mg/kg/dose as a part of the perioperative antibiotic protocol. In addition, the child received dexamethasone 0.1 mg/kg every 8 hours for 48 hours as a part of the perioperative regimen for transoral odontoidectomy. The patient remained hemodynamically stable during the intraoperative period. The child was shifted to the intensive care unit postsurgery and electively ventilated overnight. The child was disconnected from the ventilator the next day. Analgesia in the postoperative period was achieved with dexmedetomidine and paracetamol up to 48 hours. The postoperative period was uneventful, with the visual analog score being 1 to 3 up to 48 hours postsurgery, and the child was decannulated on day 7 before discharge.

Discussion

MDIS is a clinical condition characterized by susceptibility to an adverse reaction against chemically unrelated drugs. During the primary exposure to the offending agents, there is a hypersensitive immunological reaction due to mast cell mediator release, T-cell, or Mrgprx mediated reactions.^{1,2} Sensitization occurs during a secondary exposure wherein the antibodies bind to specific immunoglobulin E (IgE) mediators causing a severe allergic response.² Serum autoantibodies target the IgE receptor (FcεRI), inducing histamine release.²

In our patient, the previous anesthesia record revealed an anaphylactic reaction. Subsequent drug allergy testing showed that the patient had MDIS. Thus, avoiding the identified medications with allergic potential in our anesthetic regimen was pertinent. Although cross-reactivity between opioids

with different chemical structures is a rare entity, it was noted that our patient had documented allergy to diclofenac, ketamine, fentanyl, morphine, and pethidine. This presented a significant dilemma as they constitute the mainstream analgesia in patients presenting for spine surgeries.

To address this conundrum, we discussed with the neurosurgeon regarding the surgical approach. Since the child had a retroflexed odontoid, a transoral approach and tracheostomy were decided upon. As this technique causes considerable nociception, we reviewed the surgical steps and relevant nerve anatomy to formulate a comprehensive anesthetic plan. Elective tracheostomy before transoral odontoidectomy is practiced in many institutions, as tongue and pharyngeal edema can cause respiratory distress in the postoperative period.³ We provided cervical plexus block (superficial and deep) along with translaryngeal block to provide analgesia for the tracheostomy.^{4,5} The initial step of the transoral odontoidectomy is placing a self-retaining transoral retractor system to achieve good exposure of the posterior oropharynx.⁶ Pain during this step was prevented by blocking the maxillary nerve, which supplies the roof of the mouth and the hard and soft palate. The subsequent step is to make an incision on the posterior pharyngeal wall mucosa and pharyngeal muscles supplied by the glossopharyngeal nerve, and antinociception was provided by blocking the same.³ The dissection of the anterior longitudinal ligament, alar, and apical ligaments, along with resection of the anterior arch of C1 and the odontoid process, required considerable analgesia.⁶ This was achieved with a deep cervical plexus block that blocked the ventral rami of C1 to C4 spinal nerves providing analgesia during these steps.⁴ Thus, thorough knowledge of the surgical technique aided us in delivering optimal analgesia.

Dexmedetomidine has a notable sedative and opioid-sparing effect, with an enhanced safety profile and has proven beneficial in providing analgesia in spine surgeries.⁵ Moreover, dexmedetomidine (1 µg/kg) is now used as an adjuvant to local anesthetics.^{7,8} However, it rarely suffices as a sole analgesic agent.⁵ Therefore, paracetamol was used as an additive analgesic agent as it inhibits the synthesis of prostaglandins related to pain. Moreover, a regional anesthetic technique, such as in our case, prior to surgery, has a preemptive analgesic effect.⁹ Since managing perioperative pain with opioid analgesia and nonsteroidal anti-inflammatory drugs (NSAIDs) was not an option, regional anesthesia techniques proved an excellent modality for analgesia.

Conclusion

In conclusion, we describe the successful management of a child with MDIS scheduled for transoral odontoidectomy using the regional anesthesia technique supplementing general anesthesia.

Conflict of Interest

None declared.

References

- 1 Behera SK, Das S, Chengappa KG, Xavier AS, Selvarajan S. Multiple drug intolerance syndrome: an underreported distinct clinical entity. *Curr Clin Pharmacol* 2019;14(02):84–90
- 2 Pichler WJ, Srinoulprasert Y, Yun J, Hausmann O. Multiple Drug Hypersensitivity. *Int Arch Allergy Immunol* 2017;172(03):129–138
- 3 Pani N, Kumar Rath S. Regional & topical anaesthesia of upper airways. *Indian J Anaesth* 2009;53(06):641–648
- 4 Kim JS, Ko JS, Bang S, Kim H, Lee SY. Cervical plexus block. *Korean J Anesthesiol* 2018;71(04):274–288
- 5 Tsaousi GG, Pourzitaki C, Aloisio S, Bilotta F. Dexmedetomidine as a sedative and analgesic adjuvant in spine surgery: a systematic review and meta-analysis of randomized controlled trials. *Eur J Clin Pharmacol* 2018;74(11):1377–1389
- 6 Elbadrawi AM, Elkhateeb TM. Transoral approach for odontoidectomy efficacy and safety. *HSS J* 2017;13(03):276–281
- 7 Liu W, Guo J, Zheng J, Zheng B, Ruan X. Addition of Dexmedetomidine to Ropivacaine-Induced supraclavicular Block (ADRI) investigator. Low-dose dexmedetomidine as a perineural adjuvant for postoperative analgesia: a randomized controlled trial. *BMC Anesthesiol* 2022;22(01):249
- 8 Bao N, Shi K, Wu Y, et al. Dexmedetomidine prolongs the duration of local anesthetics when used as an adjuvant through both perineural and systemic mechanisms: a prospective randomized double-blinded trial. *BMC Anesthesiol* 2022;22(01):176
- 9 Kaufman E, Epstein JB, Gorsky M, Jackson DL, Kadari A. Preemptive analgesia and local anesthesia as a supplement to general anesthesia: a review. *Anesth Prog* 2005;52(01):29–38