Subacute thyroiditis presenting with creeping in a 6-year-old boy

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Abstract. Among the types of acute thyroiditis, subacute thyroiditis (SAT) is rare in children, and there is limited knowledge regarding its characteristics in pediatric cases. We present a case of SAT in a 6-yr-old boy who was brought to our hospital with high fever and pain in the front portion of the neck. Acute suppurative thyroiditis (AST), which is common in children, was suspected initially. Tenderness observed in the thyroid corresponded to a hypoechoic region on ultrasonography. The tenderness subsequently shifted to the isthmus, which was evident as a hypoechoic region on ultrasonography. Movement of hypoechoicity is typical of creeping thyroiditis, wherein the pain and tenderness can be unilateral or may start on one side and subsequently shift to the contralateral side after days or even weeks. Based on this characteristic and changes in laboratory parameters, the patient was diagnosed as a case of creeping thyroiditis. Improvement was observed in the patient without the use of anti-inflammatory drugs. At the 2-y follow-up, the patient did not have thyrotoxicosis or relapse. Although AST is more prevalent than SAT in children, ultrasonography findings of creeping thyroiditis may be an important indicator for the diagnosis of SAT in pediatric patients.

Key words: pediatric, subacute thyroiditis, ultrasonography, creeping thyroiditis

Introduction

Subacute thyroiditis (SAT) is thought to be caused by viral infection; however, the condition rarely occurs in children. Moreover, the clinical features of SAT in the pediatric population are not well-understood (1). Creeping thyroiditis, a condition in which pain and tenderness gradually shifts to the opposite lobe of the thyroid gland, is a feature of adult SAT (2, 3). In this report, we present a rare case of SAT in a young boy who experienced unilateral pain in the neck that shifted to the opposite side before resolving spontaneously.

Case Report

A previously healthy 6-yr-old boy with no family history of thyroid disorders presented with a 2-d history of high fever followed by pain in the front portion of the neck. He had mild throat pain that had persisted for a week before presentation.

Physical examination revealed that his body temperature was 38.7ºC. Slight enlargement of the entire thyroid gland and left lobe tenderness were observed. Systemic examination was unremarkable. Laboratory tests showed normal white blood cell count (7,800 cells/μL; neutrophils, 73%) and elevated C-reactive protein (CRP) level (5.2 mg/dL). Thyroid function test revealed normal levels of free thyroxine (fT4) (1.5 ng/dL; normal range: 0.83–1.63 ng/dL) and thyroid stimulating hormone (TSH) (1.89 μU/mL; normal range: 0.38–4.31 μU/mL). Thyroid ultrasonography (US) revealed enlargement of the left lobe with a hypoechoic node (Fig. 1).

Based on physical examination and results of laboratory investigations, a presumptive diagnosis of acute suppurative thyroiditis (AST) was made, and treatment was initiated with tosufloxacin. However, the fever persisted (38.6ºC), and cervical magnetic resonance imaging (MRI) taken on day 3 did not reveal any abscess or pyriform sinus fistula. On day 6, a skin rash appeared on the patient’s stomach, back, and thighs. Under the assumption that this was a drug-related eruption, tosufloxacin was discontinued and cefditoren pivoxil was prescribed. The patient became afebrile on day 7, and the skin rash disappeared a day later (day 8). However,
on day 10, he developed anterior neck erythema, and the
tenderness in the left lobe shifted to the median aspect.
The patient had sensory sensitivity and mild irritability.

Laboratory tests on day 12 revealed a decline in
CRP level (2.4 mg/dL) and TSH suppression (0.13 μU/
ml). Moreover, although the level of fT4 was normal (1.5
ng/dL), and no anti-thyroid antibodies were detected,
the level of thyroglobulin (Tg) was elevated (422 ng/
mL; normal range: 0.0–33.7 ng/mL). US revealed a
new hypoechoic region in the isthmus corresponding
to the tenderness (Fig. 2). WBC count remained in
the normal range during the acute phase (days 2–10).
This information led us to conclude that the moving
tenderness was creeping thyroiditis. Thus, we diagnosed
the patient as a case of SAT. The prevailing physical
status of the patient was good; therefore, we discontinued
antibiotic therapy and continued follow-up without any
additional treatment. The neck erythema resolved on
day 14, and the patient remained afebrile. After 3 wk,
CRP and TSH levels returned to normal. Tg level also
normalized after 3 months, and no hypoechoic region
was noted in the isthmus on follow-up US (Fig. 3). The
patient remained healthy, and thyrotoxicosis or relapse
was not observed two years after the onset. The clinical
course of the acute phase is shown below (Fig. 4).

Discussion

Patients with AST and SAT present with similar
symptoms (fever, anterior cervical pain, thyroid swelling/
tenderness) as well as similar imaging findings, thereby
posing difficulties in distinguishing between the two
conditions (4, 5). However, the two diseases differ
considerably in severity. SAT is a self-limiting disease
that often resolves spontaneously without the use of
anti-inflammatory drugs in mild cases (6). In contrast,
AST, which occurs more frequently in children, can
be fatal, requiring antimicrobial therapy, drainage,
and surgery (7). Delay in the diagnosis of AST can be
dangerous. In one particular case, the initial diagnosis
of SAT was changed to AST after abscess formation,
which necessitated drainage, eventual removal, and
intravenous broad-spectrum antibiotics (8). Thus, it is
prudent to initiate antimicrobial therapy in ambiguous
cases (6, 9), as was done in this case.

At the onset of moving tenderness, erythema

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**Fig. 1.** Ultrasonography (US) showing left lobe enlargement with a hypoechoic region (yellow arrow). The image on the
right is an enlarged view of the left lobe.

**Fig. 2.** Ultrasonography (US) showing a new hypoechoic
region in the isthmus that corresponded to the
tenderness (red arrow), and reduction in the former
hypoechoic region (yellow arrow).

**Fig. 3.** Ultrasonography (US) showing no abnormal
findings. Both hypoechoic regions resolved after
3 mo.
A pediatric case of SAT appeared in the anterior neck region, which is generally suggestive of AST. Although there are no reports of erythema in patients with SAT, it resolved spontaneously a day after discontinuation of antimicrobial therapy, which does not support the finding of AST. In addition, cervical MRI taken on day 3 did not reveal any abscess or pyriform sinus fistula. US findings of AST are usually unifocal, while the spread to multiple lobes is characteristic of SAT (5). Thus, we judged the US findings to be consistent with that of SAT.

We diagnosed this patient as a case of SAT considering the painful goiter swelling, hypoechoic area within the thyroid consistent with the tenderness, elevated CRP level, moving tenderness, thyrotoxicosis, and antecedent upper airway symptoms. Usually, suppressed TSH and elevated fT4 levels are observed in thyrotoxicosis; however, fT4 level was normal in the present case. The American Thyroid Association Guidelines for Diagnosis and Management of Hyperthyroidism and Other Causes of Thyrotoxicosis states that SAT is associated with mild thyrotoxicosis and elevated fT4 level may or may not be observed (10).

Another method to distinguish between AST and SAT was outlined by Ogawa et al., who suggested that the features of AST include leukocytosis and the absence of thyrotoxicosis (1). We diagnosed our patient as a case of SAT considering the absence of leukocytosis and the presence of mild thyrotoxicosis.

A study reported that 15.4% of the adult patients with SAT had findings of creeping thyroiditis (3). To the best of our knowledge, there are no reports of creeping thyroiditis in pediatric patients with SAT; therefore, the present case may be considered rare. Although there is no significant difference in the symptoms of SAT between adults and children (1), a possible reason why creeping thyroiditis is rarely reported in children may be that they cannot accurately describe changes in the location of tenderness in the thyroid gland due to fever and/or sore throat. Therefore, repeated US is considered an important objective indicator for diagnosis.

This report has some limitations. First, the causative virus of SAT was not identified. Second, we cannot conclusively state that all cases of childhood SAT would show the same symptoms as those observed in this patient. The incidence of SAT in children remains unclear, and further studies are required to identify the incidence and clinical features of SAT in the pediatric population.

**Conclusion**

In conclusion, although AST with pyriform sinus fistula is more common in children than SAT, moving tenderness and corresponding US findings may provide useful information for the diagnosis of SAT in the pediatric population. Thus, we suggest that careful physical examination of the neck and repeated thyroid US should be performed to identify creeping thyroiditis, which is one of the features of SAT.

**Declaration of conflict of interests:** None of the authors have any potential conflicts of interest to declare that are relevant to this report.

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