

# Perioperative management of patients with neuroendocrine tumours

Octreotide is the cornerstone of perioperative management of neuroendocrine tumours, but there is no universal agreement on the optimal regimen. This article discusses the evidence for its use during different parts of the perioperative pathway.

## Introduction

Neuroendocrine tumours, or carcinoid tumours, are rare neoplasms arising from various organs, commonly the bowel and appendix. They synthesise and secrete various peptide hormones (Mancuso et al, 2011). If the unmetabolised vasoactive forms of these hormones enter the systemic circulation, they produce cutaneous flushing, diarrhoea and wheeze, also known as carcinoid syndrome (Mancuso et al, 2011). Chronic serotonin exposure predisposes the patient to endocardial fibrosis, leading to pulmonary and tricuspid valvular disease (Powell et al, 2011).

Carcinoid crisis describes life-threatening haemodynamic instability when large quantities of mediators are released, often stimulated by the catecholamine rise that occurs at induction of anaesthesia and following physical manipulation of the tumour. Perioperative management focuses on preventing mediator release, thereby avoiding crisis development.

## Preoperative assessment

Patients with neuroendocrine tumours may present for curative resection of the primary tumour, debulking surgery for symptom control, or for cardiac surgery to correct valvular dysfunctions.

A thorough history should elicit cardiovascular and biochemical complications of uncontrolled mediator release, including dehydration, electrolyte disturbances and cardiac failure (Powell et al, 2011).

Full blood count, electrolytes, liver function tests and coagulation studies are essential. A chest X-ray may reveal bronchial lesions. Electrocardiogram findings are often non-specific. A transthoracic echocardiogram should be performed to exclude cardiac lesions, especially in patients with carcinoid syndrome, or elevated B-type natriuretic peptide or 5-hydroxyindoleacetic acid levels (Agha et al, 2019). Transoesophageal echocardiography is indicated when transthoracic views are poor or equivocal (Agha et al, 2019).

## Preoperative therapy

Somatostatin is a regulatory hormone that inhibits several circulating peptides. Octreotide is a somatostatin analogue providing symptomatic control in people with neuroendocrine tumours. Its role has been extrapolated to become the mainstay of perioperative prophylaxis to prevent intraoperative crisis.

However, there is a paucity of prospective data that substantiates the benefits of giving prophylactic octreotide (Xu et al, 2022) as a result of heterogeneity in the definition of carcinoid crisis. It may also be a distinct entity from carcinoid syndrome, accounting for the differences in octreotide efficacy in symptom control vs crisis prevention.

Unsurprisingly, the optimal regimen for perioperative octreotide is not established. The UK and Ireland Neuroendocrine Tumour Society (2017) stratified their recommendations by degree of procedure and disease activity, from no octreotide, to continuous infusion spanning 24 hours before induction to 48 hours post-procedure.

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## Intraoperative management

The choice of anaesthetic technique is influenced by local preferences, but all have the primary objective of minimising mediator release to achieve cardiovascular stability.

Invasive arterial monitoring is sensible, given the potential for rapid haemodynamic fluctuations and massive bleeding in patients with highly vascular abdominal neuroendocrine tumours. Central venous pressure can guide fluid management as vasoactive hormones mask normal responses to hypovolaemia (Powell et al, 2011). In patients with carcinoid heart disease, cardiac output monitoring facilitates management of haemodynamics. Minimally invasive monitors correlate well with invasive methods, choices being dependent on local practices and availability of equipment (Mancuso et al, 2011).

Sympathomimetic inotropes and vasopressors may trigger release of vasoactive hormones, paradoxically leading to further hypotension, although an exaggerated hypertensive response is sometimes observed (UK and Ireland Neuroendocrine Tumour Society, 2017). Phenylephrine and octreotide boluses appear to be the safer options commonly used (Powell et al, 2011). Octreotide boluses are also given for intraoperative bronchospasm, seen in bronchial neuroendocrine tumours.

## Postoperative care

High-dependency care is preferable because of the potential for postoperative crises triggered by pain and hypovolaemia. The duration of octreotide infusion should be tailored to the extent of surgery, remaining tumour load and cardiovascular status.

## Conclusions

Octreotide remains customary in the perioperative management of neuroendocrine tumours, despite the lack of high-quality evidence. Given the morbidity and mortality associated with carcinoid crises, efforts should continue to establish appropriate preventive strategies.

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