Thyroid Surgery and the Larynx: Voice Optimization

Intraoperative Injury of the RLN: Ansa Cervicalis to the RLN Anastomosis

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Faculty/Presenter Disclosure

• **Faculty:** [Akira Miyauchi]

• **Relationships with commercial interests:**
  – I have nothing to declare.
If unilateral RLN is cut or injured;

Vocal cord on that side does not move fixed at a paramedian position atrophy
looses tension during phonation

Symptoms
hoarseness
mis-swallowing; aspiration
short phonation; waste of air
If you cut the RLN and anastomose the nerve ends, What will happen?

The vocal cord on that side does not restore normal motions.

The reason why this was abandoned in the past.

However, patient’s voice improves.

Why?
During inspiration and phonation, both adductor muscles and abductor muscles contract simultaneously.

**RLN**
Adductor Nerve Fibers : Abductor Nerve Fibers = 3 : 1

**Larynx**
Adductor Muscles >> Abductor Muscles
Vocal cord on that side does not restore normal motions fixed in the median NOT Paralysis Synkinesis recovers from atrophy restores tension during phonation
For good phonation

1. Narrow gap between the vocal cords
2. Good tension of the cords
3. Symmetrical volume and weight of the cords
Vocal cord on that side does not restore normal motions fixed in the median. NOT Paralysis Synkinesis recovers from atrophy restores tension during phonation

Results
improvement in voice
elongation in phonation time
reduction in aspiration
Vocal cord on that side
does not restore normal motions
fixed in the median NOT Paralysis Synkinesis
recovers from atrophy
restores tension during phonation

Results
improvement in voice
elongation in phonation time
reduction in aspiration

Paradoxical movements may occur in cases of extreme
misdirection in regeneration.
In 1990, I devised ARA with my own idea. However, this method had been reported by Dr. Crumley RL in 1986.

Professor Roger L. Crumley, University of California, Irvine Medical Center, Professor Gregory W. Randolph, Harvard Medical School, Surgery of the Thyroid and Parathyroid glands at Massachusetts General Hospital, November 7 - 9, 2008.
Anatomy of the Ansa Cervicalis

- Radix sup.
- Sternothyroid m.
- Sternohyoid m.
- Ansa cervicalis
- Omohyoid m.
- CCA
- IJV
- Radix inf.
Outcome of Ansa-Recurrent Laryngeal Nerve Anastomosis

The vocal cord on that side does not restore normal motions fixed in the median recovers from atrophy restores tension during phonation

Results
improvement in voice elongation in phonation time reduction in aspiration

No paradoxical movements.
Free Nerve Grafting
Ansa-Recurrent Laryngeal Nerve Anastomosis

RLN resected at Berry’s Ligament
Incising the Inferior Pharyngeal Constrictor Muscle to Identify the Distal Stump of the RLN

Miyauchi A. Surgical techniques in reconstruction of injured RLN for voice rehabilitation. Intermerc Co., Tokyo, 2001
Anatomy of the RLN

Miyauchi A. Surgical techniques in reconstruction of injured RLN for voice rehabilitation. Intermerc Co., Tokyo, 2001
Distal Stump of the RLN found behind the Thyroid Cartilage
Ansa-RLN Anastomosis made behind the Thyroid Cartilage

Instruments for Nerve Reconstruction
End-to-end Anastomosis
This is not easy.
Thyroid cancer often involves the RLN at the ligament of Berry.

Preservation of the RLN is very difficult because only one side of the nerve is visible.

If the portion of the RLN is resected, we have to find the distal stump of the nerve. This is not easy.

In order to overcome these problems, we identify the peripheral RLN through Laryngeal Approach before dissecting the nerve.

Chief Complaint: hoarseness for 2 months.

Physical Examination: a hard tumor 1.7cm in the left lobe fixed to the trachea.

Laryngoscopy: left vocal cord paralysis

FNAC: papillary carcinoma
Summary

1. Ansa cervicalis-RLN anastomosis gives recovery in phonatory function in patients who had the RLN resected, although the vocal cord does not restore normal motions.

2. The anastomosis can be performed at an easy position in the vicinity of the larynx. Time for recovery in voice should be shorter than free nerve grafting.

3. This technique can be applied to RLN paralysis due to cervical vagus lesions, mediastinal lesions, and theoretically central causes.
Thank you for your attention. From Kobe to the world.