

— Case Report —

A Comparative Study between CT and Histopathologic Findings of Amyloid Goiter

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There are only a few reports describing the imaging features of amyloid goiter with adequate histopathologic correlation. We present a case of amyloid goiter, focusing the correlation between CT and autopsy specimen findings.

CT showed diffuse low attenuation areas (40-50 H.U.) which corresponded to the tissue with dense amyloid deposits. There was also focal areas of very low attenuation which contained the adipose tissue. The latter finding is relatively characteristic for amyloid goiter, because fatty infiltration is known to be frequently associated with amyloid goiter : a rare finding in other disorders.

Key words : thyroid, amyloid goiter, fat, CT

Introduction

Enlargement of the thyroid gland due to massive amyloid deposits, referred to as amyloid goiter, is a rare condition. There are only a few reports describing the imaging findings of amyloid goiter. In this report, we present a case of amyloid goiter evaluated by both CT and a histopathologic study based on autopsy, and we discuss the correlation between CT and histopathologic findings.

Case Report

A 29-year-old woman presented with general malaise, diarrhea and anorexia. She had suffered from rheumatoid arthritis for more than 15 years. A diagnosis of systemic amyloidosis had been made by biopsy of the rectum and duodenum about two years previously. Physical examination revealed enlarged thyroid which is elastic firm in consistency. Although thyroid function test initially

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showed mild hypofunction, it returned to normal after eight months without any treatment. Unenhanced CT of the neck revealed diffuse enlargement of the thyroid gland, which showed diffuse low (40-50 H.U.) attenuation intermixed with focal high (110-130 H.U.) and very low (0-10 H.U.) attenuation areas (Figure 1).

The patient's renal function deteriorated progressively for the course of five years and she died of chronic renal failure. At postmortem examination, the thyroid gland was enlarged (7×6×3 cm, 48.5 g), and moderately firm in consistency. Cut surface of the thyroid gland corresponding to the CT section had a brownish waxy appearance with localized dark brown and yellowish areas (Figure 2). On histopathology, the brownish waxy, the yellowish and the dark brownish areas contained dense amyloid deposits (Figure 3a), mature adipose tissue (Figure 3b) and normal colloid follicles (Figure 3c), respectively. Compared with CT images, the areas of dense amyloid deposits coincided with the diffuse low attenuation areas, whereas foci containing adipose tissue corresponded to the very low attenuation areas. The areas composed of the normal colloid follicles corresponded to the high attenuation areas on CT.

Discussion

Since von Eiselsberg coined the name "Amyloid goiter" in 1904, many reports on the lesion have been published¹⁾. However, to our knowledge, there are only a few reports describing the radiological features of amyloid goiter which were correlated with histopathologic findings^{2,3)}.

In this case, we compared CT and histopathologic findings of amyloid goiter. Three areas were identified based on the difference of attenuation values, each corresponding to certain histologic patterns: areas of low attenuation values; dense amyloid deposits, areas of very low attenuation values; focal adipose tissue infiltration and areas of high attenuation values; normal thyroid follicles. The tissue with dense amyloid deposits showed

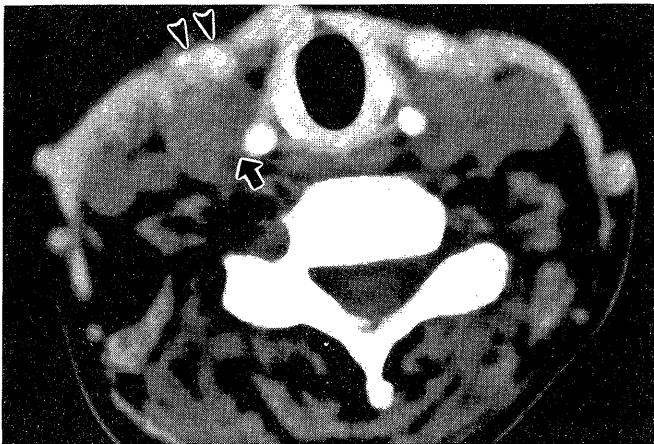


Figure 1 Unenhanced CT scan shows diffuse low attenuation area (40-50 H.U.) intermixed with focal areas of high attenuation (110-130 H.U.) [arrowhead] and very low attenuation (0-10 H.U.) [arrow] in the enlarged thyroid gland.

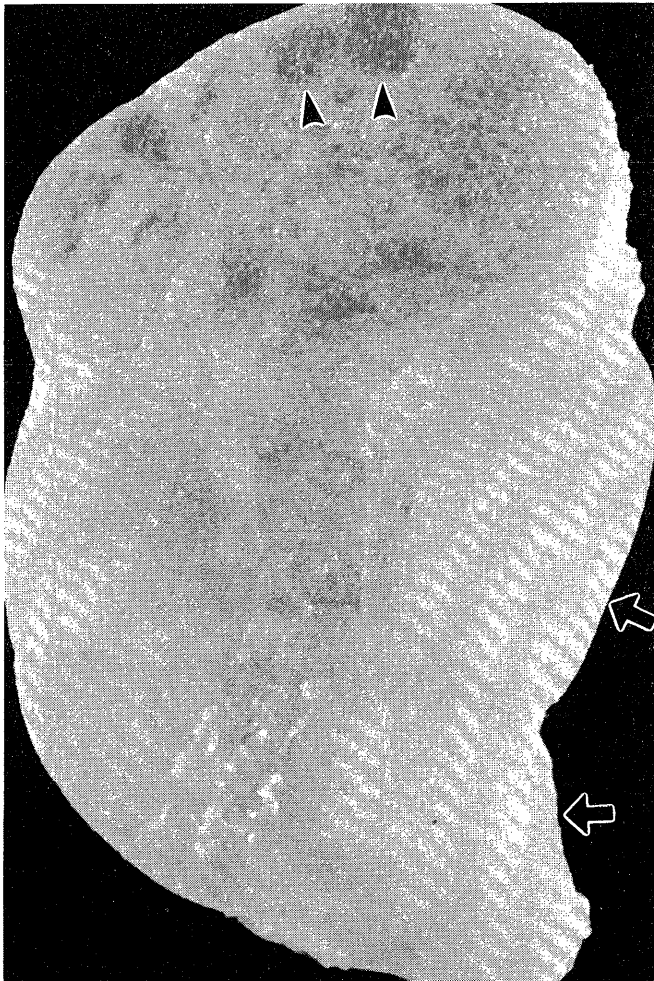


Figure 2 The cut surface of the right lobe corresponding to the CT section (Figure 1). Most of the area has a brownish waxy appearance with localized dark brown (arrowhead) and yellowish areas (arrows).

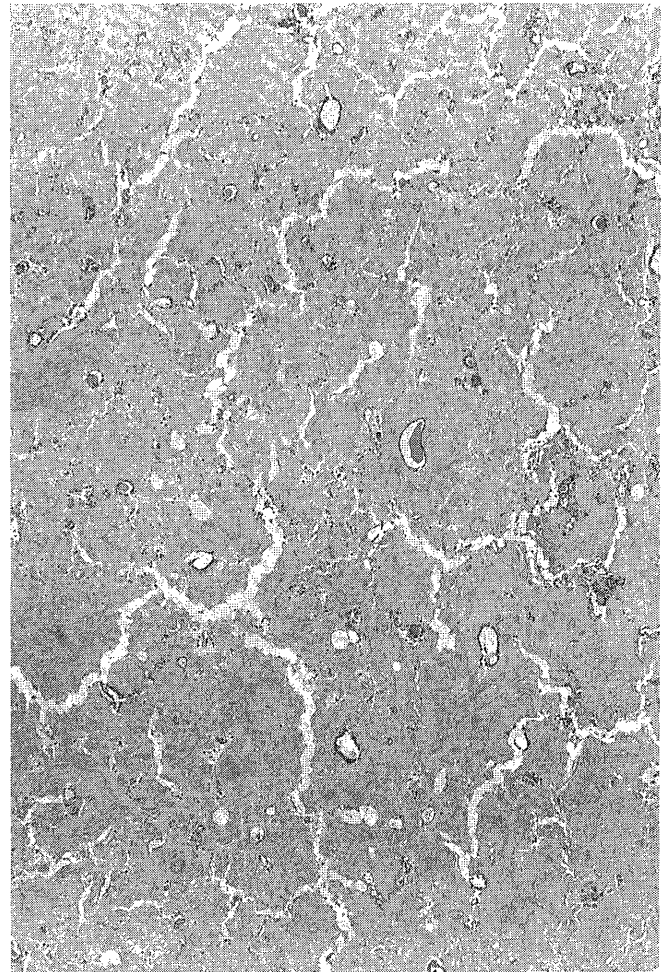


Figure 3a Photomicrograph of the area with a brownish waxy appearance coincides with the diffuse low attenuation area on CT. Diffuse amyloid deposits are noted. A few atrophic colloid follicles are also seen. [Congo Red×40]

40-50 H.U. attenuation values on CT. However, this low attenuation area does not lead the diagnosis of amyloid goiter, because it can be seen in many thyroid disorders, including chronic thyroiditis, adenomatous goiter, adenoma and carcinoma. In contrast, very low density areas, corresponding to adipose tissue infiltration, is considered to be characteristic for amyloid goiter. Walker, in his review of 58 cases of thyroid amyloidosis, pointed out that adipose tissue was often found in amyloid goiter⁴⁾. Although the mechanism of fatty infiltration is unknown, other studies have supported the association between fatty infiltration and amyloid goiter, which has rarely been reported in other disorders^{56,7)}. Miyake et al. reported two cases of amyloid goiter with extensive fatty infiltration observed on CT and histopathology²⁾. In our case, the focal areas with fatty infiltration showed attenuation values which is slightly higher than that of fat. This is probably related with two factors ; one is partial volume effect of CT sections and another is the tissue characteristics which

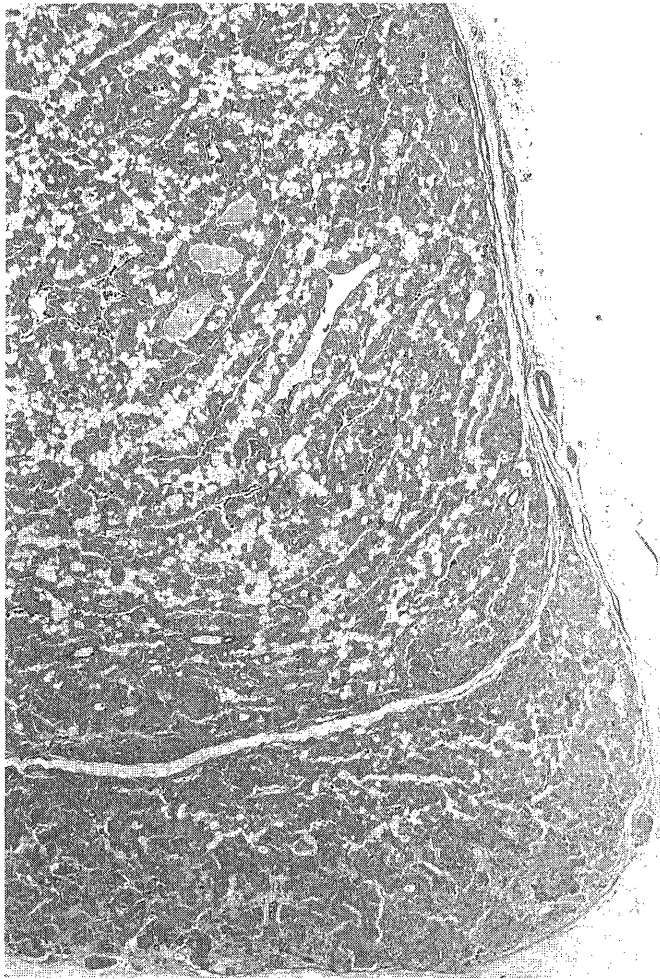


Figure 3b Photomicrograph of the yellowish areas coincides with the very low attenuation areas on CT. The mature adipose tissue is noted. The amyloid deposits and decreased colloid follicles are also seen. [H.E. $\times 20$]

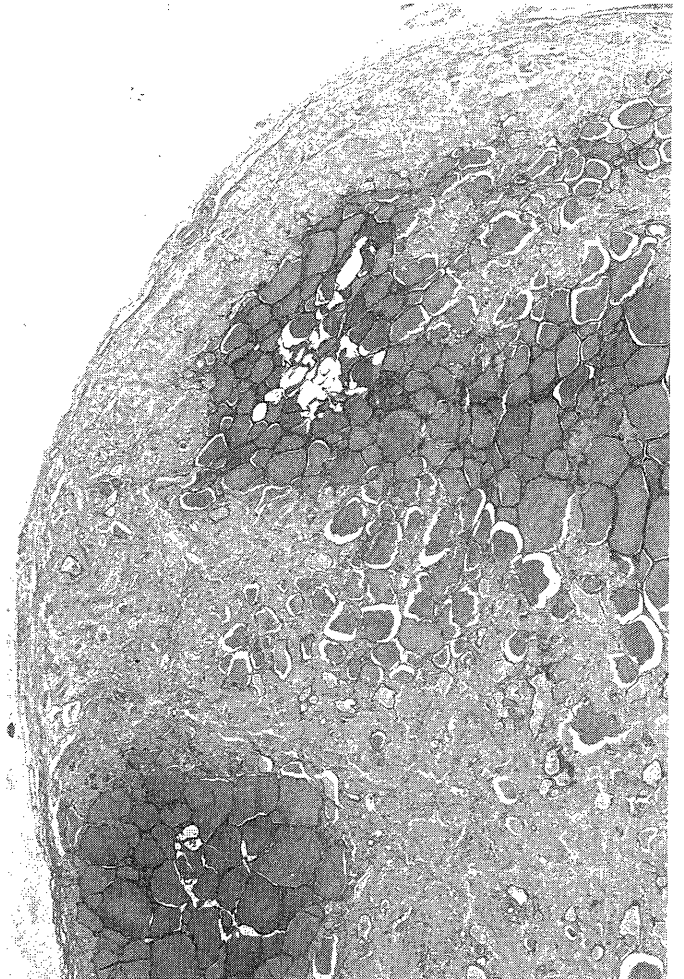


Figure 3c Photomicrograph of the area with a dark brownish areas coincides with the nodular high attenuation area on CT. Normal colloid follicles are surrounded by amyloid deposits. [H.E. $\times 40$]

include not only the adipose tissue but also amyloid deposits and colloid follicles. This focal areas of very low attenuation may simulate cystic lesions, which can be excluded by ultrasound.

we reported a case of amyloid goiter in which CT showed diffuse low attenuation areas intermixed with focal areas of very low attenuation corresponding to focal fatty infiltration. The findings are considered to be characteristic for amyloid goiter because focal fatty infiltration is frequently associated with this disorder.

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