

Optic Nerve Sheath Meningioma: A Case Study

Case Description: A 52-year-old female, previously diagnosed with Multiple Sclerosis, had reported increasing visual loss in her right eye. Investigation with computed tomography (CT) and magnetic resonance imaging (MRI) had suggested chronic right optic peri neuritis. As the diagnosis was not clear, a ⁶⁸Ga-Dotatate positron emission tomogram (PET)/CT scan was performed to investigate possible optic nerve sheath meningioma (ONSM).

Procedures Performed: A 10-minute dynamic PET/CT was acquired 41 minutes post intravenous injection of 113MBq of ⁶⁸Ga-Dotatate on a Siemens Biograph mCT flow PET scanner. Correlation with other imaging was also performed.

Findings: Increased ⁶⁸Ga-Dotatate avidity was noted in the right optic nerve with standardised uptake value (SUV) max 5.9, involving the length from the intra orbital component to the optic canal, including avidity within the optic chiasm. The appearances were consistent with ONSM. Another focus of intracranial activity noted in the frontal region of the skull was consistent with meningioma, SUV max 4.5.

Outcome: Nuclear Medicine PET/CT imaging was able to define and locate a right ONSM in this patient, confirming the diagnosis and guiding management.

Discussion: ONSMs are rare benign tumours of the central nervous system constituting 2% of all orbital tumours and 1% of all meningiomas. Symptoms include visual loss, diminished colour perception and dull headaches. Despite MRI being the current gold standard for diagnosing ONSM, sufficient information may not be provided to differentiate ONSM from other optic tumours or inflammation, highlighting the requirement for a more sensitive and specific non-invasive diagnostic imaging tool. Meningioma's are known to express somatostatin receptor 2 (SSTR2) and ⁶⁸Ga-Dotatate, being a radiolabelled somatostatin analogue, binds to the cell surface receptors forming a functional image. This case showed ⁶⁸Ga-Dotatate PET/CT was vital in diagnosing ONSM and differentiating the patient's condition from optic peri neuritis while avoiding invasive biopsy and guiding appropriate treatment.