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NONSPECIFIC GRANULOMA OF THE LARYNX

Clinical analysis and malignant transformation

Masaki Katoh* and Hirohide Yoshioka**

I. Introduction

Among nonspecific granulomas of the larynx there are such typical entities as contact granuloma, intubation granuloma and granuloma secondary to gastroesophageal reflux. The clinical entity of contact granuloma was first identified by Chevalier Jackson[1], and its primary etiology is vocal abuse. Histologically, it sometimes belongs to the group of angiomas, but it is not a neoplasm.

During the period of September 1975 to March 1983, 15 patients with contact granulomas were seen at the Department of Otolaryngology, Tokyo University Hospital. One purpose of this paper is to review the clinical records of these patients, and try to explain some of the clinical features. Another purpose is to report on one rare case, in which malignant disease later occurred.

II. Materials and methods

We reviewed the clinical records of 16 patients with contact granuloma, and, if needed, we sent follow-up questionnaires. Among these, one patient got well by the local injection of steroids, and there was one case in which malignant disease occurred subsequently. The rest of the 14 cases were diagnosed on the bases of history, laryngoscopic findings and histological examination. We then analyzed the clinical characteristics of these 14 cases.

III Results

< Age and sex >

As shown in Fig. 1, the sex distribution was males 11 and females 3. Thus, predominantly males suffer this disease. The patient's age ranged from 32 to 62, and there were no cases among younger age groups.

< Location and affected site >

In most cases, the granulomas were located not just at the level of the glottis, but a little caudal or rostral to the

*Jichi Medical School
**National Medical Center Hospital

glottis near the vocal process of the arytenoid cartilage. As shown in Fig. 2, in 9 cases the affected side was the right, and in 4 cases, the left. In 1 case, a granuloma was on the right side, but after 2 operations, it recurred in the left side.

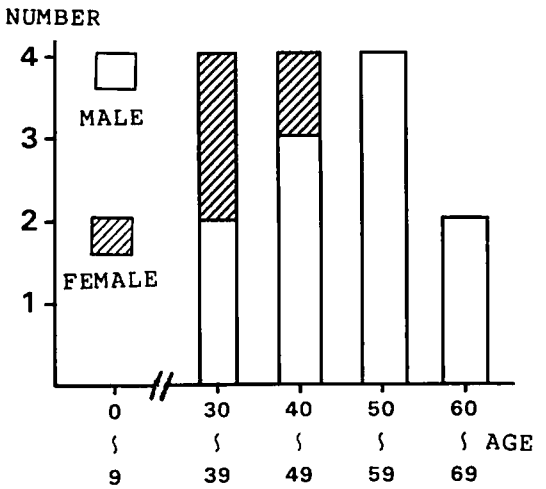

Fig. 1 Age and sex distributions.

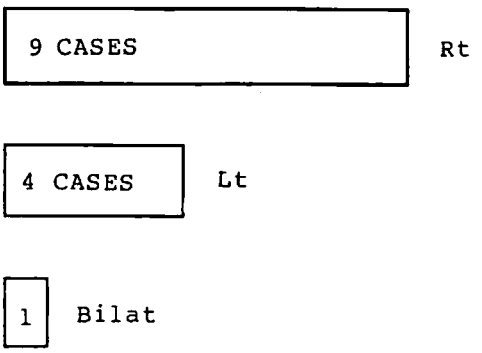

Fig. 2 Affected side(s).

< Symptoms >

Table 1 shows the patients' symptoms. All patients complained of hoarseness; four of abnormal sensations in the larynx; and two of sudden interruption of phonation during conversation.

Hoarse Voice	14
Difficulty in Speaking	1
Poor High Pitched Voice	1
Foreign Body Sensation	2
Difficulty in Swallow	1
Frequent Cough	1
Bloody Sputum	1

Table 1 Symptoms (14 cases).

Tuberculosis	0
Syphilis	0
Heavy Smoking	2
Vocal Abuse	8
Habit of Clearing Throat	4
Chronic Pharyngitis	5

Table 2 Past history and related matters (14 cases).

< Etiology >

Table 2 shows the history of the patients and other items related directly or indirectly to the contact granulomas. In 8 cases, the patients received many customers or spoke to many people on the telephone. In 4 cases, the patients coughed and cleared their throat excessively. However, in 2 cases, there were no etiologic factors behind the vocal abuse.

< Treatment and results>

Table 3 shows the type of surgery performed initially to treat each patient. All 14 patients underwent surgery. In 8 patients, endolaryngeal microsurgery under general anesthesia was done to remove the granuloma. In 4 cases, the granulomas were removed with a direct laryngoscope, and in 2, with a laryngeal mirror, both under local anesthesia. If the granuloma recurred, we repeated the surgery. Fig. 3 shows how many times we repeated surgery in each case, and the average was 2.6 times. Among the 14 cases, 9 experienced a recurrence. The highest number of recurrences was 8. Fig. 3 also shows 3 cases which experienced frequent recurrence.

Surgical Method		F	R	C	C/R
Endolaryngeal Microsurgery (general anaesthesia)	Cup Forceps only	4	5	3	3/5
	& Laser	3	8	5	5/8
	& Electrocoagu.	1	1	1	1/1
Endolaryngeal Surgery (local anaesthesia)	Cup Forceps only	4	7	0	0/7
	& Electrocoagu.	0	5	2	2/5
Under Indirect Laryngoscopy (local anaesthesia)	Cup Forceps only	2	11	3	3/11

Table 3 Surgical methods, number of first choices, number of repetitions, number of cured cases, and success rates.

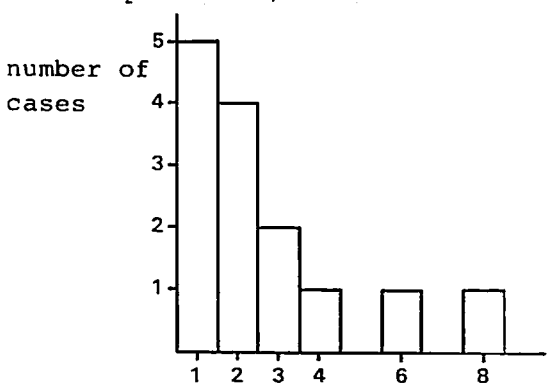

Fig. 3 Number of repetitions of surgery.

Table 3 shows the success rate for each type of surgery, calculated as follows;

$$\text{Success rate} = \frac{\text{the number of times cured}}{\text{the number of times surgery performed}}$$

According to this table, it is concluded that endolaryngeal microsurgery under general anesthesia is a little better than the other two.

< Case report >

A 57-year-old male was first seen in December 9, 1982 with the chief complaint of a hoarseness of 3 months' duration. He could recall nothing particular related to the onset of his hoarseness. The larynx showed a wide based white-gray mass with a smooth surface on the posterior portion of the left vocal cord. This was removed in January 1983 under endolaryngeal microsurgery, and its pathological diagnosis was granulation-like tissue and squamous epithelium without atypy.

Photo 1 Endolaryngeal microscopic view. Note the irregular masses on the left false cord.

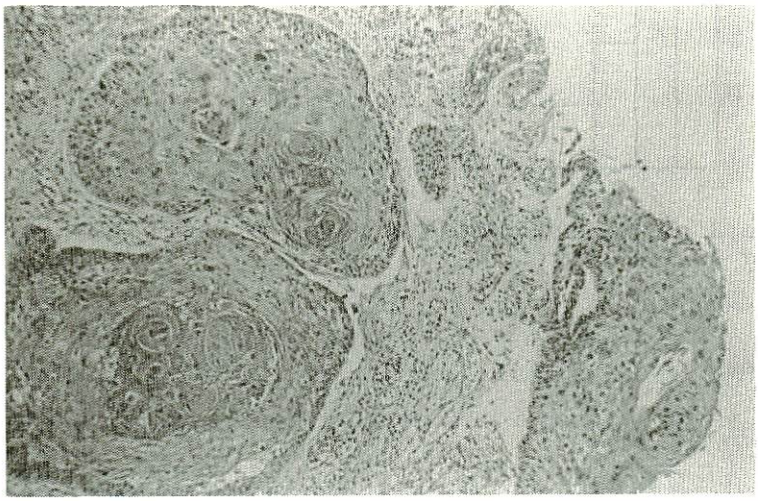

Photo 2 Microscopic findings. Note the pearl formations.

Six months after surgery, a granular mass recurred on the same site. Three months later, there appeared a widely based mass with a smooth surface on the middle surface of the left false cord. Endolaryngeal microsurgery was done again in October, 1983. These masses had irregular surfaces, and between them, there was an irregular mucosa (Photo 1). Pathological diagnosis of the masses and the mucosa between them revealed squamous cell carcinoma (Photo 2). Thus, the patient was referred to radiation therapy, and 50.5 Gy was irradiated. Since then there has been no sign of recurrence thus far.

IV Discussion

Granuloma of the larynx can be classified into two major groups: specific and nonspecific. The latter includes the following entities; intubation granuloma, growing after endotracheal intubation; postoperative granuloma, growing after surgery of the larynx; granuloma secondary to gastroesophageal reflux; and contact granuloma, whose main etiology is vocal abuse. This paper deals with contact granuloma.

Age	Sex M	F	Total
0 - 19	0	0	0
20 - 29	2	0	2
30 - 39	25	6	31
40 - 49	56	9	65
50 - 59	49	0	49
60 - 69	18	0	18
70 - 79	3	0	3
80 -	0	0	0
Total	153	15	168

Table 4 Statistics of age distribution.

		Side			Sex		
		Rt	Lt	Bil	M	F	Total
Imperatori	1933	0	1	0	1	0	1
Jackson & Jackson	1935	1	7	2	9	1	10
Woodruff	1936	0	1	1	1	0	1
New et al.	1949	---39---		5	44	0	44
Baker	1954	1	0	0	1	0	1
Holinger et al.	1960	26	35	31	84	8	92
Cherry et al.	1968	1	1	1	3	0	3
Hirano	1975	---14---		3			17
Ichimura	1976	7	2	0	7	2	9
Ward	1980	1	0	0	1	0	1
Bloch	1981				17	0	17
Kobayashi	1982	1	1	1	3	0	3
Iwamura	1982	3	5	0	7	1	8
Katoh	1985	9	4	1	11	3	14
Total		50	57	44	189	15	221

Table 5 Statistics of sex and affected side distribution.

1) Sex, age, and affected side

We examined papers and collected cases of nonspecific granulomas, except for intubation granulomas and granulomas secondary to gastroesophageal reflux. The total number of cases with sufficient description was 221 (Table 4, 5). The number of male cases was 189, and of females was 15. Thus, predominantly males suffer this disease. This high incidence in males has been attributed to loudness, low pitch, harsh voice and vocal abuse in occupation. The patients ranged in age from 28 to 74 years. Only two patients were under 30 years of age; 65 were between 40 and 49, and 49 were between 30 and 39.

The location of the granulomas were on the right side in 50, on the left side in 57 and on both sides in 44 patients. The number of bilateral cases was especially large in Holinger's data. As for the unilateral cases, the number of right-sided cases was almost the same as the number of left-sided cases.

2) Etiology

The clinical entity of contact granuloma was first identified by Chevalier Jackson[1] in 1928. It's main cause was vocal abuse. During phonation, both vocal processes hit each other at the midline, causing an ulcer at the surface of the vocal process. Then granulation tissue grows excessively to form contact with ulcer granuloma (hammer and anvil theory). Peroni,[5] in 1933, through pathologic examination at autopsy of two cases with contact ulcer, found the vocal process of the arytenoid cartilage protruded in the bed of ulcers with superficial necrosis. He infered that necrosis of the cartilages was produced by the trauma during each phonatory act, and this explains the perpetuation and chronicity of the disease. Kirchner,[4] in 1975, reported that by cauterizing the arytenoid cartilage of dogs, he succeeded in causing granuloma.

Vocal abuse not only indicates quantity of speech but also quality of voice, and moreover, involves nonlingual functions of the vocal cords, such as coughing or clearing of the throat. Von Leden,[7] in 1960, listed the following factors, which contribute to the origin and the development of contact ulcers.

A. Anatomical configuration
B. Physiological circumstances

a) Phonation
   1. Low frequency
   2. Loudness
   3. Harsh guttural sounds

b) Nonlinguistic phenomena
   recurrent cough
   persistent clearing of the throat

Peacher,[8] in 1961, wrote that cases of vocal abuse include the following: glottal plosive attacks, pitch lower than normal, poor breath control, excessive throat clearing or coughing and overuse of the voice. Moreover, he noted that emotional tension has a relation to the cause of contact ulcers, and that patients commonly have a history of emotionally changed conditions. In our cases, 12 patients had histories of vocal abuse, but in two cases we could not find any such factors.

3) Symptoms and findings

We believe that there are two typical symptoms in our cases of contact granuloma. The first one is that all cases complained of hoarseness, but the degree was rather mild compared to the size of the granulomas.

The second one is that many complained that they sometimes felt their voice stop suddenly during phonation. Upon close questioning, this symptom turns out to be a relatively common one. We think that the cause behind of these two symptoms can be explained by the location of the mass. The location of the mass is not just at the level of the glottis, but a little oral or caudal to. According to Peroni[5]'s report, the granuloma is doughnut shaped, and there is no granulation tissue on the vocal process. Then, at a relatively late stage, the mass reaches the glottis and interferes with the vibration of the vocal cords. The second symptom noted above may be caused by the movement of the mass, because it does not exist at the level of the glottis. These findings and other diagnoses have been described also by previous authors.

4) Treatment

If the main cause of this disease is faulty vocal habits, the first treatment should be their elimination. Surgical treatment is thought to be unpromising since these lesions have a strong tendency to recur. Since the report of Peacher and Holinger[1] suggesting the effectiveness of vocal rehabilitation, there are many authors who report excellent results with this mode of treatment. In Japan, because there are few professional voice therapists, and because of different social and medical condition, we find it difficult to treat patients with complete voice therapy instead of surgery. We usually indicate patients to eliminate faulty vocal habit such as coughing and throat clearing to avoid vocal abuse, but all we offer now is make a brief suggestion.

For treatment, and also for pathological diagnosis, we usually resect all cases. Recently, we resect contact granuloma by microsurgery under general anesthesia. If it recurs, we resect again at intervals of more than half a year.

5) Malignant transformation

Contact granuloma of the larynx is caused by inflammation and is not a kind of neoplasma. In some cases, contact granulomas do not recur, but after all our results only prove again that surgical treatment is disappointing because of the strong tendency to recurrence.

As far as we know, there are two papers reporting cases subsequently growing a malignancy. In 1935, Jackson C. reviewed 254 cases. He wrote that malignant disease occurred subsequently in 2 cases and is thus rare. In 1961, Peacher reviewed 70 cases, and among them, one developed malignancy under the vocal cords opposite the site of the ulcer 9 years after vocal therapy. Previously, the patient had had a vocal nodule.

In our case of a malignant transformation, we first of all made our diagnosis by physical and pathological examinations. 9 months later, the malignancy was determined. There were no cancer cells in the specimen resected at the first operation. And the location where the mass recurred first was just the same as that of the previous granuloma. In this connection, as far as we know, ours is the first paper presenting a case of malignant transformation.

References

1. Jackson, C.: Contact ulcer of the larynx. Ann. Otol. Rhinol. Laryngol., 37: 227-230, 1928.
2. Kleinsasser, O.: Microlaryngoscopy and endolaryngeal microsurgery. English translation by Hoffman, Saunders, Philadelphia, 1968.
3. Ichimura, K.: Nonspecific granuloma of the larynx. J. Jpn. Broncho. Esophageal. Soc., 27: 420-426, 1976.
4. Holinger, P.H. and Johnston, K.C.: Contact ulcer of the larynx. JAMA, 172: 511-515, 1960.
5. Peroni, A.: Contact ulcer of the larynx. Pathological observations. Arch. Otolaryngol., 17: 741-746, 1933.
6. Kirchner, J.: Experimental granuloma of the larynx. Ann. Otol. Rhinol. Laryngol., 84: 776-780, 1975.
7. Von Leden, H. and Moore, P.: Contact ulcer of the larynx. Experimental observations. Arch. Otolaryngol., 72: 746-752, 1960.
8. Peacher, G.: Vocal therapy for contact ulcer of the larynx. A follow-up of 70 patients. Laryngoscope, 71: 37-47, 1961.
9. Bloch, C. et al.: Effect of voice therapy on contact granuloma of the vocal fold. Ann. Otol. Rhinol. Laryngol., 90: 48-52, 1981.
10. Imperatori, C.L.: Contact ulcer of the larynx. Report of a case. Laryngoscope, 43: 933-939, 1933.
11. Jackson, C. and Jackson C.L.: Contact ulcer of the larynx. Arch. Otolaryngol., 22: 1-15, 1935.
12. Woodruff, G.H.: Contact ulcer of the larynx. JAMA, 106: 1562, 1936.

13. New, G.B. and Devine K.D.: Contact ulcer granuloma. Ann. Otol. Rhinol. Laryngol., 58: 548-558.
14. Baker, D.C.Jr.: Contact ulcers of the larynx. Laryngoscope, 64: 73-78, 1954.
15. Cherry, J. and Margenlies, S.I.: Contact ulcer of the larynx. Laryngoscope, 73: 1937-1940, 1968.
16. Hirano, M.: Phonosurgery: Basic and clinical investigations. Otologia (Fukuoka), Suppl. 1, 1975.
17. Ward, P. et al.: Contact ulcers and granulomas of the larynx; new insights into their etiology as a basis for more rational treatment. Otolaryngol. Head Neck Surg., 88: 262-269, 1980.
18. Kobayashi, H. et al.: Nonspecific granuloma on the posterior of vocal fold. Otologia (Fukuoka), 28: 1114-1120, 1982.
19. Iwamura, S. et al.: Nonspecific granuloma; its etiology and therapy. Otologia (Fukuoka), 29: 776-782, 1983.