

# Use of cervical ultrasonography in globus sensation investigation: a retrospective cohort study

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July 2, 2020

## Abstract

**Objective:** A globus sensation is one of the most common complaints in otolaryngological practice. Patients with no associated abnormalities detected during the usual examinations performed in ENT clinics, are being diagnosed with globus sensation. Cervical ultrasonography is usually not performed in ENT clinics; however, it is useful in screening diseases of the subcutaneous tissue/organs, whose detection is not possible with the routine ENT examinations. The purpose of our study was to elucidate whether cervical ultrasound examination identifies abnormalities in patients with globus sensation. **Design:** A single-centre retrospective cohort study. Cervical ultrasonographic examinations were performed on patients with globus sensation from January 2013 to September 2017. **Setting:** Department of Otolaryngology of Tottori university hospital, a tertiary care centre. **Participants:** The subjects were 74 patients (42 women and 32 men) experiencing globus sensation with no abnormality detected on general otolaryngological examination (including laryngoscopy). The mean age was 58.4 years. **Main outcomes:** The primary outcome measure was the percentage of patients with globus sensation who have structural abnormalities detected by cervical ultrasonography. **Results:** Ultrasonography detected structural abnormalities in 60.8% of the patients with globus sensation: thyroid disorders in 41 patients, including: 35 patients with thyroid nodules, 4 patients with Hashimoto's disease, 1 patient with Grave's disease, and 1 patient with subacute thyroiditis; Sjögren syndrome in 2 patients; and cervical lipoma in 1 patient. Furthermore, 2 patients with thyroid disorders had concomitant oesophageal cancer. **Conclusions:** Cervical ultrasonography identified thyroid disorders in patients with globus sensation, despite the normal ENT status. Therefore, it would be appropriate to adopt cervical ultrasonography as a routine examination at ENT clinics for patients with globus sensation.

## *Ethical Considerations:*

All followed procedures were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions. The ethical committee and the institutional review board of [removed for blind peer review] approved the study protocol. The requirement for written informed consent was waived due to the retrospective nature of the study. On the other hand, we provided the patients an opportunity to opt out.

## Introduction

Globus sensation is a common complaint, accounting for 3% to 4% of new otolaryngology outpatient referrals [1]. The patients complain of a 'feeling of a lump, foreign body, or tightness in their throat'; however, routine ENT examinations reveal no abnormal findings [2].

It was Purcell who first described the symptom, coining the term 'globus hystericus' in 1707 [3]. Initially, globus sensation was thought to be caused by psychological or emotional factors, and therefore, the pati-

ents with globus sensation were referred to psychiatrists. However, the introduction of medical technology innovations, such as rigid endoscopy and X-rays, made feasible the examination of organic disorders causing globus sensation [2, 4].

In 1968, ‘globus hystericus’ was replaced with the term ‘globus pharyngeus’ [2]. Malcomson et al. [2] claimed that gastropharyngeal reflux disease was one of the causative disorders of globus sensation. The definition of globus sensation has been changing depending on medical technology used in routine care. Many studies investigated the correlation between gastropharyngeal reflux disease and globus sensation, using video fluorography and pH monitoring devices [5-8]. Nowadays, we can use a flexible fiberscope for general examination. For further examination, we can perform upper gastrointestinal endoscopy, video-fluorography, and computed tomography.

At present, while the mucosal lumen of the oral cavity, pharynx, and larynx can be investigated in detail during the routine ENT examination, the subcutaneous tissues and organs are investigated only by manipulation. Therefore, the screening for diseases of the thyroid, salivary glands, blood vessels, mesenchymal tissue (tumours and cysts) and other subcutaneous organs and tissues, is insufficient.

Ultrasonography has been developing dramatically, and is widely used in recent years. It is non-invasive, and it can provide real-time fine imaging of the inside body. Cervical ultrasonography can screen thyroid, salivary gland, and lymph node diseases, and tumours in the head and neck region. In tertiary care centres, cervical ultrasonography is performed as a routine examination for detection of thyroid diseases and metastatic lymph nodes in head and neck malignancies. However, in most ENT outpatient clinics, cervical ultrasonography is not regularly used.

Therefore, our objective was to examine whether cervical ultrasonography reveals abnormal findings in patients with globus sensation, whom we often encounter in ENT clinics, and to elucidate the usefulness of cervical ultrasonography in ENT clinics.

## Materials and Methods

### *2.1 Study design and inclusion criteria*

We retrospectively reviewed 84 consecutive patients who visited our department between January 2013 and September 2017, with complaints of globus sensation and no abnormality revealed through routine ENT examination. Patients with obvious causes of globus sensation, such as pharyngeal inflammation, postnasal drips, and oedematous changes in the pharyngeal mucosa due to laryngopharyngo reflux, were excluded. The routine ENT examinations were defined as visualization, manipulation, inquiry, indirect laryngoscopy, flexible laryngoscopy, and X-ray. Patients with globus sensation who had received irradiation therapy for cervical carcinoma or underwent neck surgery were excluded (Figure 1).

The patients had various chief complaints of the pharyngolaryngeal discomfort, classified into five groups: pain, cough, sensation of dyspnoea, a lump in the throat, and other complaints. Additionally, the chief complaints of the patients who had abnormalities revealed via ultrasonography were also addressed in this study.

### *2.1 Ultrasonographic examination*

Cervical ultrasonography was performed on 74 patients with globus symptom. We used the ACUSON S2000 ultrasound system (Siemens Healthineers, Mountain View, CA) with linear transducer. The patients underwent a detailed ultrasound scan of the neck, including the thyroid, lymph node, parotid glands, and submandibular glands. In cases where a tumour was detected, fine needle aspiration cytology for tumour diagnosis was performed, as necessary.

## Results

The 74 subjects consisted of 32 men and 42 women. Seven of them had psychiatric disorders. The mean age of the subjects was 58.4 years (range: 22-83 years).

Abnormal ultrasonographic findings were detected in 45 patients (60.8%). Thyroid disorders were revealed in 42 patients (56.8%), salivary gland disorders in 2 patients (3%), and lipoma was in 1 patient (1%) (Figure 2).

The patients with thyroid disorders consisted of 6 patients with diffuse lesions and 35 patients with nodular lesions. The diffuse lesions were a result of Hashimoto's disease in four cases, and of Grave's disease and subacute thyroiditis in one case each. The nodular lesions were diagnosed as adenomatous goitre in 20 cases, cyst in 9 cases, thyroid carcinoma in 2 cases, and 4 cases included small nodules with negative cytology results. One patient with adenomatous goitre also had parathyroid adenoma (Table 1).

Two patients with Hashimoto's disease, one patient who had saliva pooling in the hypopharynx, and the other who had a swelling of the cervical oesophageal mucosa found by ultrasonography, underwent follow-up examination. They were diagnosed with thoracic oesophageal cancer and cervical oesophageal, respectively, using upper oesophagogastrroduodenoscopy.

In addition, there was no correlation between the chief complaints and the abnormal ultrasonographic findings (Table 2).

## Discussion

### 4.1 Synopsis of key findings

Ultrasonography revealed abnormal findings in 60.8% of the patients, including patients with thyroid disorders. Thyroid nodules were detected in 47.3% of the patients with globus sensation, which is a proof of the superiority of ultrasonography examination. Only a few patients were diagnosed with salivary gland disease (Sjögren syndrome in all cases). We detected a hardly palpable lipoma, and two cases of oesophageal cancer that were confirmed using additional upper gastrointestinal endoscopy (one was distal oesophageal cancer, and the other was cervical oesophageal cancer). Psychiatric disorders have been thought to be a major cause of globus sensation; however, patients with psychiatric disorders accounted for only a small proportion of the subjects in this study (0.09%).

However, the mechanism through which thyroid diseases cause globus sensation has been unclear.

### 4.2 Comparisons with other studies

Some authors have reported that thyroid disease could cause globus sensation depending on thyroid size and the thyroid nodule location in the thyroid [9-12]. Others have reported that enlarged thyroid gland caused by Grave's disease or Hashimoto's disease could cause dysphagia or dyspnoea [13,14]. In our study, thyroid nodules were detected in 47.3% of the patients, showing a higher incidence rate of nodules than in the screening examination performed in 2010 in Japan (6.9– 31.6%) [15]. Marshall et al. [16] estimated the patients with globus sensation using thyroid ultrasonography, and reported a higher incidence of thyroid abnormalities in patients with globus sensation (72.1%), than in controls (33.3%). Their study only involved thyroid ultrasonography, whereas we estimated the entire neck. Only a few patients were diagnosed with salivary gland diseases (Sjögren syndrome in both cases). The suspected reason is that patients with salivary gland diseases are difficult to classify as cases of globus sensation, because of their own clinical appearance. However, there is a report that slight abnormal ultrasonographic findings of the salivary gland indicate the initial stage of autoimmune sialadenitis, and the possibility of autoimmune sialadenitis in patients not diagnosed with salivary gland disease is also not excluded [17].

Finally, many earlier reports have confirmed that cervical oesophageal cancers and postcricoid cancers can be detected using cervical ultrasonography [18, 19, 20].

### 4.3 Strengths and limitations of the study

The main ultrasonographic examination findings in patients with globus sensation were thyroid disorders. However, there were a few patients that had serious diseases, namely oesophageal cancer and Sjögren syndrome, whose early detection is advantageous for the patients. Pharyngeal discomfort may be a symptom

of more serious diseases, including oesophageal cancer and autoimmune sialadenitis, which are easily missed by conventional ENT routine examination. The late detection can have grave consequences for the patients. Cervical ultrasonography was shown as a useful examination method for the detection of these diseases.

Our study had some limitations. The patients had various chief complaints and classifying their conditions as globus sensation depended on each doctor's decision. In addition, the patients who visited our hospital were introduced from the surrounding ENT clinics and general hospital. Therefore, these institutions seem to have more patients with globus sensation than our hospital, so cervical ultrasonography may be more useful in patients with globus sensation at private ENT clinics or ENT departments of general hospitals.

#### 4.4 Clinical applicability of the study

Our study proved ultrasonography as a more useful method than CT and MRI for the detection of abnormalities in several organs in the head and neck region, such as the submandibular glands, parotid glands, lymph nodes, etc. Cervical ultrasonography of the whole neck is not more time-consuming than thyroid ultrasonography, and the procedure is almost the same. We, therefore, recommend examination the whole neck in patients with globus sensation, rather than the thyroid region exclusively.

Cervical ultrasonography seems to be useful for the detection of hypopharyngeal and oesophageal lesions as causes of globus sensation, not otherwise detected using flexible laryngoscopy.

The patients had various chief complaints. We evaluated the correlation between the chief complaints and the abnormal ultrasonographic findings, and no association was found. Therefore, selecting the patients with globus sensation for ultrasonography based on their chief complaints seems inconvenient.

#### Conclusions

Cervical ultrasonography may detect abnormalities such as thyroid and salivary gland abnormalities, cervical mass, or oesophageal cancer in patients diagnosed with globus sensation, which are not detected by performing routine ENT examinations. Therefore, we recommend adopting cervical ultrasonography as a routine examination in patients with globus sensation at ENT clinics.

#### References

1. Moloy PJ, Charter R. The globus symptom. Incidence, therapeutic response, and age and sex relationships. *Arch Otolaryngol.* 1982;108:740–744.
2. Malcomson KG. Globus hystericus vel pharyngis (a reconnaissance of proximal vagal modalities). *J Laryngol Otol.* 1968;82:219–230.
3. Purcell J. *A Treatise of Vapours: Or hysteric Fits. The Second Edition, Revis'd and Augmented.* London: printed for Edward Place; 1707.
4. Rowley H, O'Dwyer TP, Jones AS, Timon CI. The natural history of globus pharyngeus. *Laryngoscope.* 1995;105:1118–1121.
5. Dworkin JP, Dowdall JR, Kubik M, Thottam PJ, Folbe A. The role of the modified barium swallow study and esophagram in patients with globus sensation. *Dysphagia.* 2015;30:506–10.
6. Järvenpää P, Ilmarinen T, Geneid A, Pietarinen P, Kinnari TJ, Rihkanen H, Ruohoalho J, Markkanen-Leppänen M, Bäck L, Arkkila P, Aaltonen LM. Work-up of globus: assessing the benefits of neck ultrasound and videofluorography. *Eur Arch Otorhinolaryngol.* 2017;274:931–937.
7. Koufman JA. The otolaryngologic manifestations of gastroesophageal reflux disease (GERD): a clinical investigation of 225 patients using ambulatory 24-hour pH monitoring and an experimental investigation of the role of acid and pepsin in the development of laryngeal injury. *Laryngoscope.* 1991;101:1–78.
8. Rasmussen ER, Schnack DT, Ravn AT. A prospective cohort study of 122 adult patients presenting to an otolaryngologist's office with globus pharyngeus. *Clin Otolaryngol.* 2018;43:854–860.
9. Alfonso A, Christoudias G, Amaruddin Q, Herbsman H, Gardner B. Tracheal or esophageal compression due to benign thyroid disease. *Am J Surg.* 1981;142:350–354.

10. Banks CA, Ayers CM, Hornig JD, Lentsch EJ, Day TA, Nguyen SA, Gillespie MB. Thyroid disease and compressive symptoms. *Laryngoscope*. 2012;122:13–16.
11. Nam IC, Choi H, Kim ES, Mo EY, Park YH, Sun DI. Characteristics of thyroid nodules causing globus symptoms. *Eur Arch Otorhinolaryngol*. 2015;272:1181–1188.
12. Burns P, Timon C. Thyroid pathology and the globus symptom: are they related? A two year prospective trial. *J Laryngol Otol*. 2007;121:242–245.
13. Okada H, Yoshioka K. Thyrotoxicosis complicated with dysphagia. *Intern Med*. 2009;48:1243–1245.
14. Guldiken B, Guldiken SS, Turgut N, Yuce M, Arikan E, Tugrul A. Dysphagia as a primary manifestation of hyperthyroidism: a case report. *Acta Clin Belg*. 2006;61:35–37.
15. Shimura H. The frequency and course of thyroid tumor supported by patients data of Ningen Dock in Japan. *Nihon Kojosen Gakkai Zasshi*. 2010;1:109–13. In Japanese.
16. Marshall JN, McGann G, Cook JA, Taub N. A prospective controlled study of high-resolution thyroid ultrasound in patients with globus pharyngeus. *Clin Otolaryngol Allied Sci*. 1996;21:228–231.
17. Onda K, Fukuhara T, Matsuda E, Donishi R, Hirooka Y, Takeuchi H, Kato M. Impact of screening for salivary gland by ultrasonography. *Yonago Acta Med*. 2020;63:42–46.
18. Doldi SB, Lattuada E, Zappa MA, Cioffi U, Massari M, et al. Ultrasonographic imaging of neoplasms of the cervical esophagus. *Hepatogastroenterology*. 1997;44:724–6.
19. Chen MH, Zhu Q, Kiyoshi C, Yan K, Wang B, Cao JF, et al. Transcutaneous ultrasound of the cervical esophagus in patients with esophageal carcinoma. *Chin Med J (Engl)*. 1994;107:332–7.
20. Fukuhara T, Matsuda E, Hattori Y, Donishi R, Ehara H, Fujiwara K, Takeuchi H. Usefulness of ultrasound for assessing the primary tumor of hypopharyngeal carcinoma. *Laryngoscope Invest Otolaryngol*. 2017;2:390–394.

## Tables

Table 1 The detailed statement of the diagnoses based on cervical ultrasonography

Table 2 Comparison of the chief complaints between the patients with globus symptom with normal and abnormal ultrasound findings

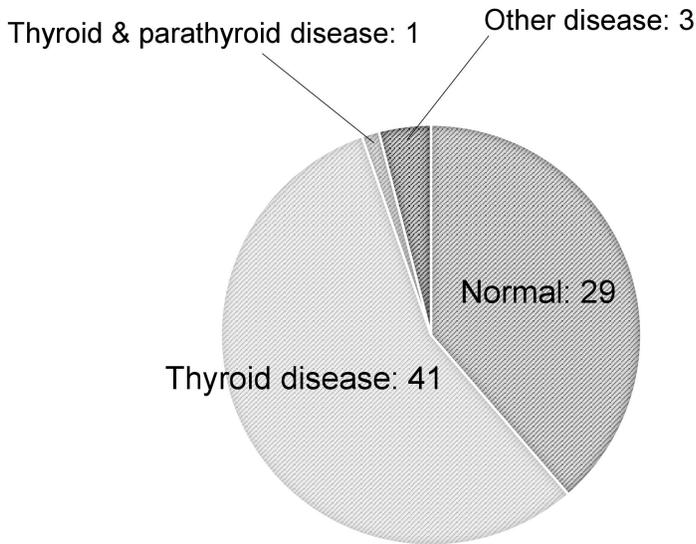
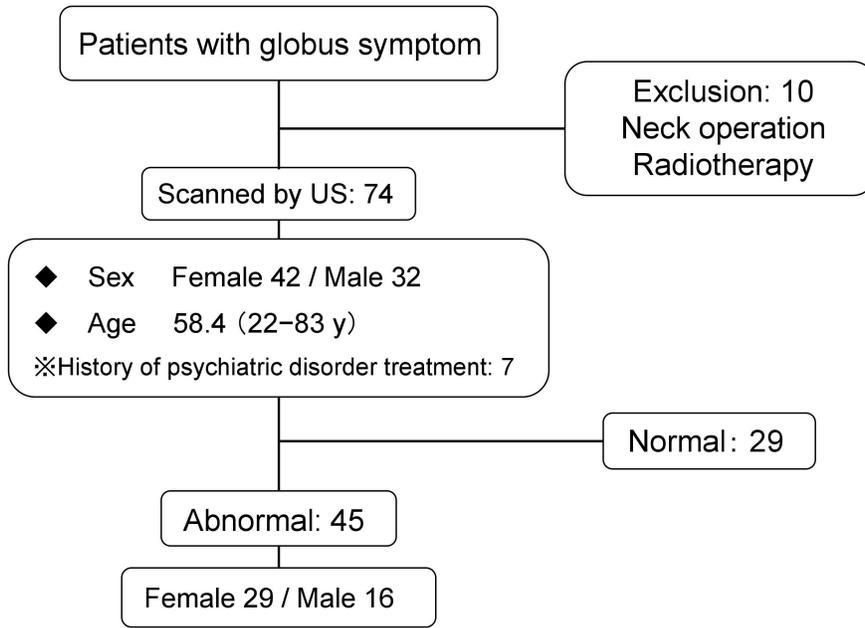
## Figure Legends

### Fig. 1

Flow chart showing the patients' demographics and their ultrasonographic results.

### Fig. 2

A pie chart showing the ultrasonographic findings in the patients with globus sensation.



Abnormal 45 (60.8%)  
Normal 29 (39.2%)