

양성 후두병변의 레이저 치료

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안 회 영

Laser Treatment of Benign Laryngeal Lesion

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서 론

본 연구는 양성 후두병변의 레이저 치료에 관한 것으로, 레이저의 종류, 출력, spot size, 파장, 그리고 수술 방법 등에 따라 치료 결과가 달라질 수 있다. 레이저 치료는 수술 후 회복 기간이 짧고, 통증이 적으며, 재발률이 낮다는 장점이 있다. 그러나 레이저 치료는 수술 전 정확한 진단과 수술 후 관리가 중요하다. 레이저 치료의 종류로는 CO₂, Nd : YAG, KTP, Argon, Diode, Holmium : YAG 등이 있다. 각각의 레이저는 장단점이 있으므로, 환자의 병변 특성에 맞는 레이저를 선택해야 한다. 레이저 치료의 출력과 spot size도 치료 결과에 영향을 미친다. 일반적으로 출력은 높을수록 치료 효과가 좋지만, 조직 손상의 위험도 높아진다. spot size는 작을수록 정밀한 수술이 가능하지만, 넓은 범위에 대한 치료에는 한계가 있다. 레이저 치료의 수술 방법으로는 suspension laryngoscopy, supraglottic scope, suction evacuator 등이 있다. 각각의 수술 방법도 치료 결과에 영향을 미친다. 레이저 치료의 종류, 출력, spot size, 파장, 그리고 수술 방법에 따라 치료 결과가 달라질 수 있다. 레이저 치료는 수술 후 회복 기간이 짧고, 통증이 적으며, 재발률이 낮다는 장점이 있다. 그러나 레이저 치료는 수술 전 정확한 진단과 수술 후 관리가 중요하다. 레이저 치료의 종류로는 CO₂, Nd : YAG, KTP, Argon, Diode, Holmium : YAG 등이 있다. 각각의 레이저는 장단점이 있으므로, 환자의 병변 특성에 맞는 레이저를 선택해야 한다. 레이저 치료의 출력과 spot size도 치료 결과에 영향을 미친다. 일반적으로 출력은 높을수록 치료 효과가 좋지만, 조직 손상의 위험도 높아진다. spot size는 작을수록 정밀한 수술이 가능하지만, 넓은 범위에 대한 치료에는 한계가 있다. 레이저 치료의 수술 방법으로는 suspension laryngoscopy, supraglottic scope, suction evacuator 등이 있다. 각각의 수술 방법도 치료 결과에 영향을 미친다.

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(Table 1).²⁻⁴⁾

Table 1. Differences in postsurgical state between a cold knife and laser

	Laser	Cold knife
Coagulation necrosis	Present	Absent
Inflammatory reaction	Not marked	Frequently marked
Epithelization	3 wks	2 wks
Excessive granulation	None	Frequent
Scar formation	Minimum	Occasionally marked



Fig. 1. Laryngeal microscopic surgery in use with CO₂ laser and micro-manipulator.

가
CO₂ 가
mainipulator 가
,

본
사용기구

CO₂
CO₂
mainipu-
lator,
hand piece, adaptor
CO₂ hand piece
(ventilating bronchoscope, suspension laryngo-
scope) . hand piece

가 가
, hand piece
(defocused)
가 가¹⁸⁾
mainipu-
lator adaptor가

Joy stick
(aimed beam)
(Fig. 1).¹⁾²⁾²³⁾
adaptor
가 가 가 , fiber
ventilating bronchoscope
. Adap-
tor , 1)
2) manipulator
guide , 3)
scan , 4)
(Fig. 2).
CO₂
가
1)
CO₂
mainipulator 가
Nd : YAG
KTP
CO₂
400 mm
microscopic - micromanupulator spot
size가 250 micron
CO₂
²⁶⁾

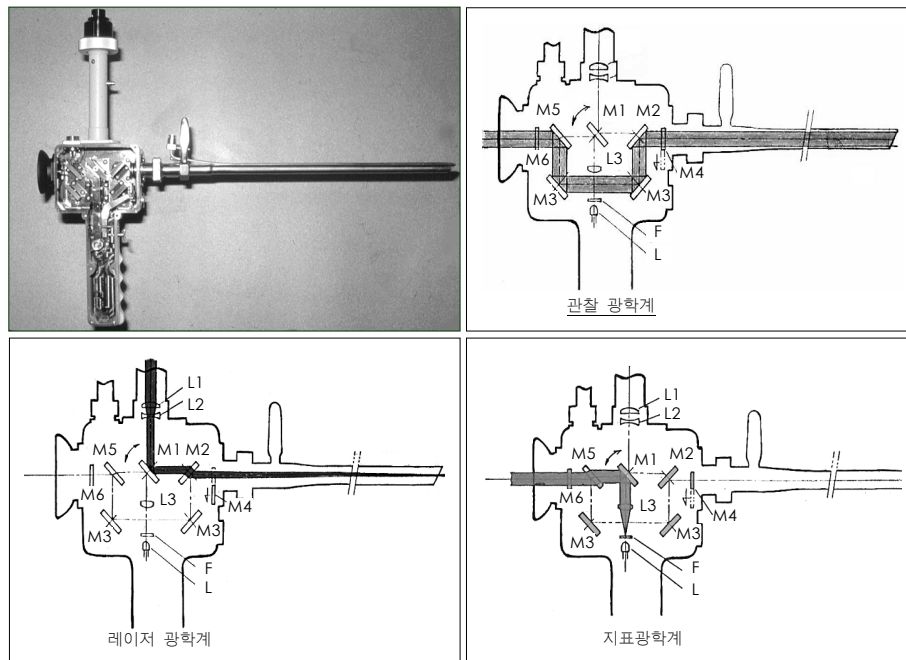


Fig. 2. Laser bronchoscope.

Nd : YAG

1.060 μm 가 extinction length가 60 mm

³⁾⁴⁾ hand piece

hand piece contact type
non contact type 가

tact type

piece tip 가 sharp tip
CO₂ 가 (Fig. 3).³⁾

Nd : YAG

, hand piece

KTP

0.532 μm 가
size(200 micron) CO₂

Table 2. Characteristics of lasers

Laser type	Aim accuracy*	Surgical precision#
CO ₂	Low	High
Nd : YAG	Medium	Low
KTP	High	High

* : function of wavelength and delivery method

: function of wavelength

³⁾ KTP 532 Nd : YAG KTP/
YAG 가 가 Nd : YAG CO₂

(Table 2).

Argon

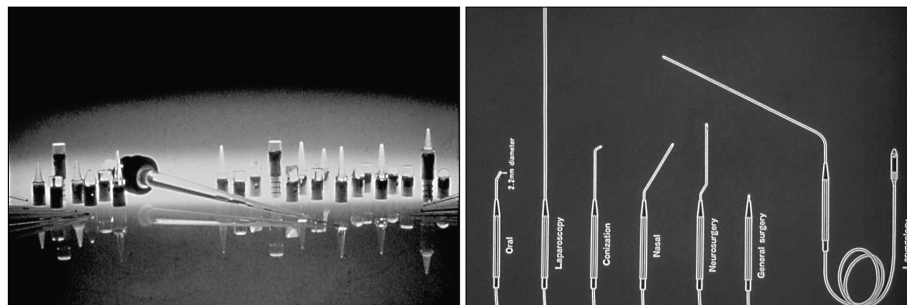
-

가

0.488~0.514 μm

spot Argon extinction length(90%가
)가 m
³⁾

Fig. 3. Nd : YAG laser ; tips (left) and hand pieces (right).



가 spot size 0.15 mm

가

가

가

4)

가

argon, KTP Nd : YAG

3)

CO₂, Nd : YAG, KTP Argon

(endotracheal tube) (reflex-

tive tape : Xomed Treace Laser Shield , Xomed

Treace, Jacksonville, FL) (re-

flexive metals : LaserFlex, Malinckrodt, Los Angeles,

CA)

PVC(plain polyvinyl chloride) 가

An-

gled vocal fold protector

(anterior commissure)

(web)

1)

CO₂, Nd : YAG, Argon KTP

(delivery system) 가 CO₂

20)

CO₂

pladget

16

25

가 400 mm

800 레이저 수술시 주의점

μm 200 μm

가 가 3)

Nd : YAG, KTP Argon

가

(halothane, enflurane)

가

aluminium foil

aluminium foil

CO₂

가

(closed ventilator system)

가

가

CO₂

(cuff)

methylene blue (cuff)

⁶⁾

Argon

plexiglass 2422 filter, Nd : YAG

Schott BG 18 KG filter가

KTP

dual - wave length

multi - wave length goggles

gth

Jet ventilation

(FiO₂) 30%

(helium) 가 ¹³⁾²⁰⁾

(

hand

piece

jet ventilation

⁶⁾²⁹⁾³⁹⁾

가

가

가

ANSI(American National Standards Institute)

Z - 136 1973

가 ²³⁾

(non - risk),

임상적용

(low - risk), , (high - risk), (closed - risk)

(nodule), (polyp), (cyst)

(pedunculated polyp)

¹¹⁾²⁷⁾²⁸⁾

microspot micromanipulator

3 watt

ANSI - Z 136.1

(focused)

가 ⁴⁾

(lamina propria)

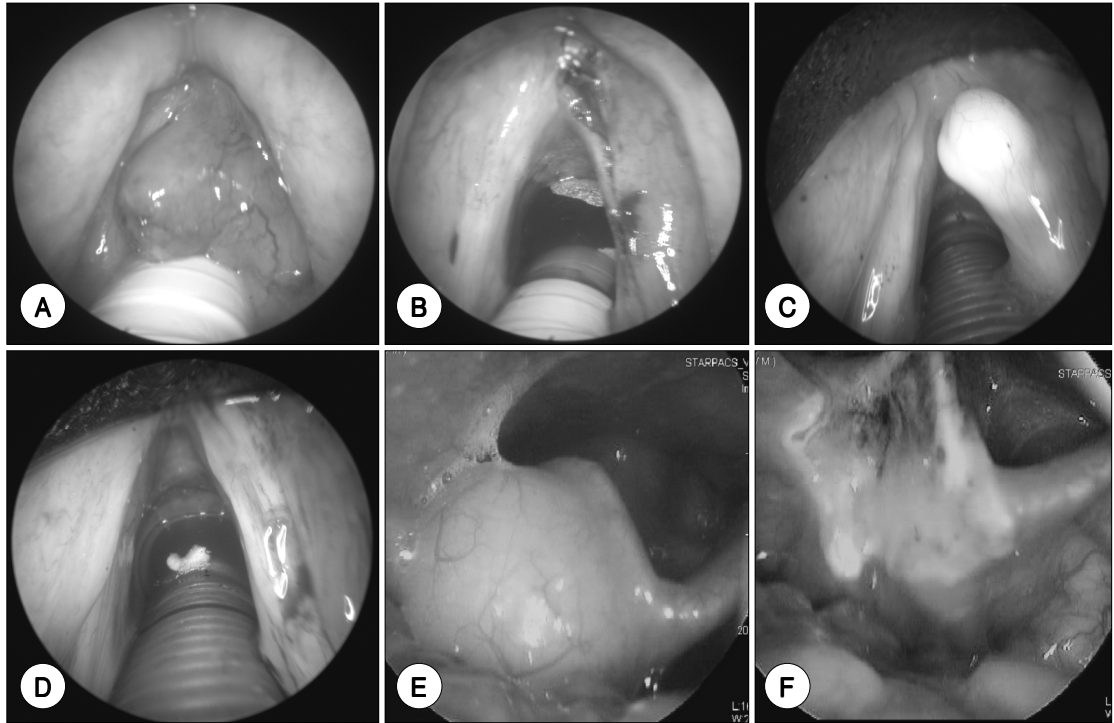


Fig. 4. Intraoperative view of vocal polyp (A), inclusion cyst (C), epiglottic cyst (E) before laser microsurgical excision and immediately after excision (B, D, F).

(Fig. 4).

가 .

CO₂

Nd : YAG

(ses-

sile polyp),

가 .

300~400 μmm 1~2 watt

가

(liner vaporization)

가

focused 250

μmm 2~3 watt . 0.1

0.5

defocused

gical cottonoid 2

(Vascular lesions)

Nd : YAG

, Nd : YAG 4 mm

가

(cold microsurgical technique)

neurosurgical

가 . Nd : 가
YAG 가 20 W

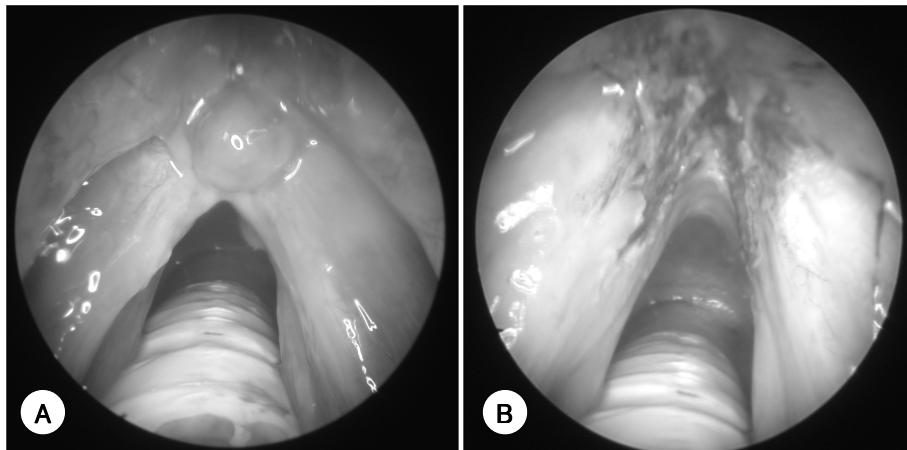


Fig. 5. (A) Intraoperative view of anterior glottic web before laser microsurgical web lysis and (B) immediately after web lysis.

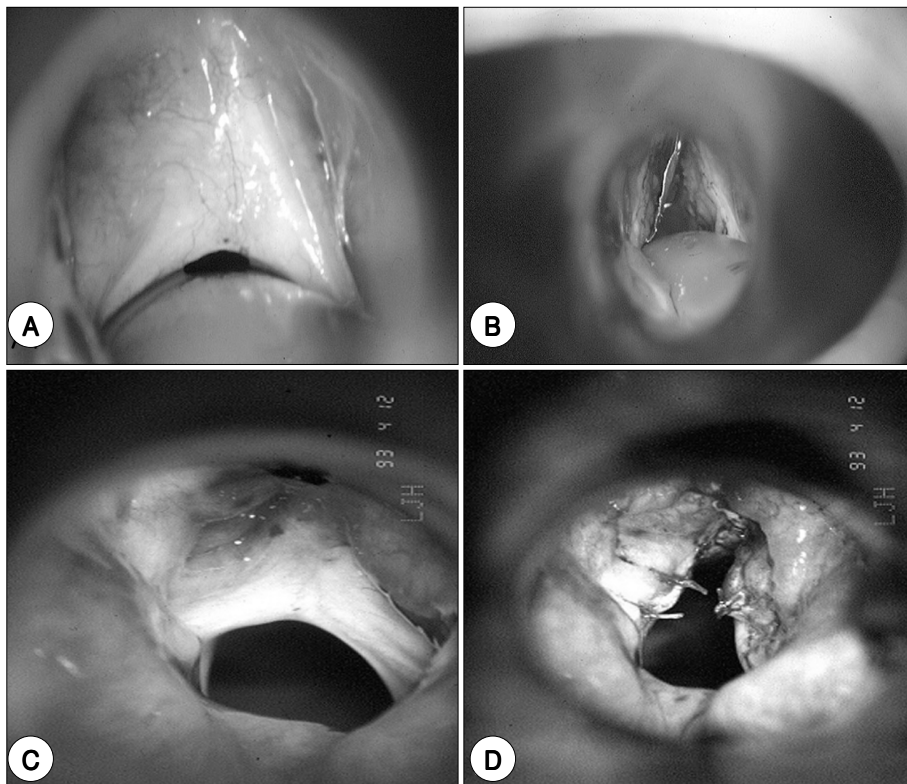


Fig. 6. (A, C) Endoscopic findings of anterior glottic web, (B) keel insertion after CO₂ laser web lysis, (D) suture after micro-trapdoor flap technique using CO₂ laser.

:
 .
 6
 가 (fixation)
 (stenosis) . McGuirt
 (1984) venturi , CO₂
 17)
 CO₂
 Fearon Cinnamon (1976)
 CO₂ Simpson
 (1979) 2
 30) Strong(1979)
 silastic roll stent (spot - welded)
 32) 가 Dedo Sooy(1984) ,
 CO₂
 1/3 (micro - trapdoor flap)
 8) CO₂
 , 3~4 가, (mi-
 4 cro - trapdoor flap)
 8 stent
 (anterior glottic webs) CO₂
 microknife . Dedo
 가 1 cm
 8)
 , fibrin glue, 1 cm
 (Fig. 5, 6). (radial)
 2 CO₂ laser 가
 keel stent 15) Silastic
 (Dow Corning, Arlington, TN)
 (cricothyroid
 membrane), (thyrohyoid membrane) (granulation tissue)
 CO₂
 (posterior glottic stenosis)
 (abduction)
 (cricoarytenoid joint)

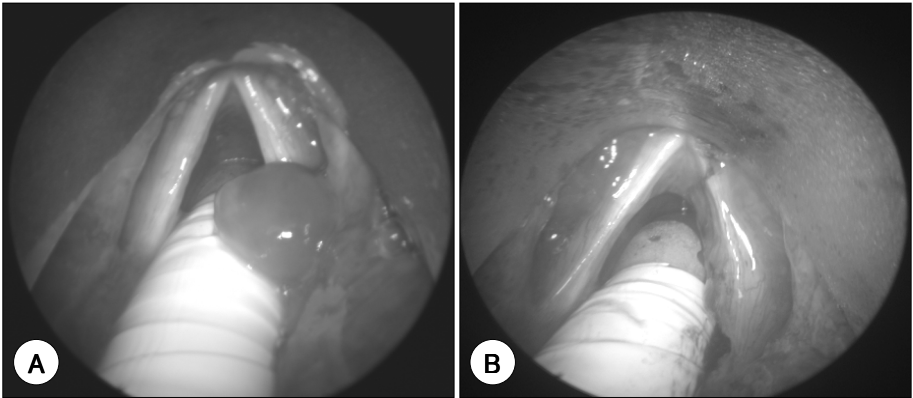


Fig. 7. (A) Intraoperative view of intubation granuloma of right vocal cord before laser microsurgical excision and (B) immediately after excision.

(Fig. 7).

가

CO₂

(posterior cordectomy),⁹⁾ (medial arytenoidectomy)⁷⁾ (standard total arytenoidectomy)²⁴⁾ (posterior cordectomy) Dennis CO₂, Kashima KTP⁹⁾

가

(suprastoma) CO₂ Crumley

(body)⁷⁾ (ary-

piglottic fold) 가

(Bilateral vocal - fold immobility) (arytenoidectomy) 20 Thornell

33)34) 가 CO₂ 1972

CO₂
(minimal excision)
5)
CO₂ focused mode
250 μm
(: 2~8 W, 0.3~0.8 mm spot size, 0.1~0.5
)

1~2 mm
31)
slightly defocused mode

6 (Fig. 8).¹²⁾

가

가 CO₂

CO₂

defocused mode

(postoperative care)

2

2

가

proton pump inhibitor

4

2

가

Table 3. Complications of laser treatment

Complications	Numbers
Endotracheal explosion	28
Laryngeal web	15
Facial burn	9
Pneumothorax	5
Laryngeal stenosis	4
Endotracheal cuff ignition	3
Postoperative hemorrhage	3
Subglottic stenosis	3
Cottonoid ignition	2
Subcutaneous emphysema	2
Laryngeal edema	2
Tracheal stenosis	1
Endotracheal explosion	1
Perichondritis	1
C carbon granuloma	1
Pharyngeal burn	1
Total	81

49/210 physicians (23.3%), Arch Otolaryngol Head Neck Surg 1984 ; 110

가 (Table 3).

cottonid

가 1~6 6

결론

가 CO₂

가 CO₂

가

20

가 CO₂ 250 μm dichroic

mirror coaxial visualization

가

(cold - knife microsurgical technique)

중심 단어 :

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