

Emergency Anaesthesia For A Moribund Patient With Carcinoid Syndrome - A Case Report.

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Abstract

Carcinoid syndrome is a rare systemic disorder attributed to the release of vasoactive amines and peptides into the systemic circulation. We present the case of a sick 47 year old lady with known metastatic carcinoid deposits who required urgent laparotomy for an intra-abdominal perforation. We explore the issues surrounding anaesthesia for this uncommon condition in the emergency setting.

INTRODUCTION

First characterized by Siegfried Oberndorfer in 1907, carcinoid tumours are rare neuroendocrine neoplasms that originate from enterochromaffin cells. Often found in the gastrointestinal tract, their annual incidence is thought to be approximately 0.28 per 100,000 population [1]. Carcinoid tumours represent a wide spectrum of neuroendocrine cell types. Under electron microscopy, they typically contain numerous membrane-bound neurosecretory granules composed of hormones and biogenic amines. The most familiar of these is serotonin but they are also known to secrete corticotrophin, histamine, dopamine, substance P, neurotensin, prostaglandins, and kallikrein. Vasoactive substances secreted by tumours arising in the gut pass through the liver via the hepatic portal vein where they are metabolised before they can exert widespread systemic effects. Tumours that originate or more commonly metastasise to the liver may bypass this metabolism and so exert systemic effects. Clinical carcinoid syndrome may be precipitated by exercise, ingestion of alcohol or high tyramine content food.

Carcinoid syndrome presents significant challenges during anaesthesia. 'Carcinoid crises' are an exaggerated form of the syndrome where hypertension, tachycardia and hyperglycaemia (related to serotonin release); hypotension, bronchospasm and electrolyte disturbances (particularly hypokalaemia and dehydration secondary to the secretory diarrhoea caused by bradykinin release) may all occur. The most common cause of such dramatic crises are anaesthetic, radiological, or surgical interventions. Moribund patients or

those with limited reserve may not tolerate poorly administered anaesthesia. Peri-operative management is aimed at reducing and treating these capricious episodes. Strict vigilance and close communication with all involved in the patient's care must be maintained.

CASE REPORT

A 47 year old Caucasian lady presented to the Emergency Department with a 5 hour history of sudden onset abdominal pain associated with profuse vomiting and cessation of bowel movements. She was known to have widespread metastatic carcinoid deposits and hypertension. Her primary gastrointestinal tract carcinoid tumour was diagnosed 20 years ago and subsequently spread to the spleen, peritoneum, breast and liver. She suffered daily symptoms of flushing, abdominal cramps and 6-8 bowel movements per day. She had undergone a bowel resection in 2002 and further laparotomy for small bowel obstruction in April 2010 with no anaesthetic complications. Regular medications were Amlodipine 5mg OD, Omeprazole 40mg OD and calcium carbonate 1.25g OD. The patient was currently not taking any long acting somatostatin analogues.

On admission all vital signs were within normal limits - oxygen saturations 99% on air, RR 18, BP 148/90, HR 82. Her weight was recorded as 72kg.

An abdominal computerized tomography scan demonstrated 'loculated air in the retroperitoneal space extending into the right psoas muscle...contained collection of air and pus in the pelvic mesentery...' and the patient was booked by the surgeons for an urgent exploratory laparotomy.

On assessment by the anaesthetic team later that day she was found to be grossly dehydrated, septic and moribund (ASA 3E). On clinical examination she was sweating profusely and delirious. She had not eaten all day and had been actively vomiting. She was tachypnoeic (RR26 and oxygen saturations 92% on air), tachycardic (HR 122) and hypotensive (BP 80/40) with warm peripheries and a fever (38.2C). A urinary catheter had been inserted but she was anuric. Her ECG showed a sinus tachycardia. Electrolytes from that evening were Na⁺ 141 mmol/L, K⁺ 4.7 mmol/L and creatinine 128 mmol/L

Fluid resuscitation was immediately commenced on the ward with a litre of Hartmann's solution and a stat dose of 100mcg Octreotide given subcutaneously. Following communication between surgical and anaesthetic teams the case was expedited and the patient brought to theatre. A critical care bed was booked for care post operatively.

On arrival in theatre fluid resuscitation continued with Hartmann's solution whilst invasive arterial and central venous lines were inserted. Modified rapid sequence induction (Fentanyl 100mcg, Thiopentone 200 mg, Suxamethonium 100mg) with cricoid pressure was performed and the airway secured. Octreotide 100mcg was administered as a slow IV bolus at induction. Anaesthesia was maintained with Isoflurane in air with further doses of Fentanyl for analgesia and Rocuronium for paralysis. Hypotension in theatre was managed with appropriate fluid resuscitation and boluses of Octreotide (10mcg aliquots) or Metaraminol. A total of 5000ml of Hartmann's solution and 1000ml of colloid (Volulyte) were administered intra-operatively with clinical improvement in haemodynamic parameters and urine output. Blood loss was minimal during the 3 hour laparotomy.

From the surgical point of view, a bowel perforation was identified with gross intra-abdominal soiling amongst dense desmoplastic adhesions and a defunctioning colostomy performed.

Post operatively the patient was transferred ventilated to the Intensive Care Unit. Octreotide, Dopamine and Noradrenaline infusions were commenced but soon weaned off as she recovered. She was extubated the following morning and discharged to the ward five days later.

DISCUSSION

Elective anaesthesia for patients with carcinoid syndrome is rare event, consequently emergency anaesthesia for

unplanned surgery in a sick patient with carcinoid syndrome is rarer still. 'Pubmed' and 'Google Scholar' searches for the keywords 'carcinoid', 'septic' and 'anaesthesia' only identified a single article [2] written nearly 40 years ago.

Patients with carcinoid syndrome require careful anaesthetic consideration in the elective situation and this becomes even more important in an emergency setting. Avoidance and management of peri-operative carcinoid crises with ensuing haemodynamic instability or bronchospasm being of upmost importance [3]. Attention should focus on avoiding precipitants that could trigger a carcinoid crisis (anxiety, stress, catecholamine release, certain drugs and pain) and proactively establishing a management plan for possible complications.

The importance of a thorough pre-operative anaesthetic assessment is evident in this case report. In addition to confirming that the patient had active symptoms of carcinoid syndrome we recognized her significant deterioration since admission and rapidly instituted appropriate management.

Circulating catecholamines would have been raised out of physiological necessity in such a moribund patient but in an elective situation an anxiolytic pre-medication (with non-histamine releasing properties) may reduce pre-operative stress response [4].

Pre operative administration of Octreotide, a somatostatin analogue, to suppress the erratic vasoactive serotonin and bradykinin release has been shown to improve perioperative outcome of carcinoid patients [1,5,6,7]. In an elective situation this may be over several weeks under the supervision of an expert although this is clearly not possible in the emergency situation. We administered 100mcg subcutaneously on the ward at the time of anaesthetic assessment followed by a slow IV bolus of a further 100mcg at induction. Small boluses of Octreotide (10mcg iv) were used in theatre to counteract hypotension induced by handling of the tumour.

Multiple publications express the importance of avoiding histamine releasing drugs that may precipitate carcinoid crises. Such medications are plentiful in anaesthesia so careful consideration was given to each agent we chose.

Thiopentone, Propofol and Etomidate all have publications supporting their safe use at induction for patients with carcinoid syndrome [7,8]. Modified rapid sequence using cautious co-induction with Thiopentone and Fentanyl was chosen given the necessity for rapid successful intubation

with maintenance of haemodynamic stability. There is a theoretical risk of suxamethonium inducing compression of the carcinoid tumour and hence release of vasoactive substances but we felt this was outweighed by the necessity for rapidly induced favourable intubating conditions. We avoided propofol because of the cardiovascular side effect profile and etomidate given its potential for adrenocortical inhibition. Systolic blood pressure fell transiently post induction by 30% and this responded to fluid and a 500 mcg metaraminol bolus.

Maintenance of anaesthesia with Isoflurane is well documented to cause no deleterious effects in carcinoid syndrome. On recognition of a suitable twitch to train-of-four stimulation we administered the muscle relaxant Rocuronium to avoid the histamine release associated with benzylisoquinolium drugs.

Whilst care must be taken infusing large volumes of fluid we administered 6 litres of intravenous fluid in just over 3 hours - one litre given immediately pre-induction and then further management guided by clinical parameters and invasive monitoring trends. This lady was profoundly fluid deplete and anuric pre-operatively due to a combination of gastrointestinal losses and sepsis, but by the end of the case her haemodynamic parameters were much improved and she was producing urine. It is particularly important that patients with carcinoid syndrome are fluid replete rather than relying on exogenous catecholamines to treat hypotension as evidence suggests they may precipitate a crisis and so actually worsen the situation [9].

An epidural was relatively contraindicated given her moribund state and intense abdominal pain would have made the positioning required extremely difficult although their safe use has been described in elective cases. Intermittent Fentanyl boluses were used intra-operatively to avoid the potential histamine release associated with morphine. Safe use of Remifentanyl has been described in patients with carcinoid syndrome [4].

Post operative critical care was clearly required given the

overall clinical picture in our situation. A low threshold for admission is advised in patients with carcinoid syndrome given the likelihood of labile haemodynamics continuing post operatively [8]. Following extubation, successful analgesia was provided with multimodal agents including a Fentanyl PCA.

CONCLUSION

Elective anaesthesia for patients with carcinoid syndrome may result in unpredictable events despite adequate pre-operative preparation. Unplanned surgery in this patient group deserves special attention and proactive anaesthetic input at the earliest opportunity. Careful and timely optimisation should be instituted with particular attention on reducing and treating peri-operative carcinoid crises. Drugs must be chosen with care to avoid precipitants and the likely requirement for post-operative critical care recognised.

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