Incidentally Detected Non-functioning Pituitary Adenoma on FDG PET/CT: An Unexpected Finding in a Patient with Multiple Myeloma

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Abstract

Pituitary incidentalomas are defined as pituitary masses that are incidentally discovered on CT or MRI studies carried out for the evaluation of diseases or complaints unrelated to visual disturbance, hypopituitarism, or anteriorpituitary hormone excess caused by sellar masses. Present study aimed to report FDG PET/CT findings of an incidentally detected non-functioning pituitary adenoma. FDG PET/CT revealed an unexpected focus of intense FDG uptake in the region of the pituitary gland of a 69-year-old male patient with a diagnosis of multiple myeloma. There was no pathological pituitary hormone increase reported in the endocrinologic evaluation. In conjunction with the patient's history, physical examination findings, laboratory results this incidental adenoma was regarded as nonfunctional clinically. In conclusion, benign pituitary adenomas can be FDG avid. Patients need further endocrinologic and radiologic evaluation in terms of tumour hypersecretion, hypopituitarism or mass effect of tumour once an incidentaloma revealed with FDG PET/CT.

INTRODUCTION

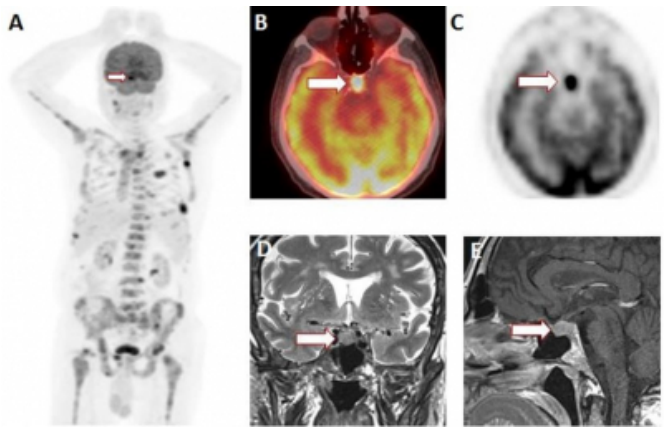
Although FDG PET/CT scan is used for diagnosis and staging of malignant tumors, some benign tumors or non-neoplastic conditions show F-18 FDG uptake (1,2). Pituitary incidentalomas are usually benign masses which remain clinically silent and associated with minimal morbidity and mortality (3). They can be classified according to their size (<10 mm are microadenomas, >10 mm are macroadenomas) and hormone secretion status (depending on their hormonal activity in vivo; nonfunctional, functional). Autopsy series showed the prevalence of pituitary incidentalomas is approximately 10%, with the majority of microadenomas (4). Buurman and Saeger reported 334 microadenoma cases and only 3 macroadenoma cases from autopsies of 3048 patients (5). The prevalence of pituitary incidentalomas detected by CT ranges from 3.7% to 20% and the prevalance found by MR imaging is 10%(6-7). There are only few case reports related to FDG PET/CT findings in non-functioning pituitary incidentalomas (3, 8-13).

Present study aimed to report FDG PET/CT findings of an incidentally detected non-functioning pituitary adenoma.

CASE REPORT

A 69-year-old male patient with a diagnosis of multiple myeloma was referred to FDG PET/CT imaging for staging purposes. It revealed widespread multipl foci of increased FDG uptake [maximum standardized uptake values (SUVmax): 17.2] in bone and bone marrow consistent with metastasis. Additionally, an unexpected focus of intense FDG uptake (SUVmax: 22.1) in the region of the pituitary gland were also seen (Figure 1: A, B, C). Patient had no signs of disease or symptoms (double vision, loss of vision or headache, etc) related to this condition. After FDG PET/CT, MRI (Figure 1: D, E) of the brain performed and it demonstrated bulging at the right half of the pituitary gland to suprasellar region and a 11 x 7.5 mm well defined lesion that compatible with hypophyseal adenoma. There was no pathological pituitary hormone increase reported in endocrinologic evaluation. In conjunction with patient's history, physical examination findings, laboratory results this incidental adenoma was regarded as nonfunctional clinically. Endocrinologist decided to follow up patient with yearly MRI.

Figure 1



DISCUSSION

Pituitary adenomas constitute 10-15 % of all primary intracranial tumors (14). A pituitary adenoma is a slow growing and typically benign tumor arising from cells in the pituitary gland. Historically, these tumors have been classified according to size and divided into microadenomas (dimension < 1 cm) and macroadenomas (dimension ≥ 1 cm). Because they originate from cells in the pituitary gland, which is the master hormone gland, they often cause problems related to hormonal dysfunction (hyperprolactinemia, Cushing's Disease, acromegaly etc.). However, a large proportion of these tumors, do not produce any functional hormones (non-functioning pituitary adenomas). They can exert a mass effect that leads to visual field defects and may progress to hypopituitarism. There are several treatment options for pituitary adenomas including; observation, medical treatment, surgery, radiation and radiosurgery.

Pituitary incidentalomas are defined as pituitary masses that are incidentally discovered on CT or MRI studies carried out for the evaluation of diseases or complaints unrelated to visual disturbance, hypopituitarism, or anteriorpituitary hormone excess caused by sellar masses. It was reported that only patients with pituitary incidentalomas greater than 10 mm in greatest diameter developed tumor enlargement or complications (15).

Current neuroimaging modalities, CT and particularly MR scanning, exert high sensitivity in detecting pituitary pathology; in addition, these techniques can be used to demonstrate disease progression (16-17). We are able to get more accurate results providing both anatomical and functional imaging with FDG PET/CT. In the literature, there are only few case reports describing FDG positivity of incidental found non-functioning pituitary adenomas by this time (3, 8-12). De Souza et. al concluded that FDG PET was complementary to MRI, because FDG PET was positive in five cases with negative or questionable results on MRI in their study (18).

Incidentally detected focal 18F-FDG accumulation in the pituitary gland was found in 107 of 13,145 subjects, accounting for an incidence of 0.8% in one study (8). Another study showed focally increased pituitary FDG uptake in 30 of 40,967 patients, accounting for an incidence of 0.073% (12). In the last study, the mean SUV maximum value of 30 patients was 8.9 ± 6.6 (range: 3.2–32.6) and histological diagnosis was obtained in three patients and included two growth hormone-secreting adenomas and one non-functioning adenoma. There were no cases diagnosed with metastasis to the pituitary gland during clinical follow-up.

There have been no reports on the mechanism of FDG uptake in functioning and non-functioning pituitary adenomas. However, the size of a pituitary mass would be considered one of the important factors for the degree of pituitary FDG uptake (3). Additionally, the cells of functioning tumours that are hormone-secreting tumours may be more active and therefore more likely to take up FDG.

In conclusion, incidental pituitary FDG uptake was a very rare finding. Cases with incidental pituitary FDG uptake were diagnosed primarily with clinically non-functioning adenomas and there were also a few functioning adenomas. Patients need further endocrinologic and radiologic evaluation in terms of tumour hypersecretion, hypopituitarism or mass effect of tumour once an incidentaloma revealed with FDG PET/CT.

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