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CLINICAL CASE

Anaesthetic technique during awake craniotomy. Case report and literature review

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KEYWORDS
Craniotomy;
Anaesthetics;
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Abstract
Introduction: Awake craniotomy for neurostimulation can be managed with different anaesthetic techniques, ranging from local anaesthesia or local anaesthesia with sedation to intermittent general anaesthesia.
Materials and methods: We present the case of a 56-year-old female who was diagnosed with a frontal astrocytoma which required surgical resection. Her magnetic resonance imaging study showed a space-occupying lesion in her left frontotemporal region, which was exerting a mass effect on the midline structures. Anatomically, the tumour involved the language area and motor tracts. It was therefore decided to perform craniotomy with the patient awake during the procedure, to allow intraoperative cortical mapping in order to preserve the language and motor functions.
Results: This case was managed with a scalp nerve block as local anaesthesia plus intravenous sedation without airway instrumentation. We reviewed the literature about patient management during awake craniotomy.

PALABRAS CLAVE
Craneotomía;
Anestesia;
Astrocitoma;
Corteza cerebral

Anestesia para craneotomía en paciente despierto. Presentación de caso clínico y revisión de la literatura

Resumen
Introducción: La craneotomía con paciente despierto en el momento de la neuroestimulación se puede manejar con diferentes técnicas anestésicas, las cuales van desde anestesia local, anestesia local más sedación y anestesia general intermitente.

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Material y métodos: Se presenta el caso clínico de una mujer de 56 años de edad en quien se realizó diagnóstico de astrocitoma frontal el cual requirió resección quirúrgica. En su estudio de imagen por resonancia magnética se evidenció un proceso ocupante en región fronto temporal izquierda, el cual presentó efecto de masa sobre estructuras de la línea media. La tumoración involucra anatómicamente área de lenguaje así como tractos motores por lo que se decidió realizar craneotomía con paciente despierta para llevar a cabo mapeo cortical intraoperatorio con el objetivo de preservar las funciones de lenguaje y motoras.
Resultados: Este caso fue manejado con un bloqueo de escalpe como anestesia local, más sedación intravenosa sin instrumentación de la vía aérea. Se hace una revisión de la literatura sobre el manejo del paciente para craneotomía despierto.

Introduction

Brain surgery with the patient awake was practised long before the introduction of anaesthesia. It was in the 1920s, however, with the work of W. Penfield, when craniotomy using techniques under conscious sedation began to be performed for location of epilepsy foci and surgical management. There is a report dating from 1929 about one awake craniotomy under local anaesthetic for resection of a large brain tumour by Dr Harvey Williams Cushing. In 1950, H. Olivecrona perfected these techniques and used the procedure especially for the treatment of brain tumours.[1,2]

Awake craniotomy has become a common procedure for tumour surgery.[3] It is now widely used for the resection of lesions close to or within eloquent areas.[1,4]

Anatomically, there are defined eloquent areas. However, the location and prognosis of function using classic anatomical criteria is insufficient, due to the variability in the organisation of the cortex, distortion of cerebral topography resulting from the mass effect of the tumour and functional reorganisation due to the plasticity of the neurons.[5,6]

Awake craniotomy for mapping of motor and language functions has increased both efficacy and safety in the resection of primary and metastatic tumours.[7]

For anaesthetic care to be successful in an awake patient, provision of adequate analgesia and sedation that still allow the patient to be conscious and cooperative during monitoring is essential, as this will make it easier for the patient to tolerate the procedure and at the same time facilitate accurate neurological monitoring.[4]

Case report

This was a 56-year-old female patient brought into surgery for tumour resection under an asleep–awake–asleep anaesthetic technique for craniotomy with cortical mapping. Her previous history included smoking, removal of giant cell tumour from the first phalanx of the middle finger of her left hand 21 years earlier, caesarean section without anaesthetic or surgical complications, systemic hypertension diagnosed 3 years earlier and managed with enalapril, metoprolol and acetylsalicylic acid and absence seizures managed with clonazepam and levetiracetam. She wore glasses and was right handed and bilingual. This report was approved by the hospital bioethics committee and informed consent was granted by the patient, subject to the rules on confidentiality and personal data protection.

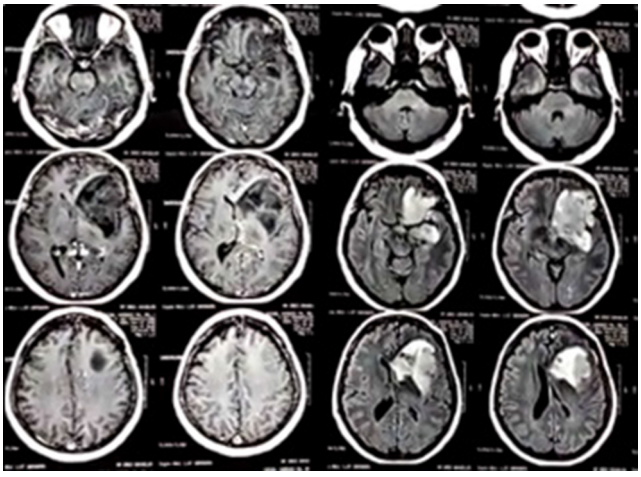

Image 1 Magnetic resonance imaging showing evidence of frontal lesion.

Following onset 2 years earlier of migraine-type headaches and difficult to control hypertension, she was admitted to hospital, where they made the incidental finding of brain cancer in the frontal region.

Astrocytoma was diagnosed from biopsy and managed conservatively. Twelve months later, she began to have absence seizures, which were managed and effectively controlled pharmacologically with clonazepam and levetiracetam. Three months prior to the surgical intervention, the patient had a magnetic resonance imaging (MRI) scan, which showed the tumour (see Image 1).

In view of the fact that anatomically, the tumour involved the language area and motor tracts, it was decided to perform awake craniotomy in order to carry out intraoperative monitoring, with the aim of preserving the language and motor functions while resecting the tumour.