

라인케 부종의 임상적 및 음성학적 고찰

임재열 · 최재남 · 서형석 · 김지훈 · 박태준 · 홍준표 · 김광문 · 최홍식

The Clinical Characteristics and Voice Analysis of Reinke's Edema

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ABSTRACT

Background and Objectives : Reinke's edema is characterized by the swelling of the vocal folds, which is bilateral, and is found superficial to the vocal ligament, Reinke's space. However, the etiology of Reinke's edema is not well understood, and voice characteristics are still controversial. The aim of this study was to evaluate the clinical characteristics of Reinke's edema, and to assess the voice qualities in patients with Reinke's edema before and after a laryngomicrosurgery. Furthermore, this study also determined which parameters were most associated with the improvement of postoperative voice quality in Reinke's edema. **Subjects and Method** : The clinical records from 61 patients with Reinke's edema were reviewed and telephone questionnaires were carried out about smoking, laryngopharyngeal reflux, voice abuse, and allergy. All the patients were classified according to the stroboscopic findings (Yonekawa's classification). The voice analysis of 61 patients with Reinke's edema were performed and compared with 30 normal controls. Also, the voice analysis of 23 patients, who underwent laryngomicrosurgery, was carried out 2 months after surgery. **Results** : Smoking, voice abuse and laryngopharyngeal reflux may play important roles in developing Reinke's edema. There were 26, 22, and 13 patients identified as Yonekawa types I, II, and III, respectively. The preoperative voice analysis of 61 patients showed decreased FxM (mean fundamental frequency), and increased subglottic pressure. Furthermore, FxSD (fundamental frequency standard deviation), QxM (mean closed quotient), and QxSD (closed quotient standard deviation) were all higher for the patients than the normal group. The postoperative results showed an increase in the FxM and an improvement in the MFR (mean flow rate), Psub (subglottic pressure), shimmer, and HNR (harmonics to noise ratio). The correlation analysis showed that jitter, HNR, QxM, and CFx (% irregularity of frequency) were the parameters, showing the best correlation with improvement in the postoperative voice quality. **Conclusion** : The fundamental frequency was approximated to normal ranges, and stabilizing of vocal fold vibration, and the improvement of vocal efficiency was also found 2 months after laryngomicrosurgery. The parameters which represented voice quality by correlation analysis after surgery were jitter, HNR, QxM, and CFx. (Korean J Otolaryngol 2005;48:913-9)

KEY WORDS : Reinke's edema · Analysis of voice · Laryngomicrosurgery.

1)2)
(lamina propria) (superficial layer) (Reinke's space) (parietal cell)
가
: 2004 11 6 / : 2005 3 23
: , 135 - 720 146 - 92 Yonekawa³⁾ 374
: (02) 3497 - 3461 · : (02) 3463 - 4750 , Ahn
E - mail : hschoi@yumc.yonsei.ac.kr 4)

1.5 가 가 2 가 / /
 가 (MFR), (dB), (Psub)
 (MPT)

공기역학적 검사

Phonatory function analyzer(Model PS 77H, Naga-
 shima Ltd., Tokyo, Japan)

음향학적 및 전기성문파형 검사

Lx Speech studio(Laryngograph Ltd, London, UK)

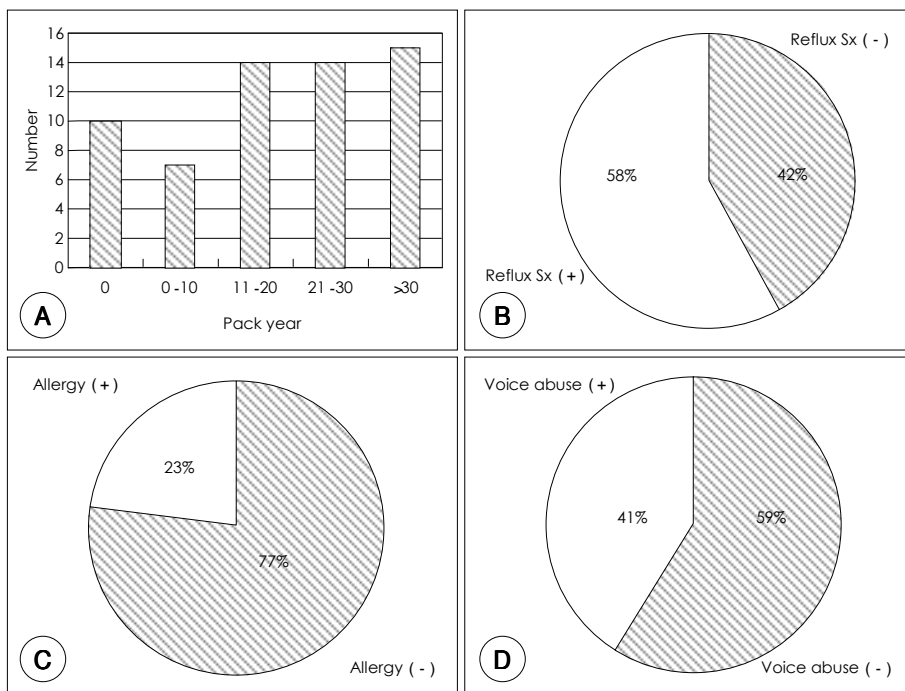


Fig. 2. Etiologic factors. A : Smoking. B : Gastroesophageal reflux. C : Allergy. D : Vocal abuse.

Table 1. Voice parameters of Reinke's edema and normal group

	Normal (n=30)		Reinke's (n=61)		*(all)
	M (n=15)	F (n=15)	M (n=32)	F (n=29)	
Aerodynamic study					
Intensity	72.86	67.93	73.94	71.83	.315
MFR	165.93	122.67	229.34	204.34	<.0001
Psub	65.93	46.13	100.03	86.07	<.0001
MPT	19.54	18.00	12.79	8.51	.09
Acoustic analysis (sustained /a/ vowel)					
Fx	118.44	216.96	108.17	174.74	.466
Qx	50.15	49.76	50.3	47.29	.001
Jitter	0.35	0.61	1.4	2.42	<.0001
Shimmer	4.07	7.39	9.91	8.28	<.0001
HNR	23.35	28.11	17.53	20.15	<.0001
Electroglottographic analysis (reading a passage of 'Ga-Eul')					
FxM	121.5	187.7	105.76	165.2	.705
FxSD	58.16	60.89	65.03	75.49	<.0001
QxM	48.2	50.5	54.03	51.78	0.001
QxSD	5.64	5.02	6.05	5.46	<.0001
CFx	4.9	4.6	14.43	16.23	<.0001
Cax	10.0	4.9	10.34	8.07	<.0001

*t-test, MFR : mean flow rate (mL/sec), Psub : subglottic pressure (mmH₂O), MPT : maximum phonation time (sec), Fx : fundamental frequency (Hz), Qx : closed quotients (%), HNR : harmonic noise ratio (dB), FxM : mean fundamental frequency (Hz), FxSD : fundamental frequency standard deviation (Hz), QxM : mean closed Quotient (%), QxSD : closed quotient standard deviation (%), CFx : irregularity of frequency (%), Cax : irregularity of amplitude (%)

라인케 부중

(electrode) . EGG . 10 . 43
 73.5% (Fig. 2A) 가 2가
 / / 2 '가' 가 34 58%
 300 ms Jitter, (Fig. 2B). 14
 Shimmer, (HNR) 23% (Fig. 2C)
 (FxM), (FxSD), 25 41% (Fig. 2D).
 (QxM), (QxSD),
 (Fx % irregularity ; CFx), (Ax % Yonekawa
 irregularity ; CAx) Yonekawa 1 26 (43%),
 2 22 (36%), 3 13 (21%) 1 가
 통 계
 Statistical Packages for Social Science(SPSS, ver.
 11.5) t - test Table 1
 'G' 'R' 2 23
 (Table 2, Fig. 3). FxM
 95%
 CFx CAx
 MFR
 MPT
 61 32 , 29 가 가
 1.1 : 1 5 8 , 2 6 shimmer가

Table 2. Preoperative & postoperative voice parameters

	Preop. (n=23)		Postop. (n=23)		p*
	M (n=14)	M (n=14)	M (n=14)	F (n=29)	
Aerodynamic study					
Intensity	75.14	69.67	75.93	73.89	0.03
MFR	261.07	216.11	202.71	146.78	0.01
Psub	117.57	93.11	84.57	68.78	0.043
MPT	12.72	9.39	14.65	9.49	0.289
Acoustic analysis (sustained /a/ vowel)					
Fx	108.7	163.93	120.07	179.02	0.013
Qx	48.58	55.43	51.18	49.49	0.799
Jitter	1.68	0.8	0.54	0.83	0.239
Shimmer	8.88	8.43	4.29	7.98	0.099
HNR	16.85	18.55	24.46	24.83	0.001
Electroglottographic analysis (reading a passage of 'Ga-Eul')					
FxM	102.23	135.44	115.15	167.37	0.005
FxSD	65.16	66.82	62.36	78.34	0.688
QxM	54.89	54.98	52.36	45.88	0.000
QxSD	6.26	5.94	5.61	5.81	0.275
CFx	15.36	14	10.32	13.03	0.822
CAx	10.26	8.14	9.32	7.46	0.473

*Paired t-test, † MFR : mean flow rate (mL/sec), Psub : subglottic pressure (mmH₂O), MPT : maximum phonation time (sec), Fx : fundamental frequency (Hz), Qx : closed quotients (%), HNR : harmonic noise ratio (dB), FxM : mean fundamental frequency (Hz), FxSD : fundamental frequency standard deviation (Hz), QxM : mean closed Quotient (%), QxSD : closed quotient standard deviation (%), CFx : irregularity of frequency (%), CAx : irregularity of amplitude (%)

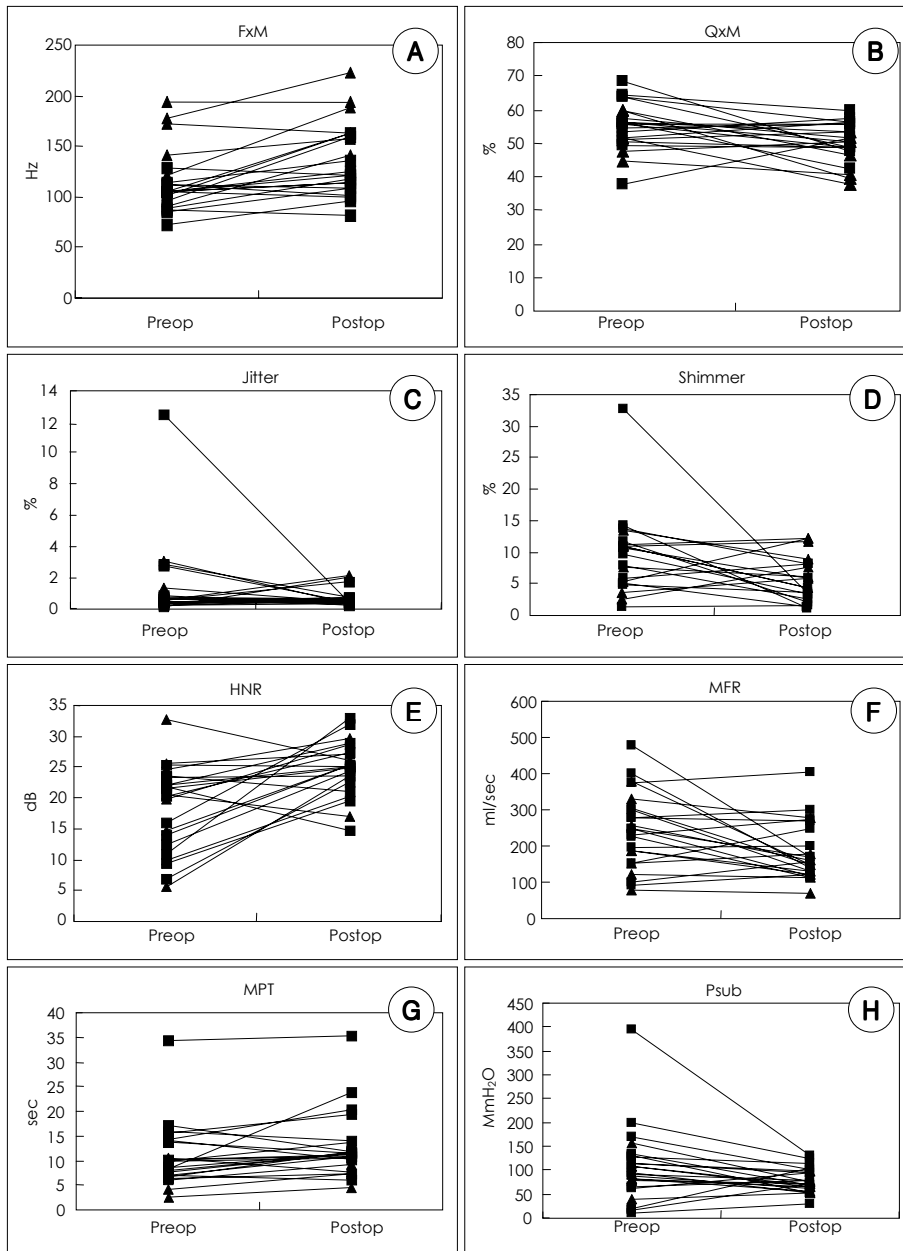


Fig. 3. Changes of preoperative and postoperative voice parameters. (A) FxM : mean fundamental frequency, (B) QxM : mean closed quotient, (C) Jitter, (D) Shimmer, (E) HNR : harmonic to noise ratio, (F) MFR : mean flow rate, (G) MPT : maximum phonation time, (H) Psub : subglottic pressure.

HNR
 QxM
 G R
 jitter(=.04), HNR(=.01), QxM(=.05), CFx
 (=.04)

QxSD
 1-3)5)8)
 Yonekawa³⁾ Ahn⁸⁾
 40~50

가
 가
 가
 50
 83% 10 73.5%,

라인케 부중

20 48% Ahn ⁴⁾ ¹⁴⁾¹⁵⁾ 가 가

. Koufman ¹²⁾

24 pH monitoring ¹⁶⁾¹⁷⁾

48 66% ⁴⁾⁸⁾ ⁹⁾ 가 2

가 2가

가 34 58%

14 23%

Hocevar - Bolte-

zar ¹³⁾ 68% (se-

25 41% 10 verity)

8

2 , FxM

Yonekawa 가

1 61 26 (43%) 가 가

가 2, 3 22 (36%) , 가

13 (21%) 61 ,

(FxM) 105.76 ¹⁾⁹⁾¹⁸⁻²⁰⁾ 2 가

Hz, 165.2 Hz 가

(: =0.18, 가

: =0.003). 가 가

(<0.0001)

⁷⁾ , MFR

가 가

가 가

가

MFR shimmer HNR jitter

가 MPT 12.79 8.51

jitter, shimmer, HNR

가 jitter, HNR

QxM, CFx

(FxSD)가 (CFx) 가

가

(CAx)

가

(QxM)

(QxSD) 가 가

가

가 가
가 가
가 jitter, HNR (QxM),
(CFx)

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