

## Intra-operative carcinoid crisis: Revised anaesthesia management

Sir,

Carcinoid is a tumour of amine precursor uptake and decarboxylation cells.<sup>[1]</sup> Tumours arise in the gastrointestinal tract (67.5%) and the bronchopulmonary system (25.3%). Pulmonary carcinoids account for 2% of all primary lung cancers with a 10-year survival of 82%–92%.<sup>[2]</sup> Bronchial carcinoids are perihilar and present with chest pain but can present as asthma, recurrent pneumonia, cough or haemoptysis. The diagnosis is sometimes delayed as symptoms might be misleading.

A 31-year-old lady with chest pain, new onset asthma and right-sided perihilar mass was diagnosed as carcinoid tumour with biopsy. No plasma or urine tests were done, and the patient was scheduled for surgery. On the day of surgery, the patient was asymptomatic. A T8–T9 epidural was placed, standard monitors were applied and anaesthesia induced with propofol and rocuronium. After an initial unsuccessful attempt using a Macintosh (MAC) 3 blade, a video laryngoscope was used to place a cuffed endotracheal tube, which was exchanged to left-sided double lumen tube (DLT). Breath sounds as well as end-tidal carbon dioxide were appreciated, and the position confirmed using fibre-optic bronchoscopy. Anaesthesia was maintained with sevoflurane 2% in air/oxygen mixture. After a few minutes, the blood pressure decreased acutely, and peak pressure increased above 40 cm H<sub>2</sub>O. Auscultation revealed coarse bilateral breath sounds with expiratory wheeze. A presumptive diagnosis of carcinoid crisis was made, and a 150 µg bolus of octreotide was given which stabilised the blood pressure and the respiratory status. After discussion with the surgeon, the surgery was aborted. Neuromuscular blockade was reversed and patient extubated. The patient was admitted to medical Intensive Care Unit for monitoring.

Pulmonary consult was obtained, and the patient was started on prednisone before second surgery. Preoperatively, during the second surgery, 500 µg octreotide bolus over 1 h followed by an intra-operative infusion at 100 µg/h was given along with H1 and H2 blockers. After placement of thoracic

epidural, anaesthesia was induced with propofol and rocuronium. Using a MAC 3 blade, a left DLT was placed and location confirmed using a fibre-optic bronchoscope. Intra-operative mild hypotension was treated with low-dose phenylephrine. Surgery proceeded uneventfully, and middle and lower lobes were resected. The patient was extubated at the end of surgery, and pathology was positive for typical bronchial carcinoid.

Carcinoid tumours are usually asymptomatic, as the mediators released are metabolised by the liver. If the liver function is deranged or there is metastasis, the patient will be symptomatic. In 10% patients, carcinoid syndrome, classically described as bronchospasm, intermittent facial flushing and chronic watery diarrhoea occur. Carcinoid crisis is an exaggerated form that may precipitate intraoperatively by laryngoscopy and surgical manipulation.

Perioperative goal is to prevent mediator release by avoiding anxiety, hypercapnia, hypothermia and hypotension.<sup>[3]</sup> Histamine-releasing drugs and succinylcholine which can release peptides should be avoided.<sup>[4]</sup> Bronchospasm and hypotension can occur perioperatively. Octreotide, a somatostatin analogue, is used to treat hyper/hypotension as well as bronchospasm.<sup>[5]</sup> Sympathomimetic drugs and bronchodilators, such as β<sub>2</sub> agonists, can activate kallikrein leading to synthesis and release of bradykinin resulting in vasodilatation and hypotension. Phenylephrine and vasopressin have been used for the treatment of hypotension.<sup>[2,6]</sup>

A 250–500 µg bolus of octreotide for suspected carcinoid syndrome for minor procedures, and a bolus followed by an infusion of 100–500 µg/h for major procedures has been recommended by the consensus guidelines for the management and treatment of neuroendocrine tumours 2010 and 2013.<sup>[7,8]</sup> Urinary 5-hydroxyindoleacetic acid (5-HIAA) is useful for diagnosis, but the levels are normal in patients with thoracic carcinoid.<sup>[5]</sup> The severity of symptoms nor the urinary 5-HIAA levels correlate with disease severity and do not help to predict physiological response intraoperatively. Since patients are asymptomatic and present with complications in the perioperative period, providers should be more vigilant.

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**Conflicts of interest**

There are no conflicts of interest.

**Michelle L Kromas, Yuvesh Passi, Chika Kuzumi<sup>1</sup>,  
Soni Shikhar<sup>1</sup>**

Department of Anesthesiology, SUNY Upstate Medical University,  
<sup>1</sup>Department of Anesthesiology, VA Medical Center, Syracuse,  
NY, USA

**Address for correspondence:**

Dr. Michelle L Kromas,  
208 West Water Street, Apt 202, Syracuse, NY 13202, USA.  
E-mail: mkromas@gmail.com

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