A rare case of cholesterol granuloma in the thyroid without an abnormality of lipid metabolism

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Abstract

This report describes a cholesterol granuloma (CG) of the thyroid. The patient was a 79-year-old male. The mass in the thyroid was observed by chest computed tomography (CT). Initially, he had no clinical symptoms and the mass was not palpable. However, it started and became palpable and painful. He was diagnosed to have subacute thyroiditis. Although he was administered prednisolone (PSL), the mass grew larger and more solid. Then thyroid left lobectomy was performed under general anesthesia. The histological diagnosis was CG of the thyroid. After surgery his clinical course was favorable.

Keywords

- Cholesterol granuloma;
1. Introduction

A cholesterol granuloma (CG) of the thyroid is extremely rare. Only two cases of CG of the thyroid have so far been reported [1] and [2]. In those cases, the CG of the thyroid was due to an abnormality of lipid metabolism, called Erdheim-Chester disease (ECD), and the CG of the thyroid was associated with lipid granuloma that developed in many other organs. No CG of the thyroid not accompanied by ECD has ever been reported. This report presents the first case of CG of the thyroid not accompanied by ECD.

2. Case report

A 79-year-old male presented in March 2005 for an evaluation of a mass in his thyroid that was found by chest computed tomography (CT). The chest CT showed a 25 mm mass in the left thyroid lobe. Although he had no clinical symptoms associated with the mass, this department was consulted for further investigation. The mass was not palpable and there was no left recurrent nerve paralysis. The laboratory examination showed almost normal thyroid function (T4: 1.37 ng/dl, TSH: 0.132 μU/ml), and there was no inflammatory response (CRP: 0.55, WBC: 6500). Anti-thyroglobin antibody and anti-thyroid peroxidase antibody were negative. Thyroid ultrasonography showed a 25 mm solitary hypoechoic lesion with regular borders in the left thyroid lobe. A thyroid scintiscan (99mTc) showed a hot spot corresponding to the mass. Contrast CT of his neck showed a 25 mm homogenous low-density area with no enhancement in the left thyroid lobe (Fig. 1). Fine needle aspiration (FNA) was performed, however, the specimen was insufficient in size to perform a cytological diagnosis. The patient refused another FNA and surgery was conducted for diagnosis because of his advanced age. Four months later, the mass had grown to be palpable and painful. A laboratory examination showed an elevated level of CRP and FT4 (CRP: 4.20, FT4: 2.13 ng), and suppressed level of TSH (TSH: 0.052 μU/ml). No upper tract infection or fever was seen. Subacute thyroiditis was suspected. Administration of 20 mg/day of prednisolone (PSL) was started. The cervical mass decreased and the cervical pain subsided immediately (CRP: 0.81). Surprisingly, the neck CT revealed the mass in the thyroid to have become enlarged (Fig. 1). FNA was performed again for the mass with informed consent. The cytological diagnosis was inflammation (possible subacute thyroiditis). He continued taking 5 mg/day PSL. The cervical mass grew larger and more dense (CRP: 3.05), despite the administration of the PSL. Neck CT then revealed the mass to have again grown larger (Fig. 1). A malignant tumor was suspected. A left lobectomy of the thyroid was performed for diagnosis with sufficient informed consent under general anesthesia. On gross examination, the thyroid left lobe was surrounded by yellow-brown granulation and atrophied. The intraoperative frozen section diagnosis of the mass was a cholesterol granuloma. Histological examination of excised material revealed that the mass
contained numerous cholesterol clefts and foreign body giant cells. The histological diagnosis was a cholesterol granuloma of the thyroid (Fig. 2). The clinical course was uneventful. No symptoms of cervical swelling and pain were observed at a 2-year follow-up examination after surgery.

Fig. 1. Neck contrast CT showed a 25 mm homogenous low-density area with no enhancement in the left thyroid lobe (A; 05/04/20). CT revealed the mass of thyroid to be enlarged (B; 05/08/22). CT revealed the mass grew larger (C; 05/10/06).

Fig. 2. Microscopic findings of the mass (A; HE 400×). Numerous cholesterol clefts and foreign body giant cells were observed. The findings were compatible with a cholesterol granuloma.

3. Discussion

CG occurs most commonly in the middle ear [3] and it is also found in many other organs, such as paranasal sinuses [4] and breast [5]. However, there have been only two cases of CG of the thyroid [1] and [2]. In those cases, the CG occurred with ECD and found in not only thyroid but also many other organs at the same time. This is the first report of CG of the thyroid without ECD. Pathologically, CG shows fibrous granulation tissue, containing many cholesterol crystals and surrounded by foreign body giant cells [5]. In the middle ear, the pathogenesis of CG was reported to cause an obstruction of air cells, thus leading to a rupture of the blood vessels and hemorrhaging. Red blood cell degeneration into cholesterol clefts produces a foreign body giant cell reaction with progressive accumulation of typical
brownish glistening fluid. The treatment of cholesterol granuloma in the middle ear requires chronic drainage into another air-containing cavity [3]. In the paranasal sinuses, the CG was reported to be caused by a disturbance of air drainage as observed in the middle ear and was treated with radical surgery via using an endoscopic approach [4]. In the breast the pathogenesis of CG was diagnosed to be periductal inflammation. Mammary periductal inflammation often occurs from duct secretions leaking into the parenchyma through damaged duct walls. In areas of chronic inflammation, the neutrophil population decreases and the macrophage and lymphocyte populations increase. Lipid accumulates in the form of cholesterol crystals from degenerated cells. The relatively non-lysable cholesterol crystals induce a foreign body giant cell reaction that leads to granuloma formation [6]. CG of the breast clinically mimics cancer. It is important to rule out the possibility of malignancy with an excisional biopsy. Chizu et al. reported a case of breast cholesterol granuloma accompanied by cancer. It should be emphasized that a surgical biopsy and a histological examination must be considered when a lesion mimicking cancer is suspected, even if the FNA cytology is negative [5]. In the present case, the pathogenesis of the thyroid was unknown. $^{99m}$Tc scintigram showed a hot spot corresponding to the mass; however, it is unclear whether the accumulation of $^{99m}$Tc correlates the clinical activity of CG, since no findings of CG by $^{99m}$Tc scintiscan have been reported in the literature. The patient had history of FNA before cervical swelling and an elevation of CRP level. The elevation of CRP might be due to inflammation caused by FNA. Thyroid puncture may have caused inflammation and acute exacerbation of the preexisting CG of the thyroid. It is also possible that inflammation of the thyroid (subacute thyroiditis) caused accumulation of cholesterol crystals that incited a foreign body giant cell reaction. Generally, cholesterol granulomas of the middle ears and paranasal sinuses cause inflammation, and many of them are treated by surgery. CG of the breast usually causes no symptoms but produces a mass. It is difficult to diagnose without a surgical excision. In the present case, CG of the thyroid caused inflammation that was not controlled by administration of steroids. It was difficult to distinguish CG of the thyroid from a carcinoma by the clinical course and imaging findings. Surgery is therefore considered to be the most appropriate diagnostic treatment for CG of the thyroid. Even if the CG of the thyroid were diagnosed with FNA or other modalities of investigation, surgery would be necessary to control the inflammation caused by CG.

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