

Associated Paralyzes of the Larynx Due to Head Injury After Motor Scooter Accident

—A Case Report—

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It is well known that there is a world-wide tendency to increase the number of road casualties, fatally and nonfatally.¹⁾²⁾

In Japan, 41,100 persons were killed in the year 1961 by traffic accidents, especially by car accidents, according to the statistical report issued by the Department of Vital Statistics of the Ministry of Welfare.³⁾

Many of the injured fatally, even nonfatally, suffered from a various kind of head injury which ranged from laceration and head contusion to the bone fracture of the skull.

Some of the nonfatal cases with a head trauma may have a paresis or paralysis of a various kind of the nerves, centrally and peripherally, in various degree.

Reports on the vocal cord paralysis or laryngeal paralysis after car accidents were seen in the journals in the United States of America and Europe.⁹⁾¹⁰⁾

In Japan, the incidence of motor scooter accidents is much higher than that of automobile, and is recently increasing amazingly like that happened in England.³⁾¹⁾

Recently, we had a case with associated paralyzes of the larynx due to head injury after motor scooter accident.

CASE REPORT

A 29 year-old business man was admitted to our clinic on March 26, 1962, because of the persistent hoarseness and so forth after head injury.

Family history: There was no remarkable note obtained. His parents are alive and well. He is the only child of his parents. No one of his relations has epilepsy or epileptic fits.

Past history: He had the usual childhood disease without any sequela. No diphtheria of any organs was noted. No pericarditis, broncho-pneumopleuritis or trauma of the neck and head was experienced.

Present illness: Approximately 3 months prior to this admission when he drove his motor scooter in high speed and what's more in drunk state, he slipped down sud-

denly and had the contusion of his left head against the hard road surface. He became unconscious immediately and was transferred to a private hospital by some strangers shortly after the accident. The bleeding was noted at the wound of the left temporal region and the left external auditory canal from where the bleeding continued until the next morning. When he got his mind again following the unconsciousness of five days duration, he noticed many symptoms such as hoarseness, rhinolalia aperta, regurgitation of liquid diets through the oronasal apertures and some weakness of the right arm muscle.

During that admission, the bone fracture of the skull at the left temporal region was revealed by the X-ray examination, and his symptoms mentioned above improved slightly.

On the last day of this January (34 days hospitalization), he was discharged from that hospital, and was treated his remained symptoms as out-patient.

On a day of approximately 40 days after the discharge, he consulted with another doctor about his remained symptoms, and was said that "his vocal cord was paralyzed" and was referred to this medical school hospital.

On March 22, 1962, he was first seen at our hospital on his foot and made an appointment of admission to the otolaryngology ward on March 26.

Examination:

A moderately short-thin postured and fairly flaccid (not apathetic) faced young man who complained of many symptoms such as; hoarseness, rhinolalia aperta, regurgitation of liquid diets through the oronasal apertures, feeling of fullness of the left ear without tinnitus, right shoulder pain and/or distress, some difficulty in phonating in a large voice, loss of appetite and some disturbances of memory (especially "delay to remind"), had a fairly good general condition of the body of 159 cm. in height, 49.5 kg, temperature 36.5°C. (97.7°F), puls 70, respiration 20, B.P. 108/60 and cooperative mind.

In spite of those many complaints, however, at present the patient did not note the following signs such as; headach, vertigo, nausea, dyspnea, cough, fit of palpitation, faint and visual trouble.

On complaining "disturbance of memory", his memory of many things before accident remained well, however, he said it sometimes took relatively long time to remind a name of one of his friends who was fairly well known, but not intimate.

Head: Normal in configuration. Short linear scar existed on the left temporal region, however, well healed and non-symptomatic. No tenderness at region was detected.

Face: Normal, except for slightly suggestive flaccid face on both sides, especially at the cheek. There was a questionable difference in the depth of the nasolabial fold between both sides. At rest, the right nasolabial fold was shallow rather than the left. On saying "u", the centre of the upper and lower lips deviated to the right



Figure 1.
At rest.



Figure 2.
Saying "u".



Figure 3.
Saying "cheese"

slightly. But, no remarkable difference of the appearance between each noasolabial folds was noted. On saying "cheese", patient could make symmetrical folds as shown in figures. (Fig. 1, 2, 3)

Eyes: Ptosis was not revealed on both sides, movement of the eye ball was normal; corneal reflex was normal.

Muscular power to lift the upper lids and forehead was slightly weak, however symmetrically. The pupils were round and equal, and reacted to the light quickly.

Neck: Supple, no torticollis. No marked atrophy of the sternocleidmastoid muscles. No mass or lymphnode palpable.

Ears: The left eardrum showed moderate engorgement of the malleolar vessels, but no perforation. The right eardrum has a whitish opaque appearance.

Nose: The nasal septum deviated to the left. The bulla ethmoid in the left middle meatus. The left inferior turbinate was edematously swollen. In both middle meatuses, the moderate amounts of the whitish discharge existed.

Mouth, tongue and soft palate: General appearance of the mouth was within normal limits. On inspiring very tenderly, the raphe palatini showed the line to convex to left slightly and the tip of the uvula pointed to left fairly; and the right side of the tongue became short and voluminous. The left palatal arch elevated upward more than the right. On inspiring strongly, the raphi palatini showed a line to convex to the left markedly and the tip of the uvula pointed downward to the left. The palatal arch became dominantly asymmetric. (Fig. 4, 5, 6) However, the movement of the tongue in all directions were done voluntarily well.

Choana: Normal.

Larynx: On the indirect laryngoscopy, the epiglottis and arytenoids were normal. The right vocal cord was immovable and took a midline position on inspiration.

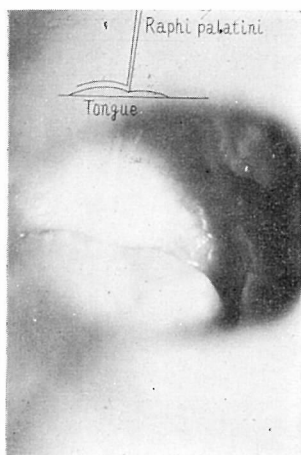


Fig. 4. At only opening his mouth widely, the Raphi palatini is seen vertically and straightly.

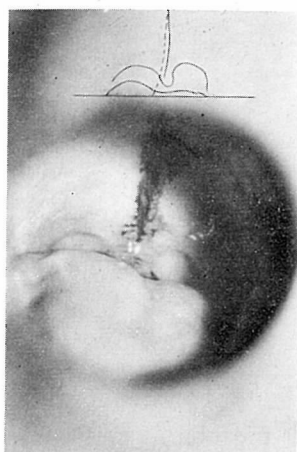


Fig. 5. On inspiring tenderly, the line of the raphi palatini convexas to the left.

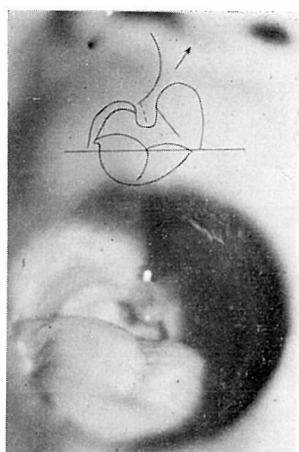


Fig. 6. On inspiring strongly, the line of the raphi palatini to left dominantly and the palatal arch of the left side upward, the tip of uvula points to the left.

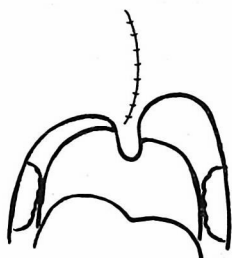


Fig. 6'. Schematic view

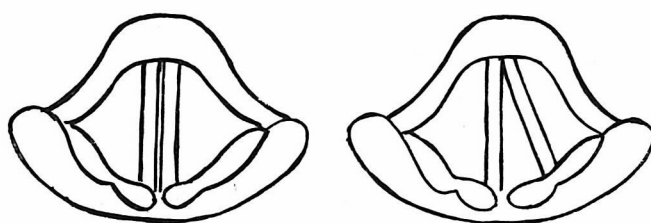


Fig. 7.

During phonation.
Linear space is seen
between the cords.

In inspiration.
Right vocal cord is in
a midline position.

During phonation, both vocal cords did not close tightly, remaining a linear space as shown in figure. (Fig. 7)

Chest: The chest was symmetrical, and the heart and lungs were clear to perc-

sion and auscultation.

Abdomen: There was no scar visible, no mass or tenderness palpable.

Extremities: Normal shaped and moved well voluntarily. However, right shoulder muscle was slightly atrophic and flaccid rather than the left, as shown in figure. (Fig. 8)

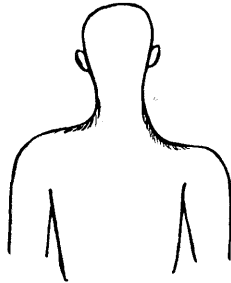


Fig. 8. View of the back
Atrophic and flaccid right shoulder muscles.

Laboratory findings:

The peripheral blood examination revealed red blood cell was 442×10^4 , hematocrit 41.3 per cent, MCV 93.2%; white blood cells 5300 with 0.5% band form neutrophils, 77.5% segmented neutrophils, 18.5% lymphocytes, 3.5% monocytes and 0.5% of eosinophils. Examination of the blood revealed a hemoglobin of 14.5 gm per 100 ml, a hematocrit 43.0 per cent, a MCC 33.8%, a serum protein 6.2gm per 100 ml, a blood sugar 84 mg per 100 ml, an albumin 3.6 and a globulin 2.6 gm per 100 ml, a A/G ratio 1.38; And icteric index was 5.

Examination of urine revealed normal with negative protein, negative sugar. However, there was a few RBC and WBC in the sediment per a low power field.

Serologic tests for syphilis was negative according to the blood Wassermann test, a glass plate method and agglutination reaction test.

A lumbar puncture revealed watery clear fluid under an initial pressure equivalent to 175 mm H₂O and a final pressure to 100 mm H₂O after removal of 3 ml. of the fluid, and well responded to Queckenstedt's test.

Spinal fluid analyses disclosed a protein of 44 mg/dl, a sugar 44 mg/dl, a chloride of 426 mg per 100 ml. The colloidal gold test was 1122000000.

The hearing test showed mild loss of the left side. The labyrinthine test revealed as followed: spontaneous nystagmus was in all directions and positions. Induced nystagmus by a rotation test was within normal limits. Past-pointing test was done normally.

Waltzing test (fifty steps) within normal limits, however, moving to the left backward a short distance.

Romberg's and Mann's test were negative. Goniometer test was normal.

The electrocardiogram showed a sinus bradycardia (57/min) and semiventricular position, but no other remarkable abnormality. The electroencephalogram showed "no abnormality".

The X-ray films of the skull taken by the Schüller's view disclosed a considerable linear fracture on the left temporal bone (Fig. 9)



Fig. 9. X-ray film taken by Schüller's view revealed a linear fracture of the left temporal bone.

Angiography of the brain revealed the flow of the contrast material which was injected into the left internal carotid artery, showing some narrowing. So, a small amount of the contrast material was seen in the arteria cerebri media; and the delay of the contrast to flow through the vessels was so dominant that it took three to four times more than the usual and normal one. No visible dye in the arteria cerebri anterior was observed. A film of 5 second after injection showed that the dye remained still in the arterial vessels. (Fig. 10, 11) Examination of the taste for salt, sugar, acid juice and bitter juice, disclosed some reduction or abnormality, especial-

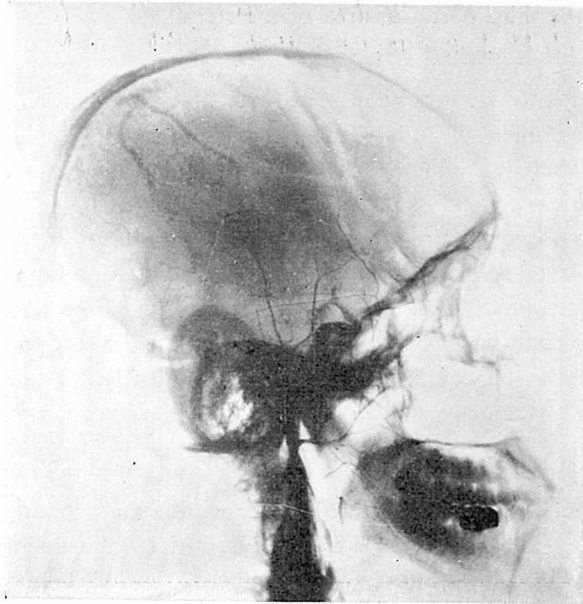


Fig. 10. Angiographic film taken immediately after dye injection. Suggesting a narrowing of the arterial vessels at or near the carotid siphon.

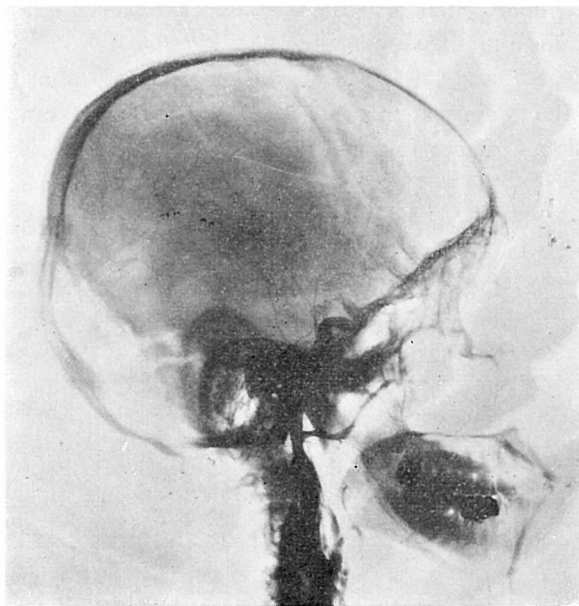


Fig. 11 Angiographic film taken 5 second after dye injection

ly at the half or one third posterior area of the right side.

Treatment and hospital course:

Palliative treatment including vitamin B₁ 100 mg injection I.V., Vagostigmin 0.5 mg injection subcutaneously and Adenosine triphosphate (Adephos-Kowa) 10 mg injection I.M., once daily. The massage of the shoulder and arm was done at the physiotherapy service.

Hospital course progressed improving slightly.

On the 25th hospital day, he was discharged from here for a domestic reason with some remained sign and symptoms, i.e., hoarseness and objective findings of the midposition of the right vocal cord and the paralysis of the soft palate.

Generally, however, his condition is improving gradually.

DISCUSSION

This patient has i) the history of left head contusion and wound at the left temporal region against the hard road surface followed by the unconsciousness of 5 days duration, ii) the demonstrated fracture line of the left temporal bone of the skull by the X-ray film, and iii) some narrowing of the left cerebral artery at the carotis syphon area of the internal carotid artery by the angiography; and many findings of paralyzes of the right vocal cord, the right side of the soft palate and tongue (only taste), and the shoulder muscle atrophy (mild).

In view of these findings, we concluded that this case was suffering from the right IX, X, XIth cranial nerve paralyzes (so-called associated laryngeal paralyzes) due to left head trauma after a motor scooter accident.

According to Coates et al (1957) (Tables 1 and 2), Goto et al (1945), and Okinaka et al (1953), the findings of this case are consistent with Vernet syndrome, and in another expression, "jugular foramen syndrome".

TABLE 1 Neurologic (Associated Vocal Cord Paralyzes) Combinations

Syndrome	Paralysis of				
	IX	X		XI	XII
	Taste	Vocal Cord	Palate	Shoulder	Tongue
Collet & Sicard	+	+	+	+	+
Hughlings Jackson		+	+	+	+
Vernet	+	+	+	+	
Schmidt		+	+	+	
Avellis		+	+		
Tapia		+			+
Villaret	+	+	+		+

TABLE 2 Anatomic (Associated Vocal Cord Paralyses) Considerations

Syndrome	Paralyses in Domain of Nerves	Vagus Lesion
A. Bulbar	IX, X, XI, XII (V, VI, VII, VIII)	High vagus paralysis
B. Jugular foramen	IX, X, XI, XII sympathetic	
C. Parapharyngeal space	IX, X, XII (VII) sympathetic	Deep vagus paralysis
D. Arch of aorta	X, phrenic sympathetic	Recurrent laryngeal n., or deep vagus paralysis

We presumed that these cranial nerves were invaded at the level of the jugular foramen with a compressing lesion, such as a hematoma, or a direct nerve injury by counter-chock. (Fig. 12, 13)

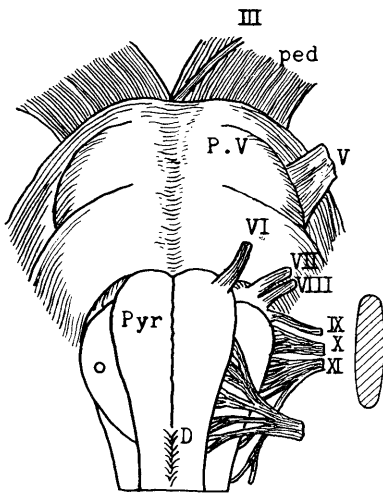


Fig. 12

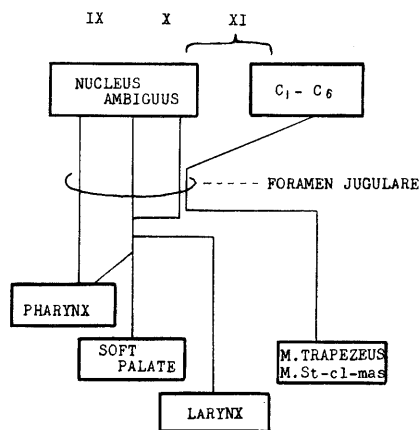


Fig. 13

SUMMARY

A case of associated laryngeal paralyses of the right side (the IX, X, XIth cranial nerves) due to a left head trauma with the fracture line in the left temporal bone of the skull after motor scooter accident is presented. Review of the available literature in Japan and abroad, and some discussions are made.

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