

Perioperative management of patients for osteo-odonto-kreatoprosthesis under general anaesthesia: A retrospective study

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ABSTRACT

An osteo-odonto-keratoprosthesis (OOKP) procedure is indicated in patients with failed corneal transplant but having intact retina for visual improvement. We studied perioperative concerns of patients who underwent the staged OOKP procedure. This was a retrospective analysis of patients who underwent OOKP. The information regarding symptoms, associated comorbidities, perioperative events including anaesthetic management were collected. Eight patients (five females and three males) underwent the staged OOKP procedure. The median age was 18 years. The median weight was 45 kg. The median duration of loss of vision was 4 years. The aetiology of blindness included Stevens-Johnson's syndrome (SJS) (7) and chemical burn (1). Four patients had generalized skin problem due to SJS. All cases were managed under general anaesthesia, and airway management included nasotracheal intubation for stage I and orotracheal intubation for stage II. The median mallampati classification was I prior to OOKP stage I procedure while it changed to II at stage II procedure. Two patients required fibreoptic nasotracheal intubation. One patient had excessive oozing from the mucosal harvest site and was managed conservatively. In one patient, tooth harvesting was done twice as the first tooth was damaged during creating a hole in it. We conclude that OOKP requires multidisciplinary care. Anaesthesiologist should evaluate the airway carefully and disease-associated systemic involvements. The use of various drugs requires caution and steroid supplementation should be done. Airway difficulty should be anticipated, mandating thorough evaluation. Re-evaluation of airway is prudent as it may become difficult during the staged OOKP procedure.

Key words: Airway, anaesthesia, drugs, osteo-odonto-keratoprosthesis

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INTRODUCTION

An osteo-odonto-keratoprosthesis (OOKP) procedure is indicated in patients with failed corneal transplant but having intact retina for visual improvement. The corneal blindness can occur due to Stevens Johnson syndrome (SJS), dry eye due to ocular pemphigoid, Sjögren syndrome, trachoma, Lyell syndrome, graft-versus-host disease, congenital lid coloboma, severe corneal burns, and bullous keratopathy and keratitis sequelae.^[1] The surgical technique of OOKP is well described in the literature, but perioperative

anaesthetic concerns have not been reported in detail.^[2-5] We present perioperative concerns in patients who underwent the staged OOKP procedure at our institute.

METHODS

This was a retrospective study for the analysis of patients who underwent OOKP. The information regarding symptoms, associated comorbidities and perioperative events including anaesthetic management was recorded.

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Anaesthetic technique

After a thorough preanaesthetic evaluation including airway evaluation, all patients were premedicated with aspiration prophylaxis (ranitidine) and anxiolytic agent (diazepam). If patients were on steroid therapy, then it was continued with the addition of stress dose. In the operating room, monitors included electrocardiogram, pulse oximeter, noninvasive blood pressure, capnograph, and temperature. Anaesthesia was induced with intravenous fentanyl (2 µg/kg), propofol (1.5-2.5 mg/kg), and neuromuscular blockade achieved with vecuronium (0.1 mg/kg). In the case of difficult airway, the management was as per institutional protocol including awake fibreoptic bronchoscope-guided tracheal intubation. Stage I OOKP required nasotracheal intubation while stage II was managed with orotracheal intubation. The site of tube fixation was required to be changed during the stage I procedure during harvesting of tooth, cheek mucosa and when the ocular procedure was done. Stage I required extension of neck and use of mouth gag for proper visualization of oral structures during teeth and mucosa harvesting. Oral packs were inserted for stage I procedure. Patient's urethra was catheterized in view of need of mannitol (0.5-1 g/kg body weight) in stage II and prolonged surgery. The blood pressure was controlled using titrated propofol infusion (100-300 µg/kg/min) and volatile agent (isoflurane 1-2%) to a minimum blood pressure of 20% less than the baseline blood pressure. Neuromuscular blockade was guided by a neuromuscular monitor. After surgery, residual neuromuscular blockade was reversed (neostigmine 50 µg/kg and glycopyrrolate 10 µg/kg) and trachea was extubated. Postoperative analgesia was provided by tramadol and paracetamol (intravenously for first 24 h and then orally).

RESULTS

Eight American Society of Anaesthesiologists (ASA) physical class I patients underwent the staged OOKP procedure. The median age was 18 years (9-28 years) and there were five females and three males. The median weight was 45 kg (32-77 kg). The median duration of loss of vision was 4 years (2-10 years). The aetiology of blindness included SJS (seven patients) and chemical burn (one patient). The SJS was due to viral infection (3), NSAIDs (2) and antibiotics (2). Four patients had generalized skin problem due to SJS and difficulty was encountered during placement of intravenous cannulae and pulse oximeter monitoring. The median modified mallampati classification (MMC) was class I prior to

OOKP stage I procedure while it changed to MMC class II at stage II procedure. Two patients required fibreoptic nasotracheal intubation due to difficult airway (restricted mouth opening). The median duration for stage Ia OOKP was 4 h, for stage Ib was 6 h and for stage II was 6.5 h. One patient had excessive oozing from the mucosal harvest site and was managed conservatively. In one patient, tooth harvesting was done twice as the first tooth was damaged during creating a hole in it. In one patient vision improved initially but thereafter it deteriorated and then the same procedure was done in the other eye.

DISCUSSION

The perioperative concerns during the OOKP procedure involves patient profile, the surgical procedure itself, the airway management (sharing of airway, pre-existing difficult airway due to disease pathology or becomes difficult after the first stage surgical procedure, fixation of tube to be changed during stage I), the drug-related implications (continuance of steroids, allergy to known and unknown drugs), prolonged surgery, measures required for decreasing Intraocular pressures, hypotensive anaesthesia, patient immobility (monitoring of neuromuscular blockade) and psychological considerations (anxiety, depression).

Anaesthetic implication of SJS includes a difficult orotracheal intubation due to oral mucosal erosions, difficult monitoring because of skin lesions, pleural blebs which can rupture and lead to pneumothorax, myocarditis and pericarditis, electrocardiogram may show fibrillatory changes, temperature monitoring as there are frequent febrile episodes. The operating room temperature needs to be maintained as patients with SJS are susceptible to Raynaud's phenomenon. Associated arthritis or fibromyalgia can affect the movement and positioning of the patient. The drugs like analgesics (diclofenac, ibuprofen, COX inhibitors), barbiturates and sedatives, antibiotics, anticonvulsants (phenytoin) should be used cautiously as these can precipitate SJS. The severe scarring of the oral mucosa may lead to restricted mouth opening and also difficulty in harvesting graft.^[6] There may be bleeding during nasal intubation as nasal mucosa may be affected due to the disease process.

Assessment of maintenance of depth of anaesthesia and neuromuscular blockade is important to maintain immobility of the patient. During the first stage, nasotracheal intubation is required in view of oral

surgery. For the second stage procedure, these patients may exhibit airway problems as a result of the first stage surgery, the most common being scarring around the site used for harvesting the buccal mucous membrane. In stage II procedure, the care should be taken to avoid any pressure by the mask over the lower lid where prosthesis has been implanted. Head up position and hypotensive anaesthetic techniques are required to minimize blood loss. Eye is open during the OOKP, so techniques directed toward prevention of rise in intra-vitreous pressures are followed.^[2] Maintenance of normocarbica, administration of mannitol (0.5-1 g/kg) and acetazolamide (500 mg) is required in the perioperative period.^[2] Urinary catheterization is required but involvement of the mucous membrane makes it difficult.

Postoperatively, after stage I OOKP, patient should be fully awake at the time of extubation, and should be able to maintain airway to avoid pressure on the eye due to face mask application. Tramadol and paracetamol are administered for postoperative analgesia as other NSAIDs should not be used in patients with SJS.

We conclude that an anaesthesiologist should evaluate the airway carefully and disease-associated

systemic involvements for OOKP. The use of various drugs requires caution and steroid supplementation should be done. Re-evaluation of airway is prudent as it may become difficult during the staged OOKP procedure.

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