PET-CT in Localized Oropharyngeal Amyloidosis : A Case Report and Literature Review

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－ ABSTRACT －

Amyloidosis is typically a systemic depositional disease, diagnosed from clinical symptoms and signs in conjunction with histopathology. When occurring in the head and neck, lesions most often involve the larynx, nasopharynx, tongue, palate, and trachea. Primary localized oropharyngeal amyloidosis is, however, an uncommon finding. We present a case of 76-year-old man with primary localized oropharyngeal amyloidosis diagnosed by biopsy and generalized laboratory tests. We compared the pattern of ^{18}F-FDG uptake in our case with others reported in the literature as a way to differentiate systemic and localized types of amyloidosis. In this case, no definitive ^{18}F-FDG uptake by amyloid tissue was seen on PET-CT. The results of this case study add to the evidence that ^{18}F-FDG PET-CT seems not to be a critical tool for the differentiation of localized from systemic amyloidosis. **(J Clinical Otolaryngol 2014;25:276-280)**

KEY WORDS : Amyloidosis · Oropharynx · Positron emission tomography · Fluorodeoxyglucose · Diagnosis.

Introduction

Amyloidosis comprises a group of conditions characterized by deposition of proteinaceous (amyloid) fibrils composed of low molecular weight subunits of a variety of serum proteins. The deposition of amyloid fibrils results in loss of function, and often causes prominent swelling of the affected organ or tissues. Amyloid deposition may be localized (restricted to one particular organ or tissue) or systemic (involving various organs and tissue throughout the body).[1)]

Amyloidosis occurs rarely in the head and neck, where it is a benign condition, and is generally localized to the orbit, sinuses, nasopharynx, oral cavity, salivary glands, or larynx. Primary, localized oropharyngeal amyloidosis is a particularly uncommon finding, with only 11 reported cases.[2-6)]

We report a case of localized oropharyngeal amyloidosis treated by surgical resection and review the literature on the effectiveness of positron emission tomography-computed tomography (PET-CT) to diagnose localized amyloidosis.

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Case Report

A 76-year-old man who had undergone CyberKnife treatment for prostate cancer 5 months previously was referred to us because of throat discomfort. He was found to have a yellowish exophytic mass in the left lateral wall of the oropharynx on fiberoscopic examination (Fig. 1). One oropharyngeal mass was observed in the previously taken PET-CT to evaluate the prostate cancer. PET-CT scan showed no marked fluorine-18 fluorodeoxyglucose (^{18}F-FDG) uptake in the oropha-

ryngeal mass (Fig. 2). And, there was a 1.6 cm sized focal increased FDG uptake in right parotid gland deep portion. The patient had an oropharyngeal mass biopsy under the visualization of the fiberoscopy in OPD environment and ultrasonography-guided fine needle aspiration in right parotid deep lobe. The oropharyngeal mass was proved as amyloidosis and the parotid mass was proved as a Warthin's tumor. We reviewed the general laboratory tests and radiologic tests to find the evidence of systemic type of amyloidosis. No abnormalities were found related to the major or-

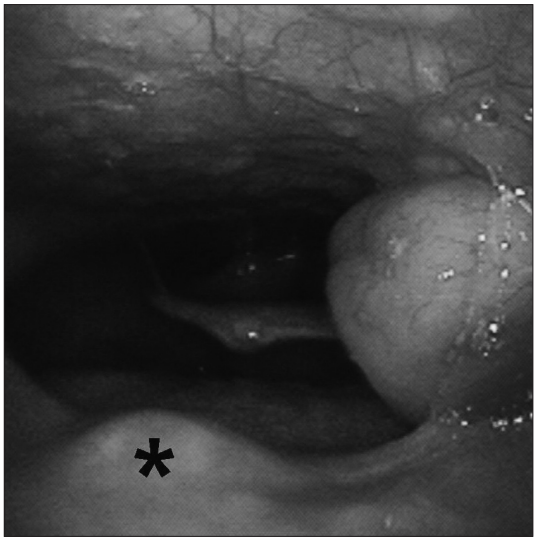

Fig. 1. Initial fibroscopic finding. A yellowish mass of approximately 1 cm in size is seen in the left lateral wall of the oropharynx. Uvula (asterisk).

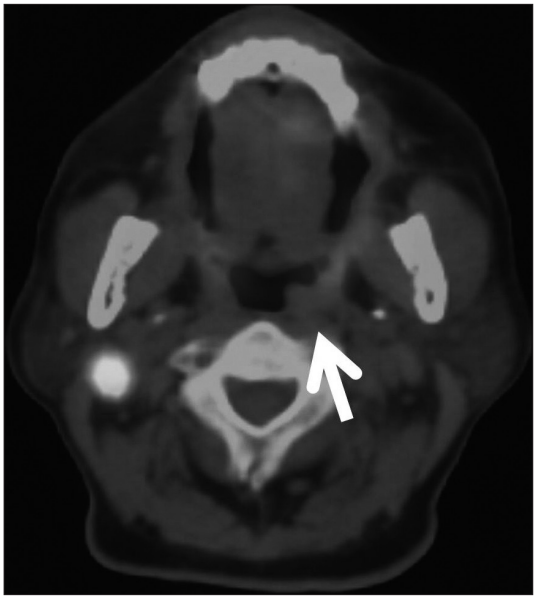

Fig. 2. PET-CT scan of the neck showing no marked uptake of ^{18}F-FDG in this localized oropharyngeal amyloidosis (arrow). Focal increased FDG uptake in right parotid gland deep portion (neck level IIa).

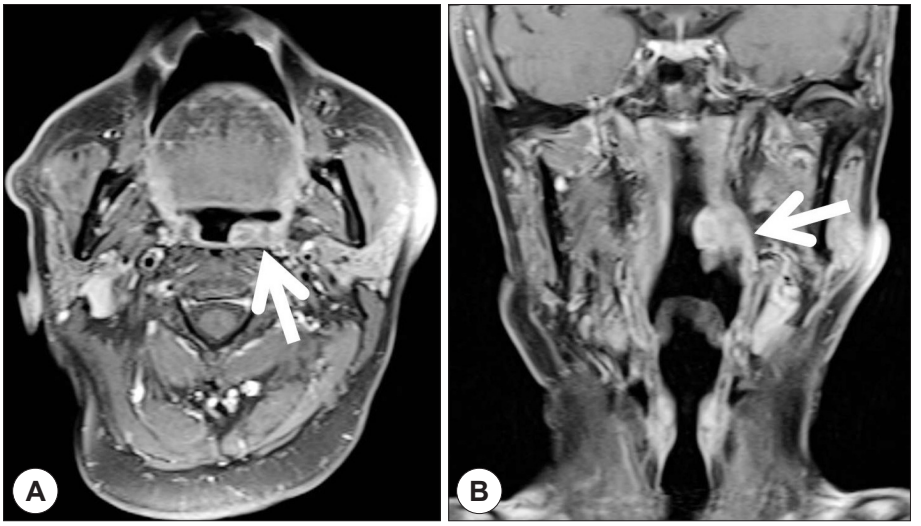

Fig. 3. Axial (A) and coronal (B) views of T1 enhanced MRI. There is an approximately 1×1 cm round mass in the left oropharynx (arrow).

gan, such as heart, liver, or kidney. Radiologic evaluations revealed no specific head or pelvic findings. Bone marrow aspiration and a rectal mucosa biopsy were also done to differentiate systemic amyloidosis. MRI images demonstrated the isolated oropharyngeal mass (Fig. 3). Following a final diagnosis of localized amyloidosis, the patient had surgery for the oropharyngeal amyloidosis and parotid tumor under general anesthesia. There was minimal surgical bleeding and no specific postoperative complications. Pathological results of the oropharyngeal mass revealed pale, homogeneous eosinophilic deposits by hematoxylin and eosin staining (Fig. 4A) and red-green birefringence with Congo red staining (Fig. 4B). And the parotid tumor was revealed as Warthin's tumor. The throat discomfort resolved after the surgery. At follow-up one year after surgery, there was no evidence of recurrence.

Discussion

Amyloidosis is a clinical disorder caused by extracellular and intracellular deposition of abnormal, insoluble amyloid fibrils that alter the normal function of tissues.[7] Most cases occur in people from 40 to 60 years of age, and it is about twice as frequent in men than in women.[8] Amyloidosis is classified clinically systemic or localized. The etiology, treatment, and outcome of systemic and localized amyloidosis are totally different. The mean survival of patients with systemic amyloidosis is 5 to 15 months, whereas patients with localized amyloidosis have an excellent prognosis.[9] Consequently, it is important to establish whether the amyloid deposits are localized or systemic.

The diagnosis of amyloidosis depends on histological studies of biopsy specimens. Once the diagnosis is made, testing to determine the type of amyloid guides treatment decisions. The location and extent of the amyloid deposits are most often determined by organ-specific testing, e.g., evaluation of renal and hepatic function, proteinuria assay, and echocardiography.

Some authors suggest that confirming localized amyloidosis in the upper aerodigestive tract requires extensive clinical laboratory tests and invasive work-up such as submucosal gingival biopsy, aspiration of abdominal fat, bone marrow biopsy and rectal biopsy.[10] However, as the diagnostic yield is very low, others believe that invasive investigations are not indicated.[10] Kidney, liver or endomyocardium biopsies are sensitive when laboratory tests show organ dysfunction. However, because life-threatening bleeding can occur following organ biopsy, it should be reserved for patients in whom abdominal fat pad aspiration/biopsy and/

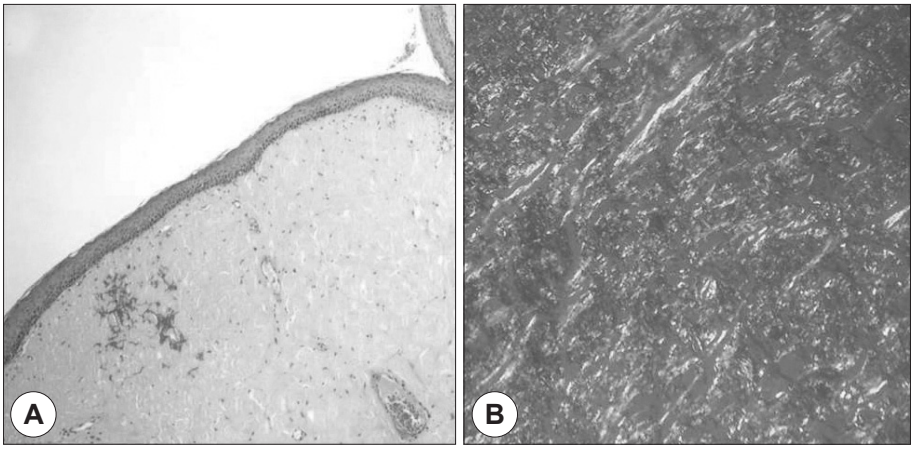

Fig. 4. Histopathologic findings. A : Hematoxylin-eosin staining shows subepithelial deposition of acellular, eosinophilic, and amorphous materials (×100). B : Congo red staining revealing characteristic red-green birefringence under polarized light typical of amyloidosis (×200).

or labial salivary gland biopsy fail to establish the diagnosis.

Recently, there have been many attempts to differentiate localized and systemic amyloidosis using ^{18}F-FDG PET-CT. Several case studies reported increased ^{18}F-FDG uptake in patients with localized amyloidosis in the lung,[11-14] nasopharynx,[15] and lymph nodes.[16] Westermark hypothesized that giant cells in localized amyloid light chain (AL) amyloidosis participate in the transformation of soluble full-length light chains into insoluble fibrils formed from N-terminal light chain fragments, and are thus involved in the production of amyloid.[17] Olsen, et al also reported that a difference between localized and systemic amyloidosis is the presence of giant cells, which are associated with amyloid deposits in localized AL amyloidosis.[18] In systemic AL, inflammatory (AA ; Amyoid A) and familial (ATTR ; Transthyretin-related) amyloidosis, however, giant cells are thought to be unnecessary for the formation and deposition of amyloid1. Because of the presence of giant cells in localized AL amyloidosis, in contrast to systemic amyloidosis, Glaudemans hypothesize that ^{18}F-FDG PET-CT might show uptake in localized but not in systemic amyloidosis.[1]

FDG uptake pattern of the amyloidosis not always meet the hypothesis. Two case studies of systemic amyloidosis reported increased focal ^{18}F-FDG uptake by deposits in liver[19] and joints.[20] Mekinian, et al. reported ^{18}F-FDG uptake in five of eight cases of localized amyloidosis and in two of four cases of systemic amyloidosis.[21] In our case, there was no marked ^{18}F-FDG uptake was seen at the amyloid site. And, the pathologist reported that no giant cells are visible in the tissue.

A number of studies have undergone to find out the usefulness of PET-CT as a way to differentiate the type of amyloidosis without the invasive biopsy tests. However, the pattern of FDG uptake lacks the consistency. Thus, more specific further studies are needed to assess the relationship between substantial existence of giant cell in localized amyloidosis and the FDG uptake pattern.

Conclusion

By the literature review, there is a tendency of increased FDG uptake pattern in the localized amyloidosis. However, FDG uptake pattern lacks the consistency by the types of localized and systemic amyloidosis. The results of this case study add to the evidence that ^{18}F-FDG PET-CT seems not to be a critical tool in the differentiation of localized or systemic amyloidosis.

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