# A Rare Case of Hydatid Cyst Mimicking Multinodular Goiter With Multiorgan Involvement

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**Abstract-** Hydatid disease is a parasitic zoonosis caused by Echinococcus granulosus, most commonly affecting the liver and lungs. Involvement of the thyroid gland is extremely rare and can mimic more prevalent conditions such as multinodular goiter (MNG). A 26-year-old Iranian woman with a history of consuming contaminated water presented with a painless anterior neck nodule in the thyroid area. Initially diagnosed with multinodular goiter, she underwent total thyroidectomy under general anesthesia. later diagnosed histopathologically as a hydatid cyst of the thyroid, with concurrent cysts identified in the liver and spleen. This case highlights the importance of considering hydatid disease in the differential diagnosis of cystic thyroid lesions, particularly in endemic areas, and discusses diagnosis and management methods.

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## Introduction

Hydatid disease, also known as echinococcosis, is a parasitic infection caused by the larval stage of *Echinococcus* species, most commonly *Echinococcus granulosus* and *Echinococcus multilocularis*. It is a significant public health concern in endemic regions. is endemic in many parts of the world including the Middle East, South America, Eastern Europe, and parts of Africa and Asia. The liver and lungs are the most commonly affected organs (70% and 20% respectively) (1,2) Involvement of the thyroid gland is rare, accounting for less than 1% of all hydatid cases (3-5) Due to its rarity and non-specific presentation, hydatid cysts in the thyroid are often misdiagnosed as multinodular goiter or simple thyroid cysts and its diagnosis can be challenging, especially in cases without systemic manifestations (6).

The rarity of thyroid hydatid cysts can be attributed to the organ's high vascularity and resistance to infection by hydatid larvae. However, when these cysts occur, they can mimic other thyroid pathologies, such as benign nodules, multinodular goiter, or even malignancies, leading to diagnostic challenges (6).

This article presents a rare case of a hydatid cyst in thyroid tissue primarily diagnosed as MNG, discussing its clinical presentation, diagnostic process, and management. Understanding such atypical presentations is critical for clinicians, especially in regions where hydatid disease is endemic, to ensure timely diagnosis and appropriate treatment.

## Case Reports

A 26-year-old Iranian woman from a village near Zabol, Iran, presented with a painless anterior neck nodule in the thyroid area. She had no history of any past illnesses, and only a history of consuming contaminated water. She had no history of fever, cough, weight loss, or compressive symptoms. On examination, an ill-defined, smooth, and mobile anterior neck mass was noted.

Thyroid peroxidase antibodies (IgM anti-TPO) were positive.

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Since ultrasound is the most appropriate initial imaging to determine whether the mass is of thyroidal origin or not, its composition (solid, cystic, mixed), and its internal architecture, and given the location of the mass in the thyroid area and the presence of positive anti-TPO antibodies, making a thyroid origin strongly suspected, a neck ultrasound was one. Ultrasound helps identify multinodularity, cyst formation, vascularity, calcifications, and septations (7).

Neck ultrasound showed a heterogeneous, cystic, multinodular thyroid gland, containing internal septations.

Fine Needle Aspiration Cytology (FNAC) is also essential for cytological evaluation of thyroid nodules. Is is classified according to the Bethesda system and helps distinguish benign from malignant lesions. Fine needle aspiration cytology (FNAC) of this patient yielded a thick, acellular, and non-diagnostic aspirate, raising suspicion for a degenerating cyst.

Cross-Sectional Imaging (CT/MRI) is usually done to assess tracheal compression/deviation or extrathyroidal extension and also whenever Hydatid cyst or unusual lesion is suspected (7).

CT of the neck and chest of this patient demonstrated well-defined cystic lesions in the thyroid, some with internal daughter cysts and calcifications. Based on imaging, a diagnosis of atypical cystic MNG or hydatid disease was considered.

The patient underwent total thyroidectomy. Intraoperative findings included a tense cyst with clear fluid. Histopathological examination confirmed the presence of laminated membranes and protoscolices consistent with hydatid disease. The pathology report reported the presence of a hydatid cyst in the thyroid gland, with granulation tissue formation, extensive necrosis, and granulomatous inflammation.

Given the unusual location, further imaging was done. Abdominal ultrasound and MRI revealed cystic lesions in the liver (segment IV and VI) and spleen with daughter cysts. These were also consistent with hydatid disease.

**The pathology of the thyroidectomy tissue was as followed**

Right lobe: A partially encapsulated, oval mass meas uring 3×3×1 cm, 4×2×1.5 cm, and 1×1×0.4 cm.

Upper lobe of the right side: A 3×3×1.5 cm mass wit h a yellow-white solid elastic appearance (Figures 1-4).

**Histological Findings**

Thyroid, Total Thyroidectomy: Hydatid cyst Tissue negative for malignancy.

**Abdominal ultrasound findings**

A hyperechoic lesion with defined borders, measuring 23×30 mm in segments 6 and 7 of the liver, suspected to be a hydatid cyst, and another hyperechoic lesion, measuring 23×38 mm, in segments 7 and 8 of the liver. Other ultrasound findings were all normal.

Subsequently, an abdominal and pelvic CT scan conf irmed the presence of cysts in the liver and spleen.

**Therapeutic intervention**

For this patient, after administering general anesthesi a, total thyroidectomy was performed and the cyst was removed. Afterwards, the patient was started on albendazole (400 mg BID) for 4 weeks preoperatively. Subsequently, she underwent laparoscopic partial pericystectomy of hepatic lesions and spleen-preserving cystectomy. Postoperatively, albendazole was continued for 3 months. Follow-up at 6 and 12 months showed no recurrence on imaging and normalization of serologic markers.

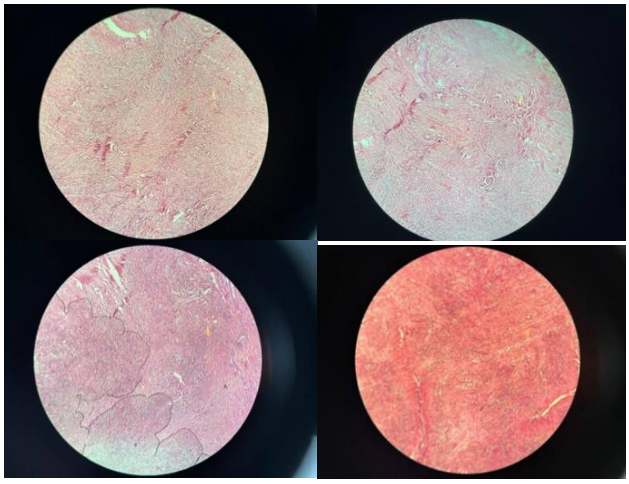

**Figure 1-4.** Thyroid tissue slide

## Discussion

Echinococcus species pass through three growth stages in their life cycle and ultimately reside as adult forms in the intestines of their definitive hosts, typically carnivores, which facilitate the disease's transmission. Their eggs are excreted into the environment through feces and, if ingested by intermediate hosts (usually pigs, camels, cattle, goals, and sheep), form metacestodes. Humans do not usually fall into the biological life cycle but may become accidental intermediate hosts when consuming food contaminated with feces containing Echinococcus eggs. Once eggs reach the digestive system, they hatch, and larvae emerge. These larvae penetrate the intestinal wall and travel via the portal system to liver sinusoids. Usually, larvae that reach the lungs are the ones small enough to escape the liver's filtration system (3,8).

The thyroid gland is an atypical site for hydatid cysts, and overall, hydatid cysts found in the thyroid are more commonly seen in individuals exposed to parasitic contamination (9). Thyroid hydatid cysts often mimic benign thyroid conditions, such as MNG, leading to misdiagnosis. FNAC may not be diagnostic and carries a theoretical risk of cyst rupture and anaphylaxis, although such events are rare (10). Imaging may reveal characteristic features such as cysts with daughter cysts, calcifications, or the "water lily" sign, though these are not always present (11).

If a hydatid disease confined to the thyroid gland without evidence of the disease elsewhere is diagnosed, it is termed primary disease. However, there are only a few reports of primary hydatid disease in the throid gland. (12,13). A thyroid hydatid cysts with the involvement of other organs such as liver and lungs is termed secondary disease.

When the cyst size increases in thyroid, it may resemble thyroid carcinoma and adhere to surrounding structures such as strap muscles, recurrent laryngeal nerve, trachea, esophagus, and carotid sheath, complicating and misleading the diagnosis. Advanced imaging techniques and a thorough histopathological examination are essential for accurate diagnosis (8). Ultrasound, computed tomography (CT scan), magnetic resonance imaging (MRI), scintigraphy, and fine-needle aspiration cytology (FNAC) are standard methods for diagnosing hydatid cysts (11).

Hydatid cysts in the thyroid, like other regions, are primarily treated with surgery, and to date, complete surgical removal followed by Albendazole post-surgery is generally performed worldwide and considered the standard treatment. Radical cysts removal with maximum caution to avoid rupturing the main cyst lesion is the most recommended surgical approach (14). However, subtotal thyroidectomy can be performed for cysts localized in a specific love be of the thyroid or small cysts. A few days of drug treatment in diagnosed cysts before surgery with medications like Mebendazole, Albendazole, and Praziquantel, can be used to as a complete cure but as a supplementary treatment. In cases with multiorgan involvement, surgical resection remains the mainstay of therapy, accompanied by perioperative albendazole therapy to prevent recurrence and reduce the risk of dissemination (15-17).

Hydatid cysts in thyroid tissue are exceedingly rare but must be considered in the differential diagnosis swelling, particularly in regions endemic to hydatid disease, and in patients with a relative clinical history and exposure risk. This case highlights the importance of maintaining a high index of suspicion for atypical presentations of Echinococcosis, as the clinical and imaging feature can closely mimic other thyroid pathologies, including malignancies.

Accurate pre-operative diagnosis through serological testing, imaging studies, and cytological evaluation is essential to guide appropriate surgical and medical management, thereby minimizing the risk of intra-operative rupture of the cyst and subsequent complications. Morover, Multiorgan screening and combined surgical-medical therapy are essential for optimal outcomes in disseminated disease.

Further studies and case reports of these rare cases are encouraged to further elucidate the pathogenesis, diagnostic approach, and optimal management of hydatid cysts in unusual locations, including the thyroid gland.

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