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Case Report

Carcinoid syndrome: Innovative anesthetic approach utilizing erector spinae plane block

Ojaswani Rai Sood[1]*, **Mohmad Salim**[1]

[1] *Dept. of Anaesthesia, Walsall Manor Hospital, Walsall, United Kingdom*

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ABSTRACT

A 57-year-old female with history of carcinoid syndrome along with extensive liver metastases presented for a right sided mastectomy and implant insertion for breast cancer. Preoperative optimization included an octreotide infusion and anxiolysis, as well as planning a cardiostable anaesthetic that avoided any crisis stressors. Ultrasound guided thoracic (T4) ESP block using 0.2% Ropivacaine was given under propofol sedation followed by remifentanil and propofol anaesthesia. Octreotide infusion along with boluses was used to treat hypotension and bradycardia intraoperatively. The combination of perioperative octreotide administration, intraoperative remifentanil and propofol anaesthesia and ESP block provided satisfactory anaesthesia. The block was effective for 36 hours post-operatively and the patient was discharged 48 hours post admission. We suggest that a novel interfascial plane block, ESP block is a useful addition to the armamentarium of the anaesthetist in the management of a patient with carcinoid syndrome with an aim to decrease dependence on morphine and preventing conversion to chronic pain.

1. Introduction

Carcinoid syndrome, a Neuroendocrine tumour (NET), poses the anaesthetist with a great challenge due to its unpredictability. The patient may develop intraoperative hypertension, hypotension and, or bronchospasm. Octreotide, a somatostatin analogue, is the current mainstay of treatment. Commonly used analgesic options, including morphine and epidural anaesthesia can trigger severe hypotension or histamine release, causing a carcinoid crisis. Here, we present a novel morphine sparing anaesthetic technique that we utilised in a patient with carcinoid syndrome that presented for mastectomy; thoracic erector spinae plane (ESP) block was used to provide effective truncal analgesia, alongside an intraoperative remifentanil infusion.

* *Corresponding author*.
E-mail address: ojaswani.sood@nhs.net (O. R. Sood).

2. Case Report

A 61-year-old female, booked for unilateral mastectomy with lymph node excision and implant insertion for breast carcinoma. Four years ago, while on chemotherapy and radiotherapy for breast carcinoma, she started suffering from chronic diarrhea, which was then linked to Liver's 10 cm space occupying lesion along with some sigmoid deposits, on CT scan. Liver biopsy, ultrasound guided, confirmed it to be the NET. Twenty four hour urine collection revealed normal catecholamines but raised concentrations of 5 hydroxyindoleacetic acid of 254 μmol /24 hr. This was then followed by hepatic resection an year ago. However, she was still on waiting list for sigmoid deposits to be surgically removed.

Pre-anaesthetic history and examination confirmed the above findings along with an uneventful caesarean section 30 year ago and breast sleeve 2 yrs ago. Haemoglobin, urea, electrolytes and chest radiograph were normal. The ECG

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showed normal sinus rhythm but no evidence of valvular heart disease in her Echocardiography (ECHO). She was then asked to be hospitalized a day before the surgery for the preoperative optimization.

A day before the surgery, all her investigations were in the acceptable range. She was explained everything about her illness, the plan of action, the risks involved, invasive monitoring and post-operative ITU stay and information printouts were given to her. Anaesthetic considerations in patients with carcinoid syndrome include the prevention of mediator release, avoiding triggering factors and preparation for the management of perioperative carcinoid crises.[1] Therefore, she was started on octreotide infusion at 50 mcg/hr for 24 hours before the surgery, as preoperative treatment with this somatostatin analogue has been shown to improve the perioperative course of these patients.[2,3] As a part of premedication, she was prescribed Temazepam 20 mg PO and Cholpheniramine 10 mg i.v. in ward before transfer to the theatre. Additionally, for post-operative recovery a bed was reserved in ITU beforehand.

The next day, on arrival in theatre, her octreotide infusion was continued at the same rate. AAGBI monitoring and 2 large IV cannulas were secured. Arterial line was inserted under local anaesthesia to keep close eye on her hemodynamics and vasopressors (phenylephrine and ephedrine), vasodilators (including sodium nitroprusside) and octreotide, both boluses and piggyback infusions were readily available. Additional factors in the operative setting that trigger the release of carcinoid mediators include the response to intubation, inadequate analgesia, hypotension, the use of drugs that release histamine, intraoperative tumour handling and hypertension, which causes the release of bradykinin. Considering the known facts, she was given 100 mcgs of octreotide bolus on induction and Propofol target controlled infusion (tci) (Cp 2 mg/ml) with oxygen support was started, to allay her anxiety from surgical environment which we believed could precipitate the carcinoid crisis. We used BIS monitor to assess the depth of sedation and one adequately sedated ultrasound guided thoracic ESP block at T4 level was given and 15 mls of 0.2% Ropivacaine with Dexamethasone 3.3 mg and Magnesium sulphate 4 mg as the adjuvants injected bilaterally. This was our main modality to provide analgesia, both intra and post-operative, as morphine and tramadol were out of line.

At knife to skin, she developed hypotension (SBP 80 mm Hg) and bradycardia (around 40 /min), Octreotide bolus 100mcgs was given, along with the increased background infusion rate of 100mcg/hr. Also, I.V. fluids boluses were given but despite of this she didn't respond, so the surgeon was asked to stop for a while and two more boluses of Octreotide 100 mcgs each were given at 5 mins interval. Finally, her heart rate and blood pressure picked up and the surgery was restarted.However, her mean arterial blood pressure was always >60 mm of Hg. Finally, her airway was secured using I-gel and Remifentanil TCI at 2 Cp 2ng/ml was started which although is an opioid but is safe to use in these patients as there is no histamine release with it.[4,5] She was maintained on sevoflurane end tidal minimum alveolar concentration at 1.0, in an air/oxygen mixture.

Additional drugs included ondansetron 8 mg and cefuroxime 1.5 g. The entire procedure lasted 2 hours; arterial pressure, heart rate and saturation remained virtually unchanged throughout the procedure. Blood loss was minimal and intraoperative fluids consisted of Ringer lactate 3 litres. She was extubated and transferred to ITU for post-operative care and management. She was strictly continued on octreotide infusion for 48 hours post-operatively and was slowly weaned off the infusion by decreasing 25% every 2 hourly during day time. She was on regular oral Paracetamol and I.V. Fentanyl PCA if needed. Her ESP block worked very efficiently and she was pain free throughout her ITU stay and was manageable on oral analgesics. She was discharged on day 3 of ITU stay with no further carcinoid crisis.

3. Discussion

Carcinoids are the NET derived from enterochromaffin cells which actively secrete bioactive substances that include serotonin, histamine and kinin peptides.[6] NETs that arise from the midgut, rectum, and ileum, in the setting of extensive liver metastases, can lead to carcinoid syndrome causing vasomotor changes, hypermotility of the GI tract, hypotension, bronchospasm, and in cases of cardiac valvular involvement with symptoms and signs of heart failure.[7] A life-threatening condition of CS spectrum, known as carcinoid crisis, may be precipitated spontaneously or during the induction of anesthesia. Also, physical manipulation of the tumor (including deep bedside palpation), chemotherapy induced chemical stimulation or tumor necrosis resulting hepatic artery ligation or embolization. The clinical manifestations of carcinoid crisis includes flushing with associated severe fluctuations in blood pressure, cardiac arrhythmias, bronchoconstriction and altered mental status.

Premedication with an anxiolytic, reduces the preoperative stress related release of catecholamines along with an antihistamine, like Chlorpheniramine. We added ondansetron a 5HT3 inhibitor, since patients with carcinoid syndrome, have shown some improvement when treated with this drug.[8] Also, subcutaneous octreotide 100 μg suppresses serotonin and kinin activity during intubation and surgery.[1] In a recent series, 43% of patients received vasopressors, either phenylephrine or ephedrine, and 38% of patients required intraoperative octreotide. The median dose of octreotide was 350 μg.[3]

There is a high risk of epidural anaesthesia causing hypotension, triggering mediator release and therefore carcinoid crisis.[9] On contrary, Remifentanil infusion has

very less potential for histamine release. While little is known on this, remifentanil has been seen to decrease the likelihood of histamine release in patients with mastocytosis,[10] however, Morphine has been reported to cause severe hypotension in such a patient.[1] Remifentanil infusion with the advantages of suppressing the intubation response, good analgesia, rapid titratability is useful in the management of a patient with carcinoid syndrome. A significant disadvantage is the predictable hypotension, especially at higher infusion rates. Therefore, using TCI rate, the haemodynamic variables were virtually unchanged in this patient. Other narcotics that have been used in the management of carcinoid syndrome include sufentanil and fentanyl.[9,11] Additionally, to completely avoid the potentially harmful effects of morphine we choose PCA with fentanyl as a safer option.[12]

ESP block, initially was used to manage neuropathic pain of ribs secondary to metastatic deposits but later it has been used for many acute or chronic pain conditions.[13] Cadaveric studies have showed that block at T5 level is sufficient to have unilateral multidermatomal sensory block ranging from T1 to L3.[14] It not only blocks the posterior ramus of spinal nerves, it also enters in to para-vertebral space and probably blocks sympathetic fibres, thus this block serves the purpose of a paravertebral block without risk of pleural injury.[15] Therefore this block was used to avoid the perioperative dependence on Morphine as analgesic agent along with the prevention of subsequent development of chronic pain in mastectomy patients.

4. Conclusion

Noticeably the remarkable team work, well versed knowledge of the patient management guidelines, relevant ESP block choice and well planned ITU recovery period seemed a prodigy of triumphant surgery and recovery. The ESP block chosen for analgesia is strictly practical expertise that should be implicated in departmental teaching as it can emerge as a saviour when morphine, the standard analgesic, is out of the window. It was another example of a well-managed difficult case that went well.

5. Source of Funding

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6. Conflict of Interest

None.

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Author biography

Ojaswani Rai Sood, Senior Clinical Fellow (Anaesthesia) https://orcid.org/0009-0009-5421-6185

Mohmad Salim, Consultant https://orcid.org/0009-0001-5527-0345

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