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Anaesthetic Management of a Suspected Carcinoid Tumor

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Case Report

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Abstract

Carcinoid tumors are slow growing neoplasms of neuro-endocrine tissues arising from enterochromaffin cells and although rare can create serious problems during the surgery due to myriad clinical manifestations and perioperative complications. A slow growing tumor, it remains asymptomatic and is mostly found coincidentally intraoperative. Tumor secretes mediators which, if, bypass the hepatic metabolism result in Carcinoid syndrome characterized by profound hemodynamic instability intraoperative. Diagnosed patients who are already receiving octreotide show better hemodynamic control during surgery. We present a case of anaesthetic management of intestinal obstruction with illeal mass in a 65 year old male who was operated with the suspicion of Carcinoid tumor, proven later on histopathology.

Keywords: Enterochromaffin cells; Octreotide

Introduction

Carcinoid tumors are the most common type of neuroendocrine tumors**.** They are mostly benign but capable of metastasis to distant organs. The first description of Carcinoid tumor was by Lubrach in 1888 and Ransom first described the classic symptoms of a Carcinoid tumor in 1890. In 1907 Oberndorfer coined the term Karzinoidetumoren due to its similarity to carcinomas despite its benign nature [1]. Gusset and Masson in 1914 stated that these tumors were endocrine in nature which pose major anaesthetic challenges due to their unusual effects [2]. Diagnosed cases of Carcinoid tumor need good co-ordination between the anesthetist, cardiologist, surgeon and the endocrinologist. We present the case of a patient managed in our facility for acute intestinal obstruction (ileal growth on C.T scan) with high suspicion of a Carcinoid tumor.

Case Report

A 68 year old male was admitted to our facility, with complaints of severe abdominal pain, unable to pass flatus and gradual abdominal distention for the last two days. On examination, he was conscious, abdomen was distended with no bowel sounds, heart rate 120 beats/min, blood pressure 160/110 mm of Hg, respiratory rate 35 breaths/min, SpO_2 93% on room air. He was a hypertensive for the last 20 years and had been on tab. amlodipine and losartan. There was no other remarkable history of any other systemic illness or surgery in the past. A naso-gastric tube was placed in emergency to decompress abdomen. Urgent CT scan was done which revealed a mass lesion measuring around 4 x 3 X 3 centimeters in the Ileum and small gut mesentery with distended jejunum, probably a Carcinoid tumor along with ascites in peri-hepatic and peri-splenic region.

He was shifted to the Intensive Care Unit for pre-operative optimization, two wide bore cannula were secured and blood samples for Complete Blood Count, Liver Function Tests, Renal Function Tests, grouping and cross-matching, Arterial Blood Gases, coagulogram, blood sugar and electrolytes were sent. Chest X-ray, ECG, ECHO were also done. The echocardiogram showed moderate tricuspid regurgitation with moderate pulmonary arterial hypertension with a non-collapsing IVC to respiration. Central venous catheter, foleys catheter and arterial line were also placed and intravenous fluids were given carefully. All laboratory reports were within normal limits except serum potassium2.34 mmols/l which was replaced with 60 meq of potassium chloride given as an infusion along with magnesium 2gms via the central venous route. High suspicion of Carcinoid tumor was due to the site of the lesion (ileum and mesentery), symptom of intestinal obstruction (10% initial presentation) along with chronic hypertension and tricuspid regurgitation in the patient's age (60 years). A plan for an emergency exploratory laparotomy was made after initial resuscitation and he was shifted to the operation theatre within 2 hours of admission. Warm intravenous fluids, rapid fluid infuser, in vasopressin and insulin infusions were kept ready.

On arrival at operation theatre vitals were checked and ECG, SpO_2, intra-arterial blood pressure were monitored, inj. Ranitidine 50 mg, inj. Octreotide 50 mcg (prophylactic dose)and inj. Glycopyrrolate 0.2 mg was given. Thoracic epidural was placed at T9-T10 level and extended cephalad and InjRopivacaine 0.2% with Fontanel 2mcg/ml @ 7 ml/hr was started through the epidural catheter. Anaesthesia was induced with inj Fontanel 150 mcg and inj Etomidate 10 mg, inj Rocuronium 60mg was given to achieve muscle relaxation and trachea was intubated with a8.5mm internal diameter cuffed endotracheal tube. Anaesthesia was maintained with Inj Dexmedetomidine infusion, Isofluraneand 1-2% in oxygen/air mixture. During tumor manipulation and surgical resection of the hepatic metastases (incidental finding during surgery) hypotension ensued which was managed with infusion of 2.5 liters of crystalloids, 0.5 liters of a colloid (gelofusine), one unit of packed red cells and inj Vasopressin infusion 1 unit/hour. Resection of the tumor with end to end anastomosis was done along with hepatic resection of involved sections. Prophylactic appendectomy with omental biopsy was also done and specimen was sent for histopathological examination. A plan for elective ventilation was made in view of haemodynamic status and patient was shifted to the surgical ICU on Vasopressin infusion. In the Intensive Care Unit patient was sedated with Inj Fontanel and inj Dexmedetomidine infusion and vasopressors were gradually tapered and stopped. Judicious fluid replacement was done as per IVC, pulse pressure variation, hourly urine output and lactate measurements periodically. Epidural analgesia was continued with injRopivacaineand inj Fontanel infusion. Patient was fed parenterallyand electrolytes were replaced as per the need. Blood glucose levels were monitored hourly and managed with insulin infusion as per ICU protocol. The trachea was extubated on day 2 of surgery once he was haemodynamically stable and met the extubation criteria.

Histopathology report confirmed low grade well differentiated neuroendocrine tumor with involvement of liver, appendix and mesentery. Octreotide was continued as 50 mcg 12 hrly and tapered over one week as advised by endocrinologist. Patient was shifted to ward on 4th post operative day.

Discussion

Carcinoid tumors arise from enterochromaffin cells from different embryonic divisions of gut. Hence the foregut tumors arise from lungs, bronchi and stomach, midgut tumors from small intestine, appendix and proximal large gut and the hindgut tumors arise in distal colon and rectum. [3] The most common site of origin is appendix, predominantly in 4th or fifth decade with female predominance. 10% of tumor causes obstructive features as in our patient. Metastasis to liver at the time of presentation is not rare decreasing the 5 year survival to around 35%. [4] Most crinoids are found incidentally during surgery as they remain asymptomatic or present with complaints of vague gastrointestinal symptoms. The symptoms are mostly seen in patients wherein the primary tumor does not drain to the portal circulation hence bypassing the hepatic metabolism. Most important mediators released are – serotonin, histamine dopamine, substance P, prostaglandins andkallikrien. Serotonin is metabolized to 5 hydroxyindole acetic acid (5 HIAA) which is excreted in urine and is a marker of Carcinoid. [5] Increased serotonin and histamine are responsible for "Carcinoid syndrome" in 10%patients characterized by intermittent flushing in response to stimuli like exercise, alcohol high tyramine content food. "Carcinoid heart syndrome" shows predominantly right sided tricuspid and pulmonary lesions in two third of patients due to chronic exposure to serotonin. Our patient had a tricuspid regurgitation with moderate pulmonary hypertension.

Serotonin stimulates secretion of sodium, potassium, chloride and water by small intestine with increasing gastric motility resulting in diarrhea. Vomiting, bronchospasm, tachycardia, fluctuating blood pressure,

arrhythmias, hyperglycemia and drowsiness are characteristics of "Carcinoid Crises". Profound hypotension is seen due to bradykinin induced vasomotor relaxation mostly during tumor handling, hepatic artery ligation during surgery and anaesthetic exposure.

In 2000 WHO classified these tumors based on malignant potential as assessed histologically. [5]

1. well differentiated NE tumor
2. well differentiated NE carcinoma
3. Poorly differentiated NE carcinoma.

Histopathology of our patient showed well differentiated NE tumor of low grade.

In functional tumors 24 hour urinary 5-HIAA (>25 mg in 24 hrs), a serotonin metabolite is used as diagnostic marker and to monitor tumor activity has around 73% sensitivity and 100% specificity. [6] Urinary 5-HIAA levels does not predict the response to intra operative tumor manipulation, it is used to access disease progression.[5]Serum chromagraffin A is 95% specific and 80% sensitive for Carcinoid tumors. [7] Non functional tumors usually present with intestinal obstruction, pain and G.I. Bleed. CT and MRI are helpful to evaluate primary as well as liver and lung metastasis. [8] The gold standard for locating functional NE tumor is radiolabel led indium-111- labeled octreotide scintigraphy. [9]

Anaesthetic Management

Patients with Carcinoid tumors are regarded as having multisystem disorder and a thorough preoperative optimization, intraoperative planning and post-operative management is required in a high dependency unit with clinicians well versed with complications.

Fluids and electrolyte disturbances due to obstruction, malnutrition, and dehydration should be treated aggressively. Wide bore i.v cannula, central venous catheters; foleys catheter should be placed preferably preoperatively. Basic preoperative viz. chest X ray, ECG, Echocardiogram, hepatic and renal function tests, Arterial Blood Gases, full blood counts, coagulogram, and grouping and cross matching needs to be done.

A detailed cardiovascular workup is a must to rule out right heart failure, tricuspid regurgitation, and pulmonary hypertension due to high right sided pressures or biventricular failure. History of reduced exercise tolerance, dyspnea, pedal oedema, angina with flushing episode is important.

To minimize tumor activity and to avert hypo or hypertensive response during surgery octreotide (50 mcg/hr infusion for 12 hrs or 50 to 100 mcg 12 hrly,) [10] somatostatin analogue a potent growth hormone and LH inhibitor is given one day prior or at least 12 hrs before surgery or 100 mcg just before induction [11]. It also decreases splanchnic blood flow and inhibits release of gastrin, serotonin, VAP, motilin. QT prolongation and bradycardia are reported side effects.

Primary objective of anaesthesia is to avoid any stress, stable vitals, avoid blood pressure variations and adequate analgesiaperioperatively. Thoracic analgesia before induction helps in reducing stress during induction and post operative period. Fluid warmers and rapid fluid infusion system need to be kept ready to deal with rapid fluid loss. Antihistaminics and all previous drugs should be continued preoperatively. Fontanel or remifentanyl with isoflurane or sevoflurane and vecuronium gives adequate depth for intubation. Avoid morphine, suxamethonium and atracurium due to potential for histamine release. Intra operative bronchospasm and hypertension should be managed by increasing the depth of anaesthesia. Hyperglycemia due to release of serotonin should be managed with insulin infusion and intravenous octreotide 25 mcg. Blood gases should be done on an hourly basis to assess ventilation and fluid strategy. Intra operative hypotension during hepatic resection for metastases and clamping of hepatic artery or during tumor manipulation is expected and should be cautiously managed with low dose phenylephrine and vasopressin infusion. Nor-epinephrine which activates kallikrien and stimulates bradykinin release resulting in vasodilatation produces paradoxical hypotension in these patients should be thus avoided. Hypertension intraoperative should be managed with labetalol infusion.

Post operative care in a high dependency unit is needed with invasive monitoring, judicious fluids, adequate analgesia and octreotide infusion for safe recovery from surgery. Hyperglycemia, electrolyte disturbances, hypotension /hypertension are to be managed adequately.

Summary

Providing anaesthesia in these patients carries significant risk which requires pre-operative preparation, intraoperative preparedness for any potential event and postoperative care in a vigilant high dependency unit. Good communication and team play between anesthesiologist, surgeon, endocrinologist is of utmost importance for successful management and better results.

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