

Interventional Procedures and Surgery in Patients with the Carcinoid Syndrome

Such procedures may result in "Carcinoid crisis" where the main features are vascular i.e. tachycardia, intense flush and either a rise or fall in blood pressure, but also bronchoconstriction and mental disturbance.

[Note: in **bronchial carcinoids** peptides are released into the circulation directly and one does not have the hepatic first pass metabolism to clear them from the systemic circulation. Some patients will not be aware of symptoms prior to surgery having long suffered heartburn, flushing, tachycardia and wheezing, thought to be stridor. They often think these are "normal" and only become aware they are abnormal when they disappear after surgery. We have documented occasions where the first appearance of carcinoid syndrome has been arrested during surgery. Therefore all bronchial carcinoids should be treated with this protocol.]

Pathogenesis

It is not clearly known what precipitates a crisis, whether the procedure itself or the drugs. [Anecdotally we have seen crisis precipitated by tumour handling and terminated by ligation of draining vessels.]

Various drugs which should be avoided include "nerve blockers", acetylcholine, curare, morphine, noradrenaline and b-adrenergic agonists.

Pre-procedure Management

The patient should for 24 hours before, be commenced on **Sandostatin** subcutaneously, in a dose of at least **100 micrograms 6 hourly**. However, when the patient has been taking 400 micrograms or greater in the 24 hours, the daily dose should be doubled to a maximum of 2000 micrograms in the 24 hours. The dose should continue to be given 6 hourly.

During the procedure

The 6 hourly Sandostatin should be continued, timing one of the doses to just before the procedure.

Vital signs - pulse and BP should be monitored. [In addition, pulse oximeter, end tidal CO₂ and regular blood gases are standard for thoracic anaesthesia.]

Carcinoid Crisis

Signs of carcinoid crisis can be treated by **100 micrograms Sandostatin I.V. stat.**, and if necessary a **continuous infusion** of Sandostatin 100micrograms 6 hourly.

Another measure to use in **hypotension** includes volume replacement.

Hypertension may also respond to I.V. **Ketanserin 10 milligram stat** (Ketanserin is a selective antagonist of serotonin. It is available on a named

patient basis from pharmacy and **must be ordered by the ward medical staff the day before** and sent to theatre with the patient.) Infusion can be continued at 2-6 mg/hour. Additional drugs include hydrallazine.

Post procedure

Monitoring of vital signs should continue for at least 48 hours. The 6 hourly Sandostatin should be continued for 48 hours.

Warning: *Knowledge concerning the above is in a developing phase at present. It is recommended that the metabolic team (neuro-endocrine tumour group) be contacted prior to surgery on all patients with suspected carcinoid.*

We are grateful to Professor Keith Buchanan, Department of Medicine, Queen's University, Belfast for preparing this protocol and for paying so much attention to our patients over the years.