

A CLINICO-PATHOLOGICAL STUDY OF REINKE'S OEDEMA

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ABSTRACT : *An analysis of 92 cases of Reinke's oedema was done in this study. It was most often seen in middle-aged persons. A male predilection (57%) was found. In 68 (74%) cases, the lesions were unilateral and in 24 (26%) cases, the lesions were bilateral. Smoking (83%), vocal abuse or misuse (80%) and chronic respiratory tract infection (43%) were the main aetiological factors. No significant relationship of Reinke's oedema with hypothyroidism was found. There were no dysplastic changes in the epithelium. The treatment of Reinke's oedema is a combination of surgery and vocal rehabilitation. Conventional microlaryngeal surgery is ideal for the treatment of Reinke's oedema. Acquired laryngeal web involving the anterior part of the vocal cords may develop if stripping of the both vocal cords is performed carelessly. Operating measures do not prevent recurrences of Reinke's oedema. Voice therapy and cessation of smoking in the postoperative period play important roles in the long term treatment results of Reinke's oedema.*

Key Words : *Reinke's oedema, vocal nodule, vocal cord polyp, acquired laryngeal web, microlaryngoscopy.*

INTRODUCTION

Hoarseness of voice is a common symptom with which patients come to an otolaryngologist. The differentiating audible feature of hoarseness is roughness that results from random variations in the periodicity and or intensity of consecutive sound waves. Normal musical sound, whether produced by an instrument or the larynx, results from the repetitive vibrations that are similar to each other in time and intensity or that vary progressively as the pitch shifts upward or downward. When the regularity of vibratory pattern is lost, i.e. becomes random, the resulting vocal sound is heard as hoarseness.

Hoarseness of voice is an important symptom of laryngeal diseases. Almost any type of pathology involving the larynx gives rise to hoarseness of voice. Reinke's oedema is one of the common benign lesions causing hoarseness of voice. The accumulation of fluid under the epithelium of the true vocal cords is generally known as Reinke's oedema. The German anatomist Reinke (1897) first identified this compartment during investigations involving membranous oedema in the larynx. The compartment is superficial to the vocal ligament, bound anteriorly by Broyles' ligament and limited posteriorly by the arytenoid. It contains loose areolar tissue. The attachment of the vocal ligament along the medial edge and underneath the vocal cord by the lamellar fibres extending to the conus elasticus restricts the oedema to the superior surface of the vocal cord.

The aetiology of Reinke's oedema is not completely understood, but it is strongly associated with smoking

(Myerson 1950, Ballenger 1985 and Marcotullio et al 2002). Vocal abuse (Putney 1940) and laryngopharyngeal reflux (Koufman 1995) are other precipitating factors. Aerodynamic studies on vocal abusers with Reinke's oedema generally demonstrate an increase in the subglottic aerodynamic driving pressure (Zeitels et al 1997). It has been hypothesized that individuals with vocal hyperfunction in the presence of mucosal irritation caused by smoking, laryngopharyngeal reflux, chronic coughing, or frequent expectoration are prone to develop Reinke's oedema. The increase in aerodynamic driving pressure from the subglottis results in unopposed distention of the lamina propria and the overlying epithelium on the superior surface of the vocal fold.

Using morphological criteria, Vecerina et al (1996) divided



Fig I : Microlaryngoscopic photograph showing normal vocal cords. Right false cord has come into the field due to slight tilting of the laryngoscope.

Table I : Age and Sex Distribution

Age Groups (in years)	Male	Female	Total
11-20	2	0	2
21-30	16	11	27
31-40	23	15	38
41-50	11	6	17
51-60	6	2	8
TOTAL	58 (63%)	34 (37%)	92 (100%)

Reinke's oedema into a pale (transparent) and a livid type. They supposed that smoke irritation provokes higher activity of stromal cells producing a special substance in Reinke's space, resulting finally in Reinke's oedema.

Reinke's oedema is fairly common and comprises about 10% of benign laryngeal pathologies. In this study an attempt has been made to go into the aetio-pathogenesis of this common benign lesion.

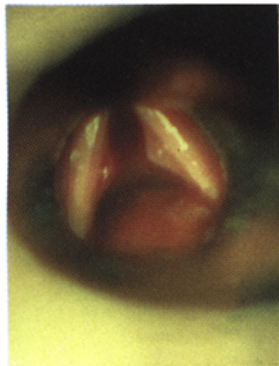


Fig II : Micro-laryngoscopic photograph showing bilateral Reinke's oedema. The lesions were situated at the typical sites of vocal nodules but colourless serous fluid from the right vocal cord and reddish serous fluid from the left vocal cord came out on incision. Note the similarities and differences with vocal nodules in Fig III.



Fig III : Micro-laryngoscopic photograph showing vocal nodules at their typical sites. Note the similarities and differences with bilateral Reinke's oedema at the same sites in Fig II.

Table II : Predisposing factors

Misuse or abuse of voice	Misuse or abuse of voice and Chronic upper respiratory tract infection	Chronic upper respiratory tract infection	Total
52	22	18	92
Smoking		No smoking	
76 (83%)		16 (17%)	
			92 (100%)

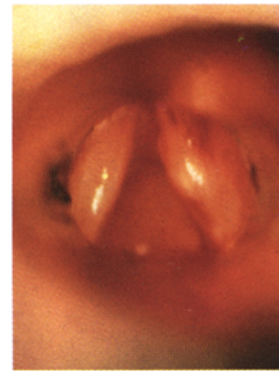


Fig. IV : Micro-laryngoscopic photograph showing Reinke's oedema of both vocal cords . Whitish jelly like material came out from both vocal cords following incision.

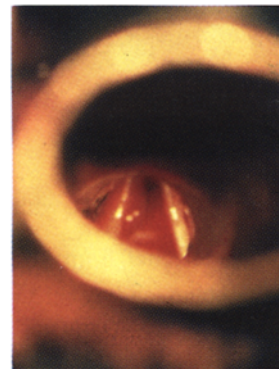


Fig. V : Micro-laryngoscopic photograph showing Reinke's oedema of the left vocal cord. The lesion was translucent and reddish serous fluid came out on incision.. Note the similarities and differences with vocal cord polyp of the right vocal cord in Fig VI.

MATERIALS AND METHODS

This study was conducted over a period of fourteen years. The work was done in Calcutta National Medical College; N.R.S. Medical College, Kolkata and different other state hospitals of West Bengal. The subjects of this study were selected from the patients presenting with hoarseness of voice in the E.N.T. out patient department of these hospitals. All these patients were examined and only the cases with hoarseness of voice for more than 15 days duration were

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Fig. VI : Microlaryngoscopic photograph showing oedematous polyp arising from the right vocal cord with a broad base. Note the similarities and differences with Reinke's oedema of the left vocal cord in Fig V.

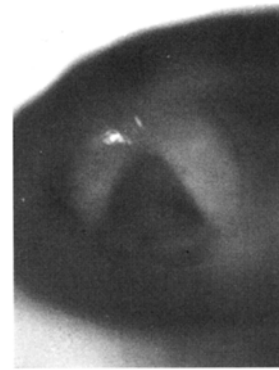


Fig. VII : Microlaryngoscopic photograph showing laryngeal web formation over the anterior third of vocal cords, depicting a possible surgical complication of stripping of both vocal cords in the same session.

selected. The patients presenting with other voice disorders were excluded from this study. The patients with hoarseness of voice for less than 15 days duration were excluded.

A detailed history was taken in all cases with special importance to age, sex, occupation, complaints with duration and any predisposing factors. The onset and the progress of the symptoms were noted. Past history of such episodes and other illnesses and history of previous treatment were taken. Thyroid function tests were done in patients who had experienced a significant weight gain or had no identifiable irritant.

Thorough clinical examination was done in every case including careful indirect laryngoscopic examination. 92 cases were clinically diagnosed as Reinke's oedema. Most of them were then examined by microlaryngoscopy under general anaesthesia using a Zeiss operating microscope fitted with a 400 mm objective lens. Photographs were taken using a SLR camera fitted to the side tube of the operating microscope. Necessary surgery was done after that.

After the surgery, absolute vocal rest was advocated for one week. Speech therapy was instituted after 2 to 3 weeks and was continued for as long as it was felt to be beneficial.

OBSERVATIONS AND DISCUSSIONS

Total 92 cases were studied. The youngest of the patients was of 18 years and the oldest was of 54 years with the mean age of 35 years. Majority of the patients (89%) were between 21 and 50 years of age. In 68 (74%) cases the lesions were unilateral and in 24 (26%) cases the lesions were bilateral. Broeck(1997) stated that the patients were mostly aged between 30 and 60 years.

Of the 92 patients, 58 (63%) were male and 34 (37%) were female patients. Broeck (1997) also stated a male preponderance. Raabe et al (1999) pointed out that middle aged women in speaking professions, who smoked were often affected. According to Zalesska-Krecicka et al (1993) this pathological condition involving vocal cords is most often seen in middle-aged smokers, and has a female predilection.

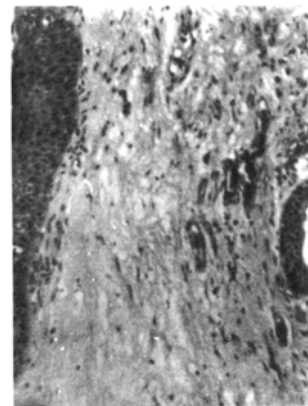


Fig. VIII : Histological picture of Reinke's oedema (x80) showing subepithelial oedema with few blood vessels and without any epithelial changes.

In 74 (80%) out of 92 cases, vocal misuse or abuse was present. Chronic respiratory tract infection was present in 40 (43%) cases out of 92 cases. Ballenger (1985) also stated that misuse or abuse of voice may be considered as one of the main aetiological factors.

83% of the patients were smokers which indicates that smoking is an important predisposing factor. Myerson (1950), Ballenger (1985) and Marcotullio et al (2002) also

considered smoking to be one of the main aetiological factors. Marcotullio et al (2002) in their study of 125 patients of bilateral Reinke's oedema concluded that the main risk factor for Reinke's oedema and for its recurrence was tobacco use. Their study results showed that the clinical manifestation of the disease was related to the number of cigarettes smoked daily and the duration of exposure to smoke.

Garcia et al (1999) made a retrospective epidemiological and histopathological review of 258 patients. Forty had laryngeal polyps, 35 vocal fold nodules, and 41 Reinke oedema. One patient with oedema had mild dysplasia. The epidemiological data showed that voice abuse or misuse was the main factor in patients with vocal fold nodules and smoking was the main factor in polyps and oedema.

Thyroid function tests were done in 16 cases who had experienced a significant weight gain or had no identifiable irritant. Only 2 patients were marginally hypothyroid, which suggests that hypothyroidism is not an aetiological factor. Lindeberg et al (1987) in their study of 43 cases and Wedrychowicz et al (1992) in their study of 60 cases had found no significant relationship of Reinke's Oedema with hypothyroidism. White et al (1991) in their prospective, controlled study compared thyroid function in 61 consecutive Reinke's Oedema patients with an age and sex matched control group (n = 65) without laryngeal disease, suggested that hypothyroidism was not an aetiological factor in the development of Reinke's oedema.

In two cases, the lesions were very much similar to vocal nodules (i.e. bilaterally symmetrical and situated at the junction of the anterior 1/3 rd and posterior 2/3 rd of the vocal cords) but on microlaryngoscopy they were found to be translucent and serous fluid came out following incision over the vocal cords (Fig II and Fig III). It is the histological picture which really differentiates them in such cases.

The oedema fluid is usually serous but if the Reinke's oedema persists longer, the viscosity of the oedematous fluid increases and it becomes jelly like (Fig. IV).

Sometimes it becomes difficult to differentiate localised Reinke's oedema from a gelatinous polyp of the vocal cord. Not only do they look alike on indirect laryngoscopy but also on microlaryngoscopy (Fig. V and Fig. VI). The histological picture helps in those cases.

The treatment of Reinke's oedema consists of a combination

of surgery and vocal rehabilitation. Naturally all known causative factors should first be eliminated. Most of the patients were treated by microlaryngoscopic surgery. Healing was usually rapid and new epithelium developed with a firmer attachment to the vocal cord muscle which prevented recurrence.

There is some controversy whether both vocal cords should be stripped at the same session or whether an interval should be allowed. According to Kleinsasser (1990) and Broek (1997) it is perfectly safe to treat both cords during the same operation, but care should be taken not to extend the incisions to the anterior commissure. In the present study, in bilateral Reinke's oedema, both vocal cords were operated in the same session taking care not to extend the incisions to the anterior commissure to minimise the chance of developing postoperative synechia of the vocal cords. None of the 24 cases of bilateral Reinke's oedema developed synechia of the vocal cords. In this context it may be mentioned that during the period of the present study, a case of acquired anterior laryngeal web involving the anterior one third of the vocal cords (Fig. VII) was encountered. In that case, bilateral stripping of the vocal cords was performed in another institution. The patients were followed up for one year after surgery in our study. There was recurrence in 4 cases within one year of surgery. Recurrence was significantly less in the patients who stopped smoking and misuse or abuse of voice after surgery. Hojslet et al (1990) also stated that if smoking was not stopped, the result of any treatment would be disappointing.

Zaleska-Krecicka et al (1993) in their study of 160 patients with Reinke's oedema emphasized that cessation of smoking played an important role for long term treatment results. According to them, very good voice improvement can be obtained by means of microsurgery in almost all cases of Reinke's oedema.

The histological picture was of subepithelial oedema with few blood vessels. The epithelium was normal stratified squamous epithelium (Fig. VIII). There were no dysplastic changes in the epithelium. Garcia et al (1999) in their study of 41 cases of Reinke oedema had found mild dysplasia in one patient.

CONCLUSION

Reinke's Oedema is commonly found in middle aged persons. Majority of the patients are between 21 and 50 years of age. Males are more affected than females, although

the percentage may vary widely. In 68 (74%) cases the lesions were unilateral and in 24 (26%) cases the lesions were bilateral. Smoking, vocal misuse or abuse and recurrent respiratory tract infection are the main aetiological factors.

There is no significant relationship of Reinke's Oedema with hypothyroidism.

In some cases it becomes difficult to differentiate Reinke's oedema from vocal nodules or vocal cord polyp.

The treatment of Reinke's oedema consists of a combination of surgery and vocal rehabilitation. Conventional microlaryngeal surgery is ideal in the treatment of Reinke's oedema. It is safe to perform surgery of the both vocal cords during the same session, but care should be taken not to extend the incisions to the anterior commissure.

Acquired laryngeal web involving the anterior part of the vocal cords may develop if stripping of the both vocal cords is performed carelessly.

Operating measures do not prevent recurrences of Reinke's oedema. Voice therapy and cessation of smoking play important roles for long term treatment results of Reinke's oedema.

Reinke's oedema is essentially a benign pathology. It is not associated with any dysplastic changes in the epithelium. It does not show any tendency to undergo malignant transformation.

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