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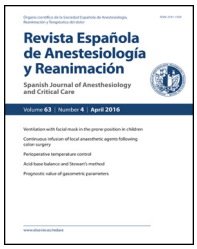

CASE REPORT

Clevidipine for hypertension treatment in pheochromocytoma surgery☆

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KEYWORDS
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Surgery

Abstract Pheochromocytoma is a catecholamine-producing tumour and laparoscopic adrenalectomy is its treatment of choice. During pneumoperitoneum insufflation and tumour handling there is a high risk of massive catecholamine release and hypertensive crisis. After tumour excision, severe arterial hypotension is a common effect, due to relative vasodilation and the residual effect of antihypertensive drugs. We report the case of a patient with pheochromocytoma who was treated with laparoscopic adrenalectomy. During surgical manipulation there was a sudden hypertensive peak that could be controlled quickly with clevidipine infusion. After tumour resection, clevidipine perfusion was stopped and there were no arterial hypotension episodes. Clevidipine is a new intravenous calcium antagonist with rapid onset of action and short half-life that has no residual effect and does not produce arterial hypotension after tumour resection. For these reasons, it can be a first-choice drug for this kind of surgery.
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PALABRAS CLAVE
Antihipertensivo;
Feocromocitoma;
Adrenalectomía;
Catecolaminas;
Vida media;
Cirugía

Clevidipino como antihipertensivo en la cirugía de feocromocitoma

Resumen El feocromocitoma es un tumor productor de catecolaminas y su tratamiento de elección es la adrenalectomía laparoscópica. Durante la insuflación del neumoperitoneo y la manipulación tumoral hay alto riesgo de liberación masiva de catecolaminas y crisis hipertensivas. Tras la exéresis tumoral es frecuente la hipotensión arterial grave por vasodilatación relativa y por el efecto residual de los fármacos antihipertensivos utilizados. Presentamos el caso clínico de un paciente con feocromocitoma intervenido de adrenalectomía laparoscópica.

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Durante la manipulación quirúrgica hubo un pico hipertensivo brusco que pudo controlarse rápidamente con clevidipino en perfusión. Tras la resección tumoral se detuvo la perfusión y no se produjo hipotensión arterial en ningún momento. El clevidipino es un nuevo antagonista del calcio intravenoso con inicio de acción rápido y vida media corta que no tiene efecto residual y no causa hipotensión tras la resección tumoral, por lo que puede ser un fármaco de primera elección esta cirugía.
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Introduction

A pheochromocytoma is a catecholamine-secreting tumour that in 80–85% of cases is located in the adrenal medulla. It has an incidence of 2/100,000 inhabitants/year, has no predilection for a particular gender, and is more common in patients aged between 30 and 50 years. It can be sporadic or associated with genetic diseases, such as neurofibromatosis type 1or von Hippel-Lindau disease.[1] Symptoms, which include high blood pressure, heart palpitations, increased temperature, flushing, etc., are caused by the excessive secretion of catecholamines.[1]

The diagnostic method of choice is determination of plasma and/or urinary metanephrines, not catecholamines.[2] Following positive laboratory tests, the tumour should be located using computed tomography or magnetic resonance, initially only of the abdomen and pelvis where 95% of these tumours are located. The functional imaging test of choice is 123I-metaiodobenzylguanidine scintigraphy,[1,3] while the treatment of choice is laparoscopic adrenalectomy, except in unresectable malignant tumours, in which case treatment is chemotherapy or, in very large tumours, open surgery.[1–4]

During surgery, high catecholamine levels can cause hypertensive crises, especially during pneumoperitoneum insufflation and tumour manipulation.[4] Preoperative administration of alpha blockers, calcium channel blockers, or angiotensin receptor blockers are recommended inhibit the effect of circulating catecholamines. Patients with tachyarrhythmias should be treated with beta-blockers or calcium channel blockers, although beta-blockers should only be used after adequate pre-treatment with alpha-blockers.[3]

The most frequent complication after tumour excision is severe arterial hypotension due to increased venous capacitance and the residual effects of preoperative alpha-blockers. Hypotension should be managed with volume expansion using goal-directed fluid therapy[5] to achieve optimal haemodynamic (cardiac output, cardiac index, stroke volume index, stroke volume variation) and circulating volume parameters that will ensure adequate perfusion and tissue oxygenation. Any hypotensive drugs administered prior to tumour resection should have a short half-life in order to avoid a residual effect.[1,3–7]

Clevidipine, an intravenous calcium antagonist, could be a candidate for antihypertensive treatment in these interventions due to its rapid onset of action, short duration of effect, metabolism by plasma esterases and ease of titration. In the following case report, we describe the use of clevidipine in pheochromocytoma surgery.

Case report

A 36-year-old man, 63 kg and 175 cm, with no known drug allergies or toxic habits, and a history of neurofibromatosis type 1 with no neurological involvement, and Moya-Moya disease (progressive stenosis and occlusion of basal intracerebral arteries) diagnosed following a single seizure at 12 years of age. Since then, the patient had remained asymptomatic. The patient was diagnosed with pheochromocytoma in the left adrenal gland following per-protocol catecholamine determination ordered by his dermatologist as part of a neurofibromatosis study. The patient had not previously manifested any symptoms.

Of note in the preoperative workup were: total plasma metanephrines: 164 pg/ml (0–90 pg/ml), 24 h urinary metanephrines: 1.695Mcg/24 h (0.01–320 mcg/24 h), 24 h urinary vanillylmandelic acid: 12.8 mg/24 h (0.01–6.6 mg/24 h).

An abdominal CT scan showed a nonspecific nodule measuring 21 mm. The study was completed with an MRI that showed a nodule compatible with pheochromocytoma.

The patient was classed as ASA (American Society of Anesthesiologists) III.

He was admitted for scheduled laparoscipic left adrenalectomy. Preoperative preparation included nifedipine retard 20 mg/12 h, with atenolol 50 mg/24 h being added 24 h before surgery due to mild tachycardia (100 beats per minute [bpm]). The preoperative therapy allowed us to maintain blood pressure (BP) at 120/75 mmHg and heart rate at 67 bpm, with no evidence of hypertension at any time.

Upon arrival in the operating room, monitoring was started with non-invasive BP, sequential electrocardiogram, ST segment analysis, pulse oximetry for oxygen saturation, capnography, bispectral index (BIS) for depth of hypnosis, ''train of four'' for muscle relaxation, the ''Analgesia Nociception Index'' (Mdoloris Medical Systems, Loos, France) for depth of analgesia, and hourly urine output. BP was 135/67 mmHg, heart rate was 65 bpm in sinus rhythm, and blood oxygen was 100%.

An epidural catheter for postoperative analgesia was inserted at the level of T10. The epidural space was located

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