BAMBOO NODES IN A PATIENT WITH RHEUMATOID ARTHRITIS: CASE REPORT AND REVIEW OF LITERATURE

Abdul-Latif Hamdan[1] and Elie Khalifee[2]

Abstract

Objective: To report a third case of bamboo nodes in a patient with rheumatoid arthritis with a review of the literature.

Methods: Case report and literature review using keywords "bamboo nodes" and "vocal cords".

Results

A total of 17 case reports and one case series of 19 patients were identified. Only two subjects were reported to have rheumatoid arthritis as an underlying autoimmune disease. In this report, the authors describe a third case of bamboo nodes in a patient with rheumatoid arthritis who presented with hoarseness, voice loss and voice fatigue. Laryngeal video-endo-stroboscopic examination revealed bilateral transverse submucosal yellowish lesions of the vocal folds with the clinical description of Bamboo nodes. Patient was started on voice therapy with minimal improvement following which she underwent local steroid injection using the transoral Fiberoptic Injection Technique as an office procedure.

Conclusion

Bamboo nodes are a potential cause of dysphonia in patients with rheumatoid arthritis. With the advent of vocal fold injection as an office procedure, early intervention with local steroid injection as a management strategy is advocated by the authors.

Keywords: Bamboo node, vocal fold deposits, hoarseness, autoimmune disease, rheumatoid arthritis.

1 MD, EMBA, MPH, FACS, Department of Otolaryngology and Head & Neck Surgery, American University of Beirut-Medical Center, Lebanon.

2 MD. Department of Otolaryngology and Head & Neck Surgery, American University of Beirut-Medical Center, Lebanon.
Corresponding Author: Abdul-Latif Hamdan, MD, EMBA, MPH, FACS, American University of Beirut, Department of Otolaryngology, P.O. Box: 11-0236 Beirut-Lebanon. Tel/Fax: 961-1-350000. E-mail: ah77@aub.edu.lb

Introduction

The laryngeal manifestations of autoimmune diseases are many. Patients may present with a change in voice quality, vocal fatigue, throat discomfort, difficulty in swallowing, excessive mucus, cough and at times shortness of breath and dyspnea. These symptoms are often masked by the systemic complaints leading both patients and physicians to miss the underlying laryngeal pathology. The most commonly reported laryngeal endoscopic findings are mucosal edema, ulcerations, epiglottitis, cricoarytenoid joint arthritis with or without impaired vocal cord mobility, subglottic stenosis, and last but not least vocal cord submucosal nodules referred to as rheumatoid nodules by Raven et al in 1948[1].This term has been attributed due to the similarity between the histopathologic findings of these lesions and those seen in rheumatoid nodules in other sites of the body, namely the presence of "focal areas of necrosis and lime salt deposition surrounded by an epithelioid zone and an outer area of fibrous connective tissue" as described by Mikkelsen et al[2]. These lesions are more common in patients with rheumatoid arthtitis, Sjogren's diease and systemic lupus erythematous (SLE) with a prevalence of 30% to 100% based on the examiner's index of suspicion and activity of the disease with increased frequency of occurrence during periods of exacerbation[3,4].

Less frequently observed are the bamboo nodes which do not resemble the rounded submucosal rheumatoid nodules. These lesions, initially reported by Hosako et al in 1993, are described as unilateral or symmetrical yellowish or whitish transverse submucosal lesions either at the junction of the posterior and middle thirds of the vocal folds or in the middle third of the vocal folds[4]. Based on the literature review using the words " bamboo nodes " and " vocal cords", there are in total only 17 reported cases and one case series of 19 patients. All reported subjects are female adults with the diagnosis of an autoimmune disease, except for one case of a 13 year old girl with no associated autoimmune systemic disease[5]. Telescopic examination is considered key in making the diagnosis with or without laryngeal biopsy. On stroboscopic examination there is decrease or absence of mucosal waves at the site of the lesion with incomplete closure posteriorly[6]. Given the dependence of stroboscopy on the regularity of the vocal fold vibration, high speed imaging can be of added value in the diagnosis of these lesions. Histopathological examination often reveals "fibrosis around granulomatous lesions with central amorphous eosinophilic material" as reported by Murano et al[6]. Despite the handful case reports of bamboo nodes, there is no consensus on the best mode of therapy which may consist of systemic steroid administration, local steroid injection, surgical removal or voice therapy.

In this report the authors review the literature using "bamboo nodes" and "vocal cords" as key words and describe a new case of bamboo node in a patient with Rheumatoid arthritis that was treated with local steroid injection using the transoral fiberoptic injection technique under local anesthesia as an office procedure. This is the third case of Bamboo node reported in a patient with rheumatoid arthritis treated using local steroid thru a newly described approach.

Case report

This is a case of a 24 year old lady with rheumatoid arthritis diagnosed in January 2014 when she started having pain in the shoulders that progressed over a week into pain in bilateral wrists, fingers, and sole of feet. Pain was exacerbated by movement and relieved by taking anti-inflammatory medications. Patient also complained of morning rigidity and multiple aphtous ulcers in her oral cavity. Rheumatologic work up was done 4 months after onset of symptoms and revealed RF 16, anti-CPP 101.1, CRP 0.7, ESR 7 and ANA negative. Subsequently she was diagnosed with rheumatoid arthritis and was started on Ebetrexat (methotrexate) 15mg per week, Tratul (Diclofenac) 25-50mg every 8 hours for 4months, and folic acid 5mg per week. Patient responded well to treatment and was kept on Tratul on erratic basis.

In April 2016, the patient started complaining of hoarseness and vocal fatigue. Her symptoms progressed over the course of 4 months until the patient reported to the "Hamdan Voice Unit". Voice Handicap Index-10 filled by the patient showed a score of 12. Perceptual evaluation using the GRBAS classification revealed G3R2B1A2S1. On acoustic analysis the Fundamental frequency was 198.6Hz, Jitter 2.078 and

Shimmer 10.61. Laryngeal video-endo-stroboscopic examination performed using a 70 degree telescope (Kay Pentax RLS9100), revealed bilateral transverse submucosal yellowish bands more evident on the left side with decrease in the mucosal wave's amplitude over the site of the lesion. The vocal folds closure was complete with no evidence of glottal gap. See Figure 1 (A & B). In addition, there was evidence of edema and redness over the interarytenoid region. The diagnosis of Bamboo nodes was made based on the clinical presentation and laryngeal endoscopic findings. Patient was started on Nexium 20mg twice daily for 3months and referred to voice therapy following which she reported minimal improvement in her vocal symptoms. In October 2016, she underwent bilateral local injection of steroids at the site of the lesions using the Transoral Fiberoptic Injection Technique under local anesthesia as an office procedure. A total of 0.2-0.3cc of Depomedrol 10mg/cc was injected submucosally in each site. See Figure 2.

Fig. 1 A
Endoscopic view of larynx showing bilateral transverse submucosal yellowish band stripes (A)

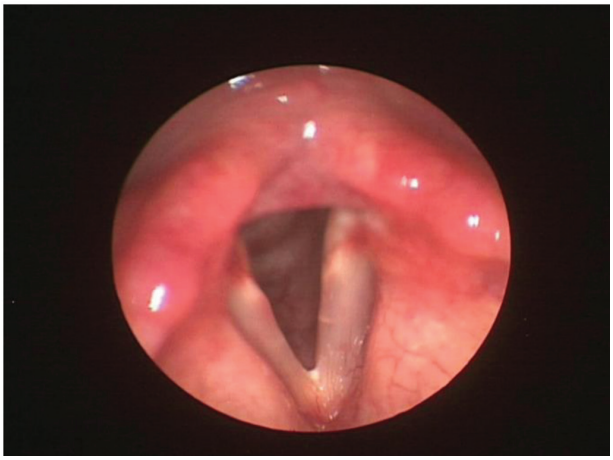

Fig. 1 B
Same view during phonation (B)

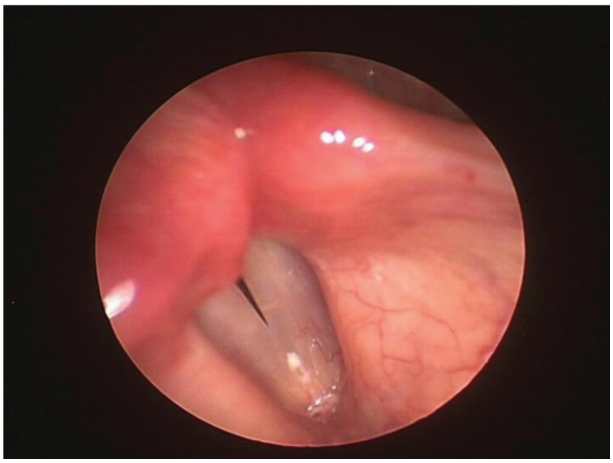

Fig. 2
Transoral Fiberoptic injection of steroids at the site of the right vocal fold lesion

Discussion

In 1933 Hosako et al was the first to describe a case of a transverse yellow band of the vocal folds in an *SLE patient*[7]. The lesion was referred to as "bamboo joint like lesion" in view of its similarity to the bamboo and its nodes. In 2001, Murano et al has simplified the term to "vocal fold bamboo nodes" and described two more cases of bamboo nodes in addition to five other cases that were reported in the interim period, diagnosed with *SLE*, progressive systemic sclerosis, autoimmune hepatitis and undifferentiated connective tissue syndrome[7-10]. In the two cases by Murano, bamboo nodules were the primary unique features that led to the diagnosis of autoimmune disease, namely *SLE i*n one patient and *Sjogren disease* in the other. His findings substantiated the strong interplay between the occurrence of these lesions and the autoimmune disease activity[6]. These patients were treated either with steroid alone or surgery followed by steroid intake, similar to the other five previously reported cases. Since then, there has been nine reported cases of bamboo nodes in the literature, only two of which have been described in patients with rheumatoid arthritis. Refer to Table 1 for review of all the reported

cases. The authors of this manuscript report the third case of bamboo nodes in a female patient with rheumatoid arthritis. The diagnosis was made based on the clinical description of the lesion on laryngeal video-stroboscopy and the history of autoimmune disease. To our knowledge, this is the third case of bamboo nodes diagnosed in a patient with rheumatoid arthritis, highlighting the prevalence of these lesions in a disease that primarily affects the synovial joints resulting in cricoarytenoid joint fixation or the vocal folds in the form of rheumatoid nodules. Patients diagnosed with rheumatoid arthritis and complaining of dysphonia should be thoroughly checked for the possible presence of submucosal yellowish lesions that may be missed on routine examination.

Another highlight of this report is the approach in the mode of treatment, namely local steroid injection as an office procedure using the transoral fiberoptic injection technique. Based on all the aforementioned reports, four main therapeutic approaches in the management of bamboo nodes have been described in the literature; One is vocal therapy with treatment of the confounding morbidities namely reflux and/or bad phonatory habits[3], two is systemic administration of steroids as a first line of therapy or as an adjuvant drug post-surgical intervention[6,8], three is local injection of steroids in the vocal fold affected by disease[5,13,14] and last but not least is surgical intervention[6,8,9,12]. The surgery consists of making a longitudinal incision parallel to the free edge of the cord, raising a mucosal flap along the site of the lesion followed by complete removal of the lesion if possible given the lack of distinctive margins and its intimate proximity to the vocal ligament. There are four concerns when surgery is considered as a treatment modality; one is the timing of surgical intervention early vs. late, two is the amount of resection since bamboo nodes are not encapsulated and have ill-defined boundaries, three is possible damage to the vocal ligament during the dissection given the submucosal site of these lesions, and last but not least is recurrence of the disease. Given the aforementioned shortcomings of surgery in the management of bamboo nodes and with the advances in technology fostering office based procedures, the authors strongly advocate early treatment of these lesions with local steroid injections as an office procedure performed under local anesthesia.

Conclusion

Vocal complaints in patients with autoimmune diseases are often ignored despite their impact on quality of life. After primary control of the primary systemic disease the laryngeal pathology needs to be addressed. With the advent of vocal fold injection as an office procedure, the authors advocate vocal fold steroid injection as an aggressive and early management strategy for patients with bamboo nodes.

Table 1
Reported cases of bamboo nodes in patients with autoimmune diseases

Study	Subjects	Sex	Age (years)	Disease	Disease duration (years)	Presentation
Nishinarita et al 1995 [10]	1	F	51	Autoimmune hepatitis in UCTS	1	Hoarseness and liver dysfunction
Tsunoda and Soda 1996 [9]	1	F	51	Autoimmune hepatitis and SLE	N/A	Hoarseness as the initial manifestation of systemic lupus erythematosus
Hosako et al 1999 [8]	4	F	28	SLE	2	Dysphonia and diplophonia
		F	48	Hashimoto's thyroditis	2	Dysphonia and diplophonia
		F	32	Progressive systemic sclerosis	21	Dysphonia and diplophonia
		F	27	High ANA	0	Dysphonia and diplophonia
Murano et al 2001 [6]	2	F	28	SLE	0	Sudden onset of hoarseness
		F	36	Sjögren's disease	0	Constant hoarseness
Immerman * and Sulica 2007 [11]	1	F	24	Rheumatoid arthritis	N/A	Hoarseness and effortful voice production
Hilgert et al * 2008 [3]	3	F	29	Mixed connective tissue disease	8	Hoarseness
		F	31	Mixed connective tissue disease	9	Hoarseness
		F	50	Rheumatoid arthritis	N/A	Hoarseness
Wu and Gao 2011 [12]	1	F	19	UCTS	0.8	1 year history of hoarseness
Schwemmle and Ptok ** 2012 [5]	1	F	13	None	None	Hoarseness
Schwemmle et al 2013 [13]	1	F	43	Mixed connective tissue disease	6	Sudden onset of hoarseness
Todic et al 2014 [French] [14]	1	F	18	TTP, hemolytic anemia, SLE	N/A	Hoarseness
Levi et al 2014 [15]	1	F	39	UCTS	0.25	Hoarseness with pitch breaks

: Female; M: Male; UCTS: Undifferentiated connective tissue syndrome; N/A: Not available; TTP: Thrombotic thrombocytopenic purpura; SLE: Systemic lupus erythematosus.

*: Study reporting bamboo nodes in a patient with rheumatoid arthritis.

**: Study reporting the youngest patient with hoarseness and bamboo nodes and with no autoimmune disorder.

Type of Laryngeal examination	Laryngeal findings	Management	Recurrence of symptoms
Laryngoscopy	Transverse yellow-whitish band lesion	Systemic steroids	N/A
Laryngoscopy, stroboscopy	Transverse lesion encircling the vocal fold	Surgery and systemic steroids	N/A
Laryngoscopy, stroboscopy	Transverse cream-yellow band lesions protruding from the surface of the vocal folds in the middle portions	Surgery	No
Laryngoscopy, stroboscopy	Cream-yellow band lesions protruding from the surface of the vocal folds in the middle portions	Surgery and systemic steroids	Yes
Laryngoscopy, stroboscopy	Cream-yellow band lesions protruding from the surface of the vocal folds in the middle portions	Surgery	No
Laryngoscopy, stroboscopy	Cream-yellow band lesions protruding from the surface of the vocal folds in the middle portions	Surgery	Yes
Rigid laryngeal endoscopy, stroboscopy	White transverse band lesion in the submucosal space slightly protruded from surface	Systemic steroids	Yes
Rigid laryngeal endoscopy, stroboscopy	White transverse band lesion in the submucosal space slightly protruding from surface	Surgery and systemic steroids	Yes
Stroboscopy	Bilateral bamboo nodes	Systemic steroids	No, at 4 months follow up
Laryngoscopy, stroboscopy	Multiple cystic shaped yellowish lesions protruding from the surface of both vocal folds	Logopedic therapy	No
Laryngoscopy, stroboscopy	Small cream yellow transparent transverse cystic lesions of the vocal folds	Logopedic therapy	No, at 6 months follow up
Laryngoscopy, stroboscopy	Multiple submucosal cysts	Logopedic therapy	Yes
Video laryngoscopy	Bilateral small creamy yellow transverse band like deposits in submucosa protruding slightly to upper surface of vocal fold	Systemic steroid followed by surgery	No
Laryngoscopy, stroboscopy	Bilateral whitish transverse stripes in submucosa giving a slightly protruding aspect to vocal folds	Systemic steroids followed by intralesional steroid injection twice	Yes
Rigid laryngeal endoscopy, stroboscopy	Bilateral whitish transverse band stripes in the submucosa which lent a slightly protruded aspect to the vocal folds	Intralesional steroid injection 4 times followed by surgery	No (short intervals of speech therapy)
Laryngoscopy, stroboscopy	Submucosal oval lesions in middle third of both vocal folds	Systemic steroids then local steroids (twice)	No, at 6 months follow up after second injection
Laryngo-videostroboscopy	3 creamy yellow transverse band like deposits in the submucosa of the vocal cords	N/A	N/A

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