

## STEROID INHALATION VERSUS SURGERY IN TREATMENT OF POST-INTUBATION GRANULOMA

Wael A. Alzamil, M.D.\* and Essam Fathy, M.D. *Hearing and Speech Institute,\* Sameer Attya, M.D. Banha teaching hospitals \*MOHAMMED ELSHABBOURY ,MD. Shebin Elkom teaching hospitals, General Organization for Teaching Hospitals and Institutes, Egypt*

### ABSTRACT

We are aiming from our study to compare the results of vocal process granulomas treated with inhaled steroids and surgical treatment. Intubation granuloma of the larynx is induced by endotracheal intubation, mainly managed by conservative medical treatment with observation. If no response to medical treatment surgical excision can be considered as a last line of treatment due to the reported recurrence with subsequent repeated surgeries and exposure to anesthesia. 30 granulomas were diagnosed in 24 patients: 6 bilateral and 18 unilateral. 15 granulomas in 12 patients in group A were treated with Steroid inhalation. 1 (6.6%) did not respond, 4 (26.6%) partially responded, and 10 (66.6%) completely responded, No cases had recurrence. In group B which treated surgically, of the 15 granulomas, 15 (100%) removed completely by micro laryngeal cold instruments. Partial recurrence occurred in 2 patients unilateral after 10 weeks 13.3%. Considerable recurrence has been developed in 3 more patients (unilateral) beside the first 2 granulomas (5 Granulomas) 33.3% recurrence after 50 weeks follow up. We advise to manage intubation granuloma of the larynx mainly by inhaled steroid as a first line of treatment.

**Key Words:** Dysphonia - Intubation granuloma - Steroid inhalation-surgery.

**Corresponding author:**

Essam Fathy

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### INTRODUCTION

**I**ntubation granuloma is one of the chronic changes after extubation, representing one of the most common lesions in the spectrum of intubation injuries<sup>[1,17]</sup>.

When mucosal healing is incomplete and perichondritis persists, granulation tissue remains as a chronic, localized, rounded, intubation granuloma, usually unilateral but sometimes bilateral<sup>[5]</sup>.

Granulomas occur at the common site of ulceration arising from the vocal process and medial surface of the arytenoid where the mucoperichondrium attaches directly to the cartilage<sup>[8,9,10,11]</sup>.

Granulomas in atypical sites, such as the sub glottis or the anterior larynx are probably caused by a laceration from the tip of the endotracheal tube or by the introducer projecting from the tube. The patient with an intubation granuloma presents days, weeks, or months after intubation with dysphonia, a feeling of "something there," or noisy breathing from airway obstruction if the mass is very large<sup>[20]</sup>.

Intubation granulomas can be removed using the carbon dioxide laser, but potential irritation by the carbon chart makes necessary to remove it<sup>[6,7]</sup>.

Cold microlaryngeal surgery using forceps and scissors causes bleeding making it difficult to identify the attachment of the mass in some cases<sup>[13]</sup>.

Accurate removal is important, under removal allows the remainder to proliferate into a recurrent granuloma, whereas too deep removal exposes the cartilage and peichondrium of the vocal process, again predisposing to recurrence. So ,Conservative nonsurgical removal of granulomas (medical excision) by steroid inhalation avoid these surgical problems of recurrence or residual pathology<sup>[16]</sup>.

We sought to compare the outcomes of vocal process granulomas treated with inhaled beclomethasone and surgical treatment.

### PATIENTS AND METHODS

#### Studied patients:

Among the patients with intubation granuloma of the larynx who presented to the ENT clinic in the 6 years between April 2009 and April 2014 . gave written, informed consent to participate in the study. 24 patients of intubation granuloma were 6 bilateral and 18 unilateral (30 granulomas). Patients were subjected to detailed history and thorough physical examination. Flexible and rigid laryngoscopy were documented by photos and video recording. All of the granulomas were

located on the vocal process of the arytenoid cartilage. 18 patients (75%) were females, All patients were devoid of any neurologic or psychiatric disorders, and none of them was taking any long-term medications.

#### Treatment protocol:

All patients were divided into two groups (A and B) each group consists of 12 patients 3 bilateral and 9 unilateral granulomas. All of the subjects of **group A** treated by beclomethasone dipropionate inhalation per day e.g. BECLAZONE (300 ug 3 times a day). Patients were started on a 6-to-8-week trial, with further medical therapy based on repeated examination. follow-up evaluations took place every 6 to 12 weeks until recovery. failure of treatment was defined as no improvement in signs or symptoms following 2 courses of treatment. Time to partial recovery, time to complete recovery, and time of treatment were measured in weeks. completion of treatment was defined as completion of at least one (6-to 8-weeks) course of medical therapy with follow up. Resolution of vocal process granulomas was determined by modification of the grading system of Emami et al(6).cases with complete resolution of symptoms and no identifiable lesion were defined as completely resolved. cases with discoloration, including erythema, without lesion were defined as completely resolved, cases that had improvement in symptoms, as well as a reduction in the size of the granuloma, and any lingering lesion, including ulceration, were defined as partially resolved. Cases that demonstrated no symptomatic improvement or a worsening of symptoms were defined as non-responsive to treatment. **Group B** treated surgically by direct laryngoscopy and cold microlaryngeal surgery, no corticosteroid therapy or laser.

Inclusion criteria: Intubation granuloma occurs in patients who have history of recent intubation (less than 2 months) for general anesthesia.

Exclusion criteria: patients with laryngeal malignancy, other benign lesion of vocal fold, short follow up period were excluded

#### Statistical analysis:

The statistical analysis included the arithmetic mean, standard deviation (SD), standard error, hypothesis Student's "t", and Pearson's correlation tests.

#### RESULTS

A total of 24 patients with diagnosis of post intubation granuloma between 2009 and 2014 were reviewed. among them, there were 6 males and 18 females. Median patient age at time of the initial examination was 27.7 years, with a range from 18 to 40 years, Table 2 and 3.

Their symptoms including hoarseness in 19 patients (79.1%), cough in 6 patients (25%), foreign body sensation in the throat in 3 patients (12.5%) table 1. six patients (25%) presented by bilateral granuloma, and 18 patients (75%) had unilateral granuloma. Fifteen patients (62.5%) had left sided lesion, 3 patients (12.5%) had right sided lesion and 6 patients (25%) had bilateral lesion, table 2 and 3.

Results In group A are shown in Table (2), 15 granulomas in 12 patients in group A were treated with Beclomethasone (BECLAZONE) inhalation. Of the 15 granulomas that completed treatment, 1 (6.6%) did not respond (time of follow-up, 39 weeks), 3 (25%) partially responded (mean follow-up, 57.6 weeks; range, 43 to 75 weeks), and 8 (66.6%) completely responded (mean follow-up, 56.8 weeks; range, 30 to 78 weeks). No cases had recurrence

Results In group B are shown in Table (3), In this group (B) which treated surgically, of the 15 granulomas, 15 (100%) removed completely by micro laryngeal cold instruments (mean follow-up, 21.4 weeks; range, 12 to 30 weeks). Partial recurrence occurred in 2 patient unilateral after 10 weeks 16.6%. Considerable recurrence has been developed in 3 more patients (unilateral) beside the first 2 granulomas (5 Granulomas) 33.3% recurrence after 30 weeks follow up. No anesthetic or surgical complications occurred in group B.

The follow up period was noticed to have a different effect on the outcome in both groups. In group A, it has a direct relationship with the outcome which improves progressively with more weeks of steroid

inhalation and follow up fig 1. In group B, there is a reverse relationship with the

outcome which presents more recurrences with more weeks of follow up

**Table1:**presentation of symptoms.

Symptoms	Patients	
	No.	%
Hoarseness	19	79.1
Cough	6	25
Sore throat	7	29.1
F.B. sensation	3	12.5
Dysphagia	2	8.3
Sensation of increased mucous	2	8.3
Ear pain	2	8.3
Vocal fatigue	1	4.1
Hemoptysis	1	4.1

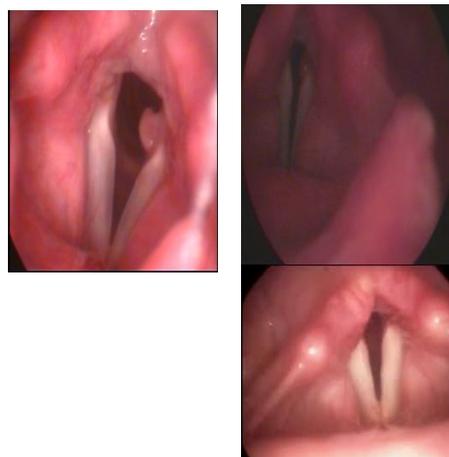


Fig.1 intubation granuloma under steroid inhalation therapy case number 6

**Table (2):** clinical characteristics and therapeutic results of beclomethasone dispropionate inhalation therapy (group A).

Patient no.	Age	Sex	Chief complaint	Site	Time of follow-up	Response	Rec.
1	18	Female	Hoarseness	Bilat.	55	partial	-
2	30	Female	Cough ,hoarseness	Left	60	complete	-
3	22	Male	Hoarseness	Left	43	partial	-
4	19	Female	Cough, hoarseness	Left	30	Complete	-
5	31	female	Sore throat, Hoarseness	Right	39	No response	-
6	35	Female	F.B. sensation	Left	42	complete	-
7	28	Male	Hoarseness	Left	47	Complete	-
8	33	Female	Cough, hoarseness	Bilat.	70	Complete	-
9	25	Female	Sore throat,hoarseness	Left	75	Partial	-
10	26	Female	Sore throat,ear pain	Left	78	Complete	-
11	36	Female	Hoarseness	Bilat.	69	Complete	-
12	29	Female	Hoarseness	Bilat.	59	Complete	-

Table (3): clinical characteristics and results of cold micro laryngeal surgery (group B).

Pat .no	Age	Sex	Chief complaint	Site	Time of follow-up	Response	Rec.
1	19	Female	Hoarseness	Left	25	Complete	No
2	25	Female	Cough, Hoarseness	Bil.	22	Complete	Partial (6weeks)
3	24	Female	Hoarseness, Globus sensation	Left	12	Complete	Considerable (22weeks)
4	40	Female	Hoarseness	Right	14	Complete	No
5	32	Male	Globus sensation	Left	29	Complete	No
6	23	Female	Cough	Right	26	Complete	No
7	21	Female	Hoarseness	Left	14	Complete	Considerable (27 weeks)
8	32	Male	Hoarseness, ear pain	Left	18	Complete	No
9	29	Female	Hoarseness	Left	29	Complete	Partial (10weeks)
10	34	Male	Hoarseness	Left	30	Complete	No
11	26	Female	Cough, F.B.sensation	Bil.	12	Complete	Considerable (21 weeks)
12	28	Female	Hoarseness	Left	26	Complete	No

## DISCUSSION

The epidemiology, presentation, and causes of intubation granuloma in this study substantiate previous published results.<sup>[1,4]</sup>

A greater number of female were affected by vocal process granuloma (by 3:1). An association that supports previous reports that women are more likely to sustain vocal process granuloma from intubation-related or surgical treatment, McFerran suggested that the thinner mucosa in smaller larynges makes women vulnerable to trauma-related granuloma<sup>[12,13]</sup>.

Hoarseness represent the most common presenting symptoms in all patients in our study, seen in 79.1% of patients<sup>[8,10]</sup>.

Higher incidence of left vocal cord affection than right side lesions (9;p<0.001). This result is supported by other studies which show higher incidence of the left side than the right side, this phenomena could be related to intubation technique and tendency for right-handed placement of an endotracheal tube to cause the tube to come into contact with the left vocal process<sup>[9,15]</sup>.

Granuloma after intubation may occur because of direct abrasion of the arytenoid perichondrium, a break in the mucosa covering it as a result of coughing on an endotracheal tube, or long term pressure

necrosis of the vocal process area. The resulting reparative granuloma may initially progress from fairly sessile to large and pedunculated, but it may then regress entirely with maturation over several months<sup>[9,10]</sup>. Intubation granulomas can be removed using the carbon dioxide laser, but potential irritation by the carbon chart makes necessary to remove it. Cold microlaryngeal surgery using forceps and scissors causes bleeding making it difficult to identify the attachment of the mass. Accurate removal is important, under removal allows the remainder to proliferate into a recurrent granuloma, whereas too deep removal exposes the cartilage and peichondrium of the vocal process, again predisposing to recurrence. So, Conservative nonsurgical removal of granulomas (medical excision) by steroid inhalation avoid these surgical problems of recurrence or residual pathology<sup>[7,12,9]</sup>.

The failure of surgical excision may be explained by its failure to address the principle causes of vocal process granuloma. recurrence rates following surgical excision similar to overall results<sup>[16,21]</sup>.

Inhaled steroids show the best results in reducing local inflammation. Budesonide, and Beclomethasone usually used to manage allergic rhinitis, asthma, and nasal polyposis<sup>[2,14]</sup>. resolution of 19 of 20 intubation granuloma within 12 months by

Roh et al [16]. the authors demonstrated resolution of 19 of 20 intubation granulomas within 12 months. 1999 Wang et al. : Compared treatment of intubation granuloma with/without inhaled steroid, more rapid regression of lesion was seen with steroid

Intubation granuloma show very high rates of resolution with inhaled steroids, our regimen applied the use of Beclomethasone because its greater effect as local anti-inflammatory and has long term safety profile up to 12months.if there is no or partial response we advise continuation of treatment for another 6 to 9 weeks. After improvement we allow gradual discontinuation of the inhaled steroids over the next 2 to 4 months (2,3)

### CONCLUSION

In this study, recent vocal process post-intubation granulomas respond to the anti-inflammatory action of inhaled steroids successfully as with low rates of side effects and recurrence. Surgical excision of granulomas has good immediate relief of symptoms but has more recurrence rate and not without the risk of general anesthesia and surgical manipulation.

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