

Case Report

Nonsurgical Management of Thyroid Abscess with Sonographically Guided Fine Needle Aspiration

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Received 18 February 2006; accepted 21 September 2006

ABSTRACT: Treatment of thyroid abscess commonly includes the surgical drainage along with systemic antibiotic therapy. Alternatives for open surgical intervention may be the conservative management with use needle aspiration or catheter drainage. We report here two cases of thyroid abscess treatment with 21-gauge needle aspiration under ultrasound guidance. In each case needle drainage was performed twice, at the 1st and 5th day of admission. Antibiotics were administered in pills and injected into the abscess cavity followed the pus aspiration and lavage. Both patients were cured. Follow-up has not revealed recurrence during 6 month and 5 years. © 2007 Wiley Periodicals, Inc. *J Clin Ultrasound* 35:333–337, 2007; Published online in Wiley InterScience (www.interscience.wiley.com). DOI: 10.1002/jcu.20288

Keywords: thyroid abscess; fine needle aspiration; ultrasonography

Thyroid abscess is rare. Approximately 500 cases have been reported in the literature.^{1–3} Mortality from suppurative thyroiditis reached 22% before the advent of antibiotics.⁴ In the current medical environment, failure of a neck abscess to respond to antibiotic treatment often requires open surgical drainage. The morbidity associated with open surgical drainage has led to the consideration of conservative management via needle (18–20-gauge) aspiration or catheter drainage under CT or sonographic guidance.^{5–7} We report 2 cases of successful nonsurgical manage-

ment of a thyroid abscess with percutaneous 21-gauge needle aspiration. In both cases, the procedure was performed under sonographic guidance using an SSA-240A scanner (Toshiba Medical Systems, Tokyo, Japan) equipped with an SM-708A 7.5-MHz mechanical sector transducer.

CASE REPORTS

Case 1

A 21-year-old female was admitted to our clinic with a 3-day history of neck swelling, severe pain, and fever. On physical examination, she had a firm, painful bulge of the anterior right neck measuring 12 × 7 cm that restricted her neck movement. The overlying skin was warm and erythematous. Her white blood cell (WBC) count was 22,000/ μ L (78% neutrophils and 10% lymphocytes) and her erythrocyte sedimentation rate (ESR) was 65 mm/h. Sonographic examination of the neck revealed an enlarged right thyroid lobe that was almost completely replaced by a 125-ml cystic lesion with heterogeneous content (Figure 1A). The left thyroid lobe had normal appearance. Under real-time sonographic guidance, a 21-gauge needle connected to a 20-ml syringe was inserted into the lesion, and 35 ml of liquefied pus was aspirated and sent for cytologic examination. After the aspiration, 1,000/200 mg of amoxicillin-clavulanate (Augmentin; Glaxo-Smith-Kline, Philadelphia, PA) diluted in 3 ml of saline was injected into the abscess. In addition, 500 mg/d azithromycin (Zithromax; Pfizer, New York, NY) was administered per os for 5 days.

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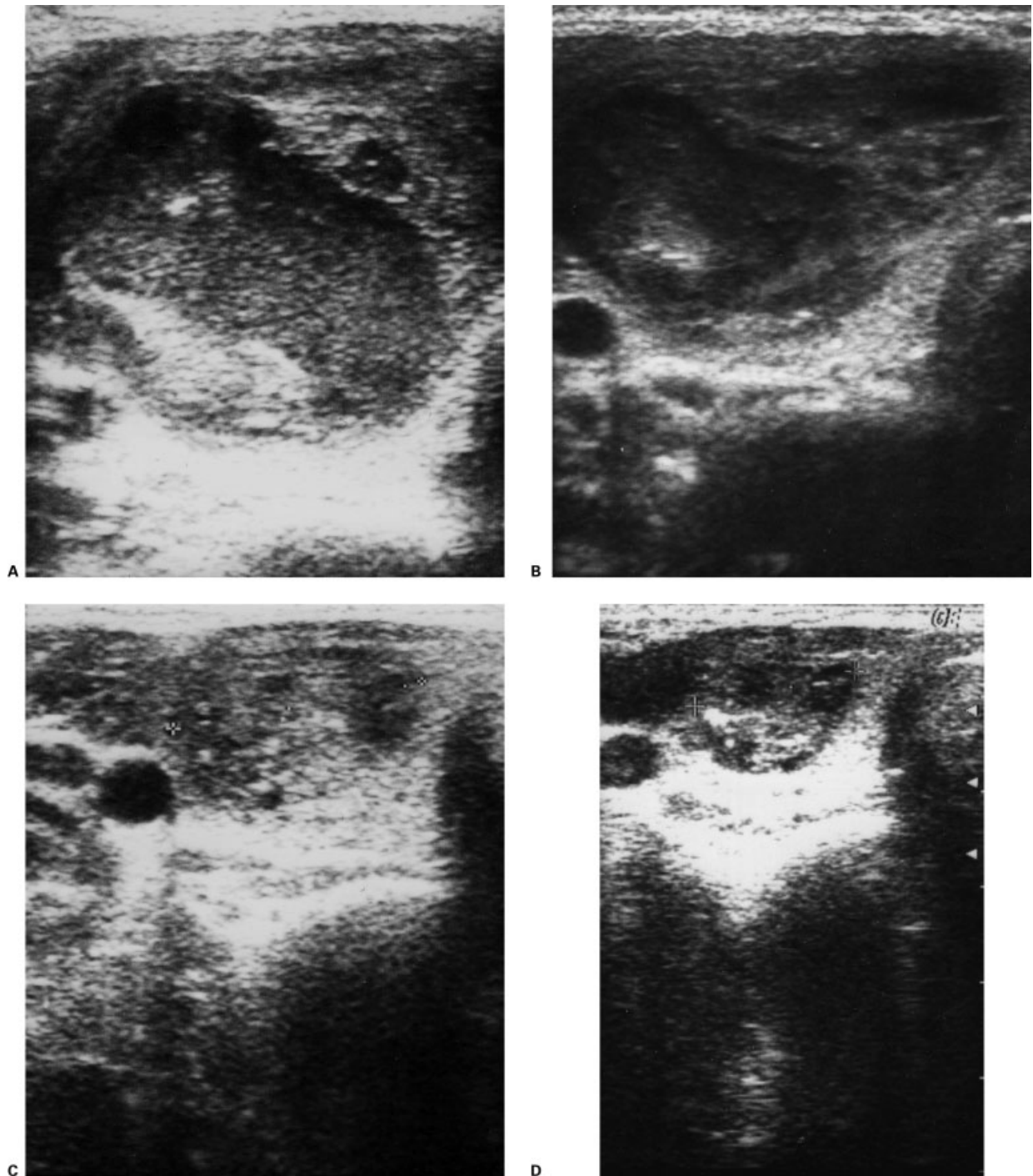


FIGURE 1. Case 1. **(A)** Transverse sonogram of the right thyroid lobe. An abscess measuring $12 \times 5 \times 4$ cm almost completely replaces the right lobe. The margins are relatively well-defined, and the internal content is heterogenous with cystic and solid components. **(B)** Sonogram obtained 5 days after the first aspiration. The size of the abscess cavity has decreased to $6 \times 5 \times 3$ cm, and the echogenicity has decreased. **(C)** Sonogram obtained 1 month after treatment. At the site of abscess, there is a solid residual nodule measuring $3.3 \times 2.1 \times 1.3$ cm with no fluid content. **(D)** Sonogram obtained 6 months after treatment. The nodule has shrunk to $2.8 \times 1.6 \times 1.2$ cm.

Cytologic examination revealed suppurative inflammatory changes. During the next 24 hours, the patient's fever subsided and her pain resolved. On the 5th day after initial aspiration, sonographic examination revealed a reduction of abscess volume to 47 ml (Figure 1B). Repeat aspi-

ration was performed. After aspiration of a small amount of viscous brown fluid, 10 ml of 0.02% chlorhexidin gluconate was injected into the cavity and then reaspirated. A second injection of 1,000/200 mg amoxicillin-clavulanate diluted in 3 ml of saline was made into the abscess. On the

7th day after admission, the patient's WBC count decreased to 11,000/ μ L and her ESR decreased to 12 mm/h. One month later, physical examination revealed a painless, smooth nodule in the right thyroid lobe measuring 2.5 cm. Sonographic examination revealed that the nodule volume had shrunk to 5 ml (Figure 1C). No recurrence was noted during the 6-month follow-up. The size of the lesion on sonograms has continued to decrease (Figure 1D).

Case 2

A 52-year-old woman was referred to our clinic complaining of painful swelling on the left side of her neck, headache, and fever. Her symptoms had begun 3 days earlier with fever and a sore throat. Two days later, painful neck swelling appeared. On admission, physical examination revealed a firm, palpable, and painful 6-cm nodule on the left side of the patient's neck. The overlying skin was warm to the touch. Sonographic examination revealed a complex, solid, and cystic mass in the left thyroid lobe with a calculated volume of 21 ml (Figure 2A) and enlarged deep jugular lymph nodes. The patient's WBC count was 22,500/ μ L (60% neutrophils), and her ESR was 60 mm/hour. Sonographically guided fine needle aspiration with a 21-gauge needle was performed, yielding 15 ml of greenish fluid, which was sent for pathologic examination. Cytologic examination revealed cell debris and macrophages. Double rinsing of the cavity with 0.02% chlorhexidin gluconate was followed by injection of 1,000/200 mg of amoxicillin-clavulanate diluted in 3 ml of saline. Ofloxacin (Floxin; Ortho-McNeil Pharmaceutical, Raritan, NJ) was administered per os at a dose of 400 mg twice a day for 6 days. The day after abscess aspiration, the patient's pain disappeared and her body temperature normalized. On the 5th day after aspiration, her WBC count was 8,000/ μ L, and her ESR was 8 mm/hour. Repeat aspiration was performed. After evacuation of 15 ml of fluid from the abscess, a second injection of augmentin was made. One month after the treatment, sonographic examination revealed the volume of the lesion to be 16 ml (Figure 2C). During the follow-up period, the size of the nodule has been steadily decreasing. Sonographic examination performed 9 months after the aspirations revealed a near complete resolution of the abscess with only an ill-defined hypoechoic area of 0.2 ml in volume remaining (Figure 2D). There has been no recurrence during the 5-year follow-up.

DISCUSSION

The rarity of thyroid abscess can be explained by the gland's total encapsulation, its secluded anatomic position, an iodine-rich environment, its extensive lymphatic drainage, and abundant bilateral blood supply, with anastomotic superior and inferior thyroid arteries that provide protection against bacterial infection and growth.⁸ Experimental injections of live cultures of staphylococci and streptococci into the superior thyroid arteries of dogs have seldom resulted in abscess formation.³

Thyroid abscess occurs more frequently in women aged 20 to 40 years, often in patients with nodular goiter.^{3,9,10} Most cases develop after infection of the upper respiratory tract, pharynx, or middle ear. Two cases were described in patients with thumb paronychia and finger infection.¹¹ It has also occurred after diagnostic fine needle aspiration,^{9,12,13} after trauma caused by foreign bodies (eg, fish bones and chicken bones),^{14,15} and in children as a complication of congenital abnormalities (eg, pyriform sinus fistula).¹⁶ In our 2 cases, thyroid abscess developed in patients without obvious inflammation in close proximity or at a distance. There was no significant medical history in either case.

The most common cause of acute suppurative thyroiditis is gram-positive cocci infection, mainly *Staphylococcus* and *Streptococcus*.¹⁻³ Agents encountered less frequently include *Salmonella*, anaerobes, *Mycobacterium tuberculosis*,^{3,17} and mixed flora.^{10,18} Unfortunately, no culture of fluid was done in our series; therefore, antibiotics were given empirically.

Although in some cases thyroid abscess can be treated with antibiotics alone, the most frequently recommended management is surgery, consisting of either excision or incision and drainage, combined with culture and appropriate antibiotic therapy. In 1985, Herzon⁵ reported the effectiveness of 18-gauge needle aspiration for the treatment of neck abscess. Of 25 patients, 80% were successfully cured, but 20% subsequently required open surgical drainage. Another modality of nonsurgical management of thyroid or neck abscess is percutaneous drainage with placement of a 7- or 8-F pigtail catheter under CT or sonographic guidance. Yeow et al.⁸ recommended needle aspiration drainage for treating lesions measuring <3 cm and catheter drainage if the abscess cavity was >3 cm and if the abscess involved a glandular structure such as the thyroid or parotid gland. In our 2 patients, thyroid abscess aspiration was performed successfully

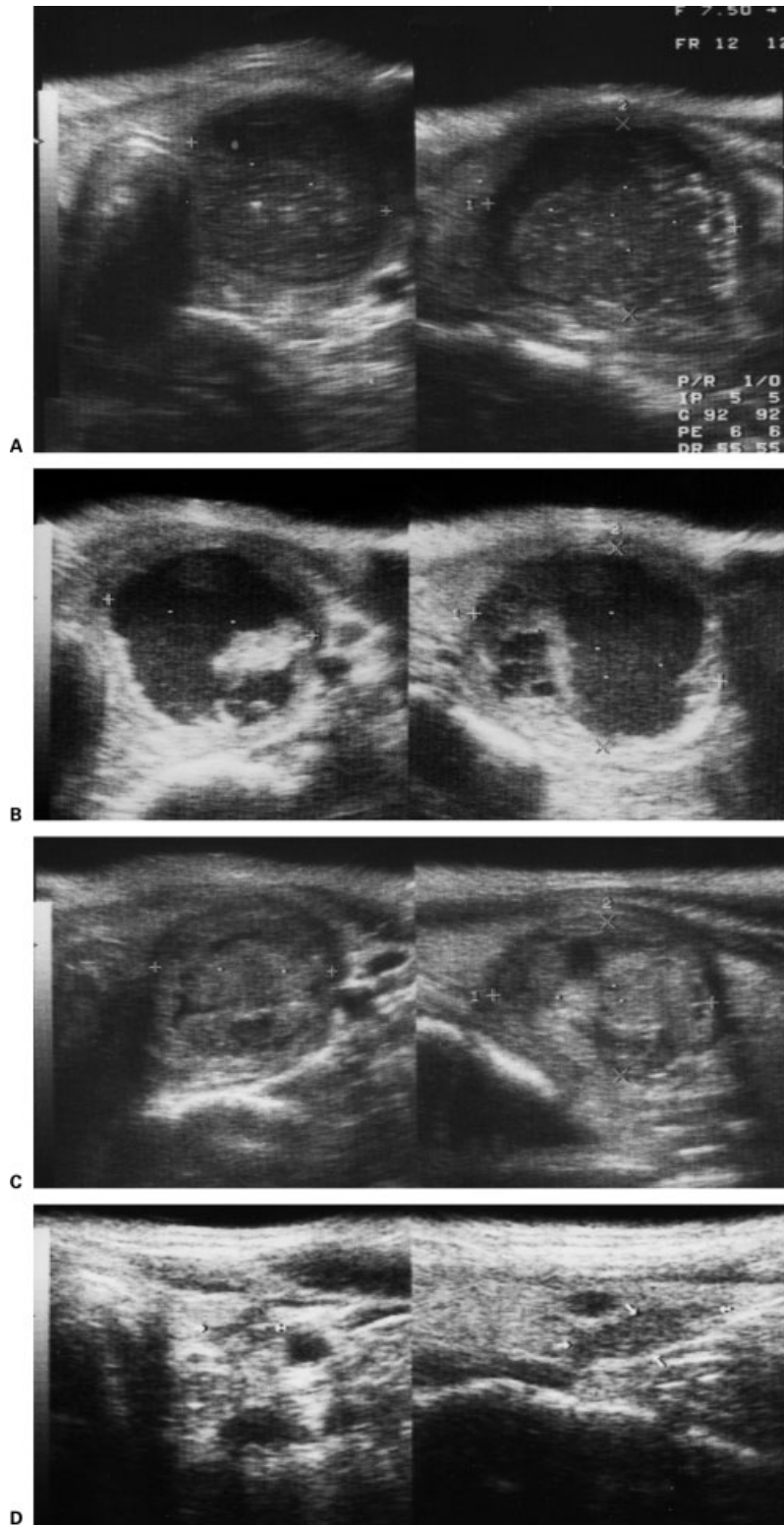


FIGURE 2. Case 2. (A) Transverse (left) and sagittal (right) sonograms of the left thyroid lobe show a complex mass (abscess) measuring $4 \times 3.3 \times 3.2$ cm filled with heterogeneous content (pus) and small hyperechoic inclusions. (B) Transverse (left) and sagittal (right) sonograms obtained 5 days after the initial aspiration. The size of the abscess cavity has not changed ($3.9 \times 3.2 \times 3.1$ cm), but its internal structure has become less heterogenous. (C) Transverse (left) and sagittal (right) sonograms obtained 1 month after treatment. There is almost no cystic component in the nodule (calipers). (D) Transverse (left) and sagittal (right) sonograms obtained 9 months after treatment. In the lower pole of the left lobe there is a small hypoechoic area (1.3×0.5 cm) that corresponds to the resolved abscess.

with a 21-gauge needle commonly used for routine fine needle aspiration biopsy. The widest diameter of the abscesses was 12 cm and 4 cm, respectively. In each case, percutaneous needle drainage was performed twice, though the clinical effect had already been observed after the first procedure. After pus evacuation and rinsing the cavity with 0.02% chlorhexidin gluconate, antibiotics were injected into the abscess cavity. There were no immediate or delayed complications. In both cases, the patients were completely cured with no recurrence during follow-up periods of 6 months and 5 years, respectively.

Sonographically guided percutaneous drainage with a 21-gauge needle followed by instillation of antibiotics into the abscess cavity appears to be an alternative to open or catheter drainage. Recurrent acute suppurative thyroiditis has been reported in a case of persistent pyriform sinus-thyroid fistula.¹⁹ Therefore, long-term sonographic follow-up is recommended. Further investigation is required to confirm the effectiveness of this technique and to better define its indications and contraindications.

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