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# Carcinoid crisis during transesophageal echocardiography

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Sir: Metastatic carcinoid tumours are frequently associated with carcinoid syndrome, which is characterised by episodic flushing of the head and neck and diarrhoea and reduced arterial-mixed venous oxygen saturation due to arterio-venous fistulae. Under certain circumstances profound hypotension or hypertension may occur, an event called "carcinoid crisis".

We report a patient who developed a carcinoid crisis during transesophageal echocardiography (TEE).

Case report. In a 58-year-old man with a metastatic midgut carcinoid tumour with tricuspid valve stenosis and insufficiency a TEE was made in evaluation for possible surgical intervention. He was sedated with 1 mg of midazolam i. v. After approximately 15 min he developed shortness of breath and peripheral cyanosis, his oxygen saturation dropped to 80 %. His systolic arterial blood pressure dropped 25 mmHg. The echocardiographic examination was terminated. Physical examination showed acrocyanosis and decreased consciousness. He was tachypnoeic (60 breaths/min) with a heart rate of 118 beats/min and blood pressure of 80/50 mmHg. The liver was grossly enlarged and there were signs of ascites. The lower limbs showed pitting oedema. A blood gas analysis showed a $PO_2$ of 4.8 kPa and a $PCO_2$ of 3.4 kPa and an arterial oxygen saturation of 73 %. The chest radiograph revealed no abnormalities.

We ascribed the symptoms to the development of carcinoid crisis. After administration of octreotide 500 μg i. v. followed by a continuous infusion of 2 mg per 24 h combined with ketanserin 3 times 3 mg i. v., hydrocortisone 200 mg i. v., colloids and ventilation with continuous positive air pressure the patient improved. Within 1 h his blood pressure increased to 120/70 mmHg and remained stable. After 3 h his respiration rate was 23 breaths/min and arterial blood gas normalised with $PO_2$ 10.9 kPa and $PCO_2$ 4.3 kPa.

During stress (in our case provoked by TEE) catecholamines are released into the circulation. In carcinoid tumours catecholamines are powerful stimuli for the release of vasoactive peptides like tachykinins and bradykinins inducing a carcinoid crisis. Besides haemodynamic instability this patient suffered from severe hypoxemia. The increased levels of vasoactive peptides might be responsible for this [1].

Carcinoid crisis may be treated by either blocking the release of mediators from the tumour (octreotide) or by blocking the action of the mediators (ketanserin) [2, 3].

Octreotide inhibits the release of humoral mediators from carcinoid tumours. Octreotide has no major acute side effects. In order to prevent a crisis, octreotide must be given prior to the stressful event. In some patients with the carcinoid syndrome insensitivity to somatostatin analogues can develop in time [4].

Ketanserin is a selective antagonist at 5-$HT_2$ receptors, alpha-1 adrenoreceptors, $H_1$-histamine receptors, and has an effect of decreasing the central sympathetic outflow. It has been successfully given in patients with hypertensive carcinoid crisis [5].

We conclude that transoesophageal echocardiography in treated patients with metastatic carcinoid may trigger a carcinoid crisis and additional pre-treatment with hydrocortisone and octreotide is advised. Anaesthetic or sedative agents and adjuvants, which are known not to trigger the release of vasoactive peptides, should be used.

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