Table 5: Positron Emission Tomography (PET) Imaging

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Jeong (2010)[67]	Incidental pituitary uptake on whole-body 18f-fdg pet/ct: a multicentre study.	Determine the incidence of incidental pituitary uptake on whole-body 18F-fluorodeoxyglucose (FDG) positron emission tomography/computed tomography (PET/CT).	40967	Diagnostic / III	Focally increased pituitary FDG uptake on PET/CT was found in 30 of 40967 patients, accounting for an incidence of 0.073%.
Hyun (2011)[68]	Incidental focal 18F-FDG uptake in the pituitary gland: clinical significance and differential diagnostic criteria.	Patients with (18)F-FDG PET/CT were retrospectively evaluated for pituitary gland uptake. Receiver-operating-characteristic curve analysis was used to determine a cutoff for pathologic or physiologic uptake.	21	Diagnostic / III	Incidental pituitary uptake was macroadenomas (n = 21) after incidental pituitary uptake in 13145 consecutive patients. When a maximum standardized uptake value of 4.1 was used as an optimal criterion for detecting pathologic uptake, the diagnostic sensitivity, specificity, and accuracy were 96.6%, 88.1%, and 91.5%, respectively to identify pituitary adenomas. Although not commonly carried out, FDG PET may be able to identify pituitary adenomas using certain max standardized uptake values.

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Seok (2013)[69]	Analysis of 18F-fluorodeoxyglucose positron emission tomography findings in patients with pituitary lesions.	Patients underwent both conventional MR and (18)F-fluorodeoxyglucose positron emission tomography imaging (FDG PET). Conventional imaging findings were compared to FDG uptake patterns, using maximum standardized uptake values. FDG uptake patterns were compared in patients with micro- and macroadenomas.	24	Diagnostic / III	All patients with pituitary macroadenomas showed increased (18)F-FDG uptake on PET scans. Meanwhile, only 5 (50%) of the 10 patients with pituitary microadenomas showed positive PET scans. For positive (18)F-FDG uptake, maximum standardized uptake values (SUV(max)) > 2.4 had 94.7% sensitivity and 100% specificity. PET can be used as a supplementary tool for identifications of pituitary adenomas as a whole.

Author (Year)	Title	Study Description	Number of Patients	Evidence Class	Conclusions
Lucignani (1997)[70]	Differentiation of clinically non-functioning pituitary adenomas from meningiomas and craniopharyngiomas by positron emission tomography with [18F]fluoro-ethyl-spiperone.	Patients with nonfunctioning pituitary adenomas, craniopharyngiomas, or meningiomas underwent [18F]fluoro-ethyl-spiperone (FESP) positron emission tomography (PET). Differences in visual interpretation of the PET images were compared between the different groups of pathologies.	16	Diagnostic / III	The results demonstrated that PET with [18F]FESP is a very specific method for differentiating adenomas from craniopharyngiomas and meningiomas. The visual interpretation of images allows such differentiation at approximately 70 minutes after tracer injection. Semiquantitative analysis of the dynamic PET data confirmed the results of visual interpretation, demonstrating that the uptake of [18F]FESP was consistently (ie, throughout the series) at least two- to three-fold higher in non-functioning adenomas than in other parasellar tumors as early as 70 minutes after tracer injection, and that it increased still further thereafter. It is concluded that PET with [18F]FESP might be of clinical value in those cases in which the differential diagnosis among various histological types of sellar tumor is uncertain with conventional methods.

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Bergstrom (1991)[71]	PET as a tool in the clinical evaluation of pituitary adenomas.	Patients with pituitary adenomas and other sellar lesions underwent positron emission tomography (PET) with carbon 11-methionine and/or dopamine D2 receptor ligands. Uptake ratios were compared between the different types of tumors.	400	Diagnostic / III	PET with carbon-11-methionine can give valuable complementary information in the diagnosis of this tumor due to PET's ability to adequately depict viable tumor tissue in contrast to fibrosis, cysts, and necrosis. Furthermore, PET with dopamine D2 receptor ligands can characterize the degree of receptor binding and thus give information as to the prerequisites for dopamine agonist treatment. Most important is the very high sensitivity given by PET with carbon-11-methionine in the evaluation of treatment effects. PET can be used as a supplement to MR for the diagnosis for pituitary adenoma as well as a sense of histology in terms of dopamine receptors.