

Case Report

Effective Treatment of Thyroglossal Duct Cysts in Young Children with OK-432 : Three Case Reports and a Literature Review

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ABSTRACT

Thyroglossal duct cysts are the most common type of congenital neck cyst. They typically require treatment for cosmesis, infection, and malignant potential. Although the Sistrunk operation is considered the standard treatment, it can give rise to complications. OK-432, which was originally developed as an immunotherapeutic agent, is effective for lymphangiomas, cervical lymphoceles, and ranulae, and its use has been reported in the treatment of thyroglossal duct cysts. Thus far, however, there are no reports of effective treatment in young children. Here, we report effective sclerotherapy with OK-432 for thyroglossal duct cysts in three young children and review the relevant literature. Our study is the first report of sclerotherapy for thyroglossal duct cysts in young children. When managing thyroglossal duct cysts, sclerotherapy with OK-432 has cosmetic value and could be an alternative therapy. (Jikeikai Med J 2015 ; 62 : 41-4)

Key words : OK432, thyroglossal duct cyst, sclerotherapy

INTRODUCTION

Thyroglossal duct cysts comprise approximately 70% of congenital abnormalities in the anterior midline of the neck, and occur in approximately 7% of the population^{1,2}. The thyroid analog embryologically arises from the foramen cecum and descends, reaching its final position during weeks 7 to 8 of development¹. The thyroglossal duct remnant is then obliterated or develops into a cyst, duct, or ectopic tissue¹. Most patients with thyroglossal duct cysts require treatment for cosmesis, infection, and malignant potential². The Sistrunk operation is the standard treatment, but it can cause complications (9-12%), cyst recurrence (1-5%), wound infection, and cosmesis¹⁻⁴.

OK-432 (Picibanil ; Chugai Pharmaceutical Co., Tokyo, Japan) was originally developed as an immunothera-

peutic agent⁵. The immunopotentiating actions of picibanil are believed to be caused by its ability to induce severe local inflammatory response that promotes the release of various cytokines^{4,5}. It is effective in the treatment of lymphangiomas, cervical lymphoceles, and ranulae^{3,4}. However, only four reports were found on the clinical outcomes of this therapy ; of these^{3,4,6}, one report involved a child², but none included the management of thyroglossal duct cysts in young children. Here, we report three cases of young children with thyroglossal duct cysts that were effectively treated with OK-432 sclerotherapy and provide a review of the literature.

METHODS

We reviewed the medical records of three patients

Received for publication, December 20, 2014

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treated at the Jikei University Kashiwa Hospital in Chiba, Japan, from 2013 November to 2014 December. Patient age ranged from 12 to 31 months, and all patients were male. We observed all patients for 8 to 13 months after the first injection. We followed up on the thyroglossal duct cysts by ultrasound (US). One month after the injection, we evaluated the effect of the sclerotherapy. Total shrinkage, marked shrinkage, and partial reduction were defined as complete absence, a decrease of more than half, and a decrease of less than half compared with the pretreatment size as determined clinically or by US.

A comprehensive literature search was performed using PubMed® in English.

OK-432 sclerotherapy

We aspirated as much fluid from the cyst as possible using US-guided aspiration and a 23-G needle. Either general anesthesia or no anesthesia was used. For the first sclerotherapy treatment, all patients received 0.5 Klinische Einheit (KE)/clinical unit of OK-432 (Picibanil; Chugai Pharmaceutical Co.) diluted with saline solution to a concentration of 0.1 to 0.5 KE/ml (0.01-0.05 mg/ml) injected directly into the cysts. We decided on the concentration by the volume of tumor. For the second injection, we injected 0.75 KE.

CLINICAL CASE

CASE 1

A boy aged 2 years, 7 months presented to our department with an enlarged midline neck mass and a ranula. The patient was diagnosed with Costello syndrome.

Computed tomography (CT) showed a well-defined, 3 cm non-calcified mass and a thin-walled cyst with low-density content (Fig. 1). The tumor was in contact with the hyoid bone (Fig. 1). US revealed a thin-walled cyst with low attenuating contents. The midline neck mass was diagnosed as a thyroglossal duct cyst. Although we recommended the Sistrunk operation for the neck mass, the patient's family did not consent. Thus, we opted to perform OK-432 sclerotherapy for both the thyroglossal duct cyst and the ranula. Under general anesthesia, simple aspiration was performed with US guidance, and 0.5 ml of mucoid material was removed. We injected 5 ml of OK-432 (0.5 KE) into the cyst. The ranula was treated in the same

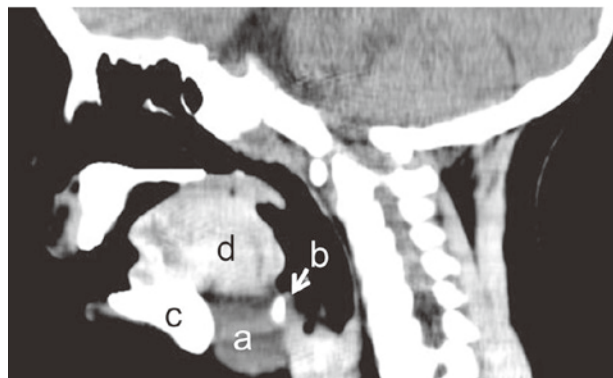


Fig. 1. Sagittal computed tomography head scan demonstrates a cystic mass, measuring 3×4×3 cm, in the anterior midline of the neck. The mass is surrounded by the hyoid bone, mandible bone, and tongue. (a ; mass, b ; hyoid bone, c ; mandible bone, d ; tongue)

way. After 1 week, the neck mass had completely resolved without serious complication. At the 13-month follow-up assessment by US, there were no signs of recurrence or inflammation.

CASE 2

A 1-year-old boy was referred to our department with a congenital midline neck mass. The patient had no other medical history. US revealed a 3 cm thin-walled cyst, with low attenuating contents, which was diagnosed as a thyroglossal duct cyst. Because his family did not consent to operative correction, we decided to perform outpatient sclerotherapy without anesthesia. A simple US-guided aspiration was performed, 0.2 ml of mucoid material was removed, and we injected 2.5 ml of OK-432 (0.5 KE). He experienced local pain without serious complication. No signs of recurrence or inflammation were detected at the 11-month follow-up assessment by US.

CASE 3

A boy aged 1 year, 4 months presented to our hospital with a congenital midline cervical mass. The patient had no other medical history. US revealed a 1.5 cm thin-walled cyst with low attenuating contents that was diagnosed as a thyroglossal duct cyst. As per his family's preference, we performed sclerotherapy without hospitalization. Simple US-guided aspiration was performed without anesthesia, and 0.1 ml of mucoid material was removed before injecting 1 ml of OK-432 (0.5 KE). After the injec-

Table 1. Treatment of Thyroglossal Duct Cysts by OK-432

	Cases	Age	Total shrinkage	Marked reduction	Partial reduction	No response	Follow up	Year	Reference
Kim MG	11	not shown	5(45.5%)	0	4(36.4%)	2(18.2%)	not shown	2008	6
Ohta N	15	not shown	12(80%)	1(7%)	1(7%)	1(7%)	14.8(7-46)	2010	4
Ohta N	17	36.4 Y(24-69Y)	14(82%)	1(7%)	1(7%)	1(7%)	14.8 M(4-46 M)	2012	3
Kim M	1	8Y	0(0%)	0	0	1(100%)	5M	2012	2
Tanaka K	3	20M(12M-31M)	2(67%)	1(33%)	0	0	8-13M	Recent	

tion, he had no clinical symptoms, but a 5 mm mass remained at his 4-month follow-up assessment. We re-injected 1.5 ml of OK-432 (0.75KE), but a 2 mm mass remained in his neck 4 months after re-injection.

All of the families opted against the Sistrunk operation so as to avoid a wide wound in the neck.

DISCUSSION

OK-432 is a lyophilized streptococcal preparation made from the (Su) strain group A *Streptococcus pyogenes* incubated with penicillin^{3,5}. Originally developed as an immunotherapeutic agent for cancer, OK-432 therapy is also effective for lymphangiomas, branchial cleft cysts, salivary mucoceles, auricular hematomas, thyroid cysts, cervical lymphoceles, and ranulae^{3,4}. The mechanism underlying the effectiveness of OK-432 sclerotherapy is the strong production of interleukin (IL)-6, IL-8, interferon- γ , tumor necrosis factor- α , and other inflammatory mediators^{3,4}. These cytokines induce strong local inflammatory reactions in the cyst wall resulting in fluid drainage, shrinkage, and fibrosis^{3,4}.

We identified only four reports of thyroglossal duct cysts that were treated with OK-432 sclerotherapy (Table 1)^{2-4,6}. Previous studies have reported cure rates of 46 to 89% (total shrinkage and marked reduction)^{3,4,6}. Our study is the first to describe the use of this agent in young children. We report that there were no serious complications, other than minor fever for a few days post-injection, and that all cases were cured at follow-up. Long-term follow-up is needed to completely evaluate the use of sclerotherapy in young children.

Ohta et al. have described the benefits of OK-432 therapy as follows: 1) no hospitalization; 2) short procedure time; 3) painless and does not require anesthesia;

4) cosmetically superior to surgery; and 5) fewer complications^{3,4}. For pediatric patients, wound care, operative pain, and hospitalization are important problems. We recommend the use of sclerotherapy as a possible alternative therapy for thyroglossal duct cysts in children for which the Sistrunk operation or hospitalization has been refused. Kim et al. reported that fibrotic changes with adhesion around the duct necessitated a wider removal of soft tissue than usual in the Sistrunk procedure after sclerotherapy². It is thus necessary to consider the risk of the operation after sclerotherapy.

Thyroglossal duct cysts are associated with malignancy with an incidence of approximately 1%, with over 200 cases reported^{2,3}. Although extremely rare, the possibility should be considered. Therefore, long-term follow-up is necessary after sclerotherapy.

Authors have no conflicts of interest.

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