5-Aminolevulinic Acid and (18)F-FET-PET as Metabolic Imaging Tools for Surgery of a Recurrent Skull Base Meningioma.

Cornelius JF, Slotty PJ, Stoffels G, Galldiks N, Langen KJ, Steiger HJ.

Abstract

Background Metabolic imaging technologies such as 5-aminolevulinic acid (ALA) fluorescence-guided resection and positron-emission tomography (PET) imaging have improved glioma surgery within the last decade. At present, these tools are not routinely used in meningioma surgery. Objective We present a case of a complex-shaped, recurrent skull base meningioma where 5-ALA fluorescence-guidance and (18)F-fluoroethyltyrosine (FET)-PET-imaging facilitated surgical resection. Material and Methods The patient underwent surgery via a combined transcranial/transnasal endoscopic approach. What was original is that both the microscope and the endoscope were equipped for 5-ALA fluorescence-guided surgery, respectively. Furthermore, preoperative FET-PET imaging was fused with computed tomography (CT) and magnetic resonance imaging (MRI) data for intraoperative navigation. The case richly illustrated the performance of the different modalities. Conclusions Metabolic imaging tools such as 5-ALA fluorescence-guided resection and navigated FET-PET were helpful for the resection of this complex-shaped, recurrent skull base meningioma. 5-ALA fluorescence was useful to dissect the adherent interface between tumor and brain. Furthermore, it helped to delineate tumor margins in the nasal cavity. FET-PET improved the assessment of bony and dural infiltration. We hypothesize that these imaging technologies may reduce recurrence rates through better visualization of tumor tissue that might be left unintentionally. This has to be verified in larger, prospective trials.

KEYWORDS: FET-PET, endoscopic, fluorescence-guided resection, recurrent meningioma, skull base


Display Settings: Abstract


5-Aminolevulinic Acid and (18)F-FET-PET as Metabolic Imaging Tools for Surgery of a Recurrent Skull Base Meningioma.

Cornelius JF¹, Slotty PJ¹, Stoffels G², Galldiks N², Langen KJ², Steiger HJ¹.

Author information

Abstract

Background Metabolic imaging technologies such as 5-aminolevulinic acid (ALA) fluorescence-guided resection and positron-emission tomography (PET) imaging have improved glioma surgery within the last decade. At present, these tools are not routinely used in meningioma surgery. Objective We present a case of a complex-shaped, recurrent skull base meningioma where 5-ALA fluorescence-guidance and (18)F-fluoroethyltyrosine (FET)-PET-imaging facilitated surgical resection. Material and Methods The patient underwent surgery via a combined transcranial/transnasal endoscopic approach. What was original is that both the microscope and the endoscope were equipped for 5-ALA fluorescence-guided surgery, respectively. Furthermore, preoperative FET-PET imaging was fused with computed tomography (CT) and magnetic resonance imaging (MRI) data for intraoperative navigation. The case richly illustrated the performance of the different modalities. Conclusions Metabolic imaging tools such as 5-ALA fluorescence-guided resection and navigated FET-PET were helpful for the resection of this complex-shaped, recurrent skull base meningioma. 5-ALA fluorescence was useful to dissect the adherent interface between tumor and brain. Furthermore, it helped to delineate tumor margins in the nasal cavity. FET-PET improved the assessment of bony and dural infiltration. We hypothesize that these imaging technologies may reduce recurrence rates through better visualization of tumor tissue that might be left unintentionally. This has to be verified in larger, prospective trials.

KEYWORDS: FET-PET, endoscopic, fluorescence-guided resection, recurrent meningioma, skull base