

1년차가 알아야 할 신경근육질환

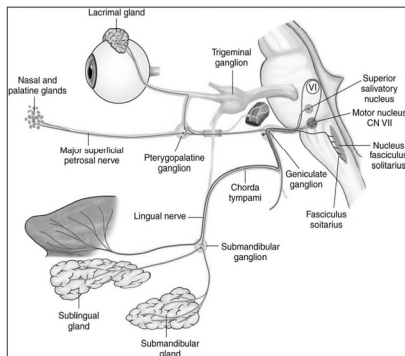
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이 강의가 끝나면 여러분들은,

- 1 Facial palsy를 진단하고 치료할 수 있다.
- 2 Guillain-Barré syndrome을 진단하고 치료할 수 있다.
- 3 Myasthenia gravis를 진단할 수 있다.
- 4 Wrist drop과 foot drop의 원인을 감별할 수 있다.
- 5 스테로이드와 면역글로불린을 올바르게 사용할 수 있다.

Anatomy of Facial Nerve



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Treatment of Bell's palsy

약물치료

- Prednisolone 1 mg/kg/day (up to 70 mg/day) for 6 days, then tapering off over subsequent 4 days
- Antiviral agent (?)

물리치료

- Variable results in electrical stimulation
- Minimal positive evidence for facial exercise

침치료

- No well-designed studies

수술

- Facial nerve decompression

Treatment of Bell's palsy

For new-onset (72-hrs of symptoms) patients,

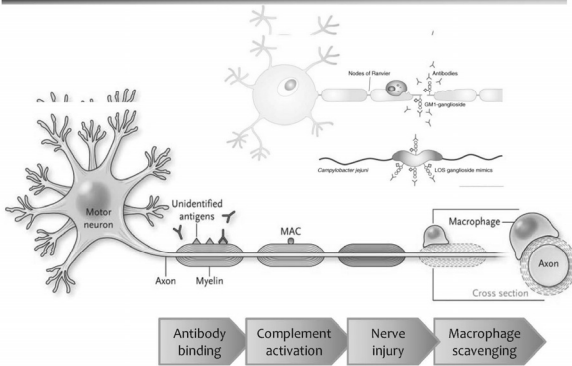
- Steroids are highly likely to be effective and should be offered to increase the possibility of recovery of facial nerve function.
- Antiviral agents in combination with steroids do not increase the probability of facial function recovery by > 7%. Patients *might be offered* antivirals in addition to steroid, and should be counseled that the benefit has not been established and its benefit is modest at best.

AAN. Neurology (2012)

Clinical Vignette (1)

- M/ 40
- 주호소: 3일 전부터 진행되는 사지 위약감
- 병력
2 주전 제주도 여행 중 감기가 심하게 걸려 일주일간 앓음
3 일전 발가락 끝이 저리면서 걸을 때 발목을 자주 접지름
전일부터는 양 손아귀 힘이 빠지면서 물건을 자주 놓침
- 신경계진찰
Symmetric distal and proximal weakness with bilateral facial palsy
Generalized areflexia
Normal sensory and cerebellar function

Guillain-Barré syndrome



Guillain-Barré syndrome

- Demonstration of elevated spinal fluid protein without cells (*albuminocytologic dissociation*) in the two paralyzed French soldiers
- Georges Guillain, Jean-Alexandre Barré, Andre Strohl (1916)



Guillain

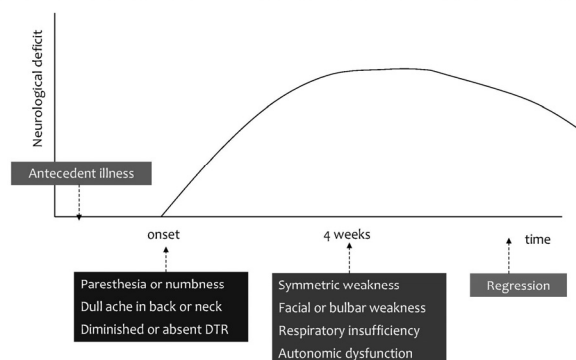


Barré



Strohl

Typical time course of GBS



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Clinical criteria for GBS

- **Symmetric weakness** of more than one limb
- **Absent or reduced tendon reflexes**
- Progression over maximum 4 weeks
- Mild sensory involvement
- Cranial nerve involvement (60 %)
- Autonomic dysfunction (15 %)
- Respiratory failure (up to 25 %)
- **NO** sensory level, sphincter dysfunction, persistent asymmetry

(Asbury AK, et al. Ann Neurol 1990)

Laboratory criteria for GBS

- CSF cell

Acellular or mild lymphocyte-dominant pleocytosis ($<50/\text{mm}^3$)

Rapid decrease in the disease course

Persistent pleocytosis refer alternative or additional diagnosis

- CSF Protein

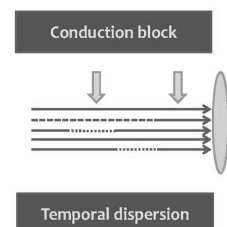
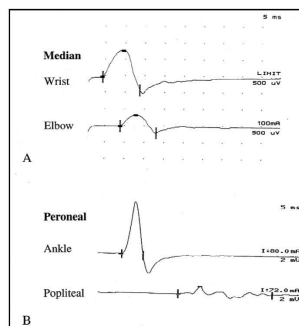
Albumino-cytologic dissociation

Normal during the first few days of symptom

80 % one week or more after onset

Peak in 4 to 6 weeks

Nerve conduction study in GBS



Treatment of GBS

- Give general good care
- Frequent watch for respiratory failure
⇒ parallel with weakness of shoulder elevation and neck flexion
- IV immunoglobulin (0.4g/kg/day for 5 days) within first two weeks
Severely affected patients (inability to walk unaided)
Secondary deterioration after initial improvement or stabilization
- Plasma exchange
200 mL/kg/ day E.O.D 4-5 times
Sepsis, shock, air embolism

Signs and symptoms of respiratory failure

- | | |
|--------------------------------|------------------------------------|
| • Morning headaches | • Difficulties handling secretions |
| • Excessive daytime sleepiness | • Restlessness |
| • Frequent nocturnal arousals | • Hyperhidrosis |
| • Lack of restful sleep | • Tachypnea |
| • Dyspnea on exertion | • Tachycardia |
| • Orthopnea | • Weak neck flexion/extension |
| • Staccato speech | • Accessory muscle use |
| • Weak cough | • Paradoxical breathing |

Objective measure of respiratory failure

- Breath count < 20 (< 2 L)
- FVC < 20 mL/kg
- MIP (NIF) > -30 cm H₂O
- MEP < 40 cm H₂O
- Hypoxemia (late sign)
- Hypercapnia (late sign)

FVC, forced vital capacity; MEP, maximal expiratory pressure;
MIP, maximal inspiratory pressure; NIF, negative inspiratory force

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Interventions of respiratory failure

- NPO for patients with dysphagia/risk of aspiration
- Noninvasive ventilation, typically BiPAP with adequate airway protection
- Invasive ventilation
- Serial MIP/NIF and FVC monitoring to aid in decisions on extubation

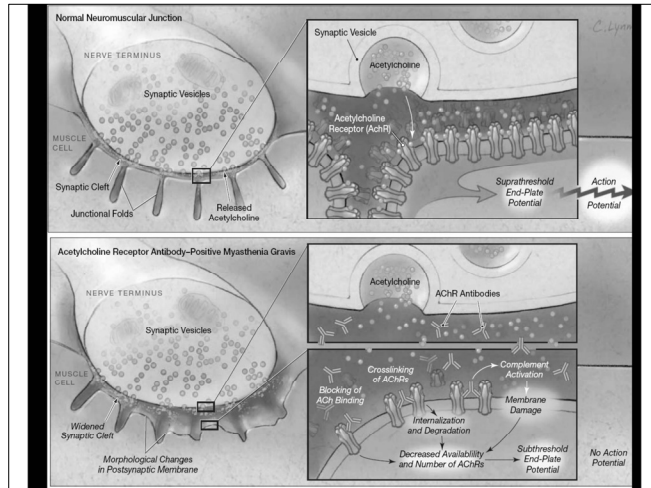
BiPAP, bilevel positive airway pressure

Prognosis of GBS

- Two thirds of patients are unable to walk in maximum weakness
- 20 % of patients remain unable to walk 6 months after onset
- Adverse prognostic factor
 - Older age onset (> 50 yrs)
 - Bed-ridden or mechanical ventilation at nadir
 - Rapid progression
 - Preceding diarrhea
 - Axonal loss in electrophysiological study
 - Low serum IgG level after IVIg administration

Clinical Vignette (2)

- F/ 35
- 주호소: 2달 전부터 시작된 피로감, 3일전부터 시작된 좌측 안검하수와 복시
- 병력, 과거력: 특이 사항 없음
- 신경계진찰
 - Ptosis (OS)
 - Isocoric pupil
 - Limitation of extraocular movement – fluctuating
 - Normal sensory function
 - Normoactive tendon reflex



Clinical features of MG

- Fluctuating weakness (fatigue), worsened in the late of day or after exercise
- Ocular palsies
diplopia, ptosis, Cogan's lid twitching
- Facial and bulbar weakness
reduced facial expression
difficulty in mastication and swallowing
- Proximal muscle weakness



Edrophonium (Tensilon®) test

- Improved strength after administration of anticholinesterase
- Positive more than 90% in generalized MG
- Neostigmine (1.0-1.5 mg) or pyridostigmine (2-3 mg)
- Compare pre- and post- (20-30 minutes) administration
- Pretreatment with atropine (0.5 mg) S.C
- False-positive : brain tumor, ALS, GBS
- False-negative : insufficient injection dosage

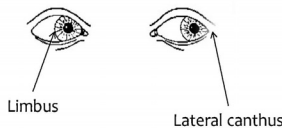
vs. Ice pack test

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How to measure – Ocular

Normal eyelid and eye



Palpebral fissure



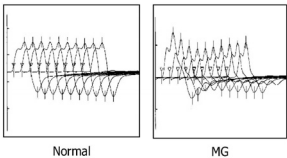
Normal when there is no ptosis or diplopia on the lateral gaze > 60 sec

How to measure – Extraocular

Test Items Weakness (Score)	None (0)	Mild (1)	Moderate (2)	Severe (3)
Facial muscles	Normal lid closure	Complete, weak, some resistance	Complete, without resistance	Incomplete
Swallowing 4 Oz / 120 ml water		Minimal coughing or throat cleaning	Severe coughing /choking or nasal regurgitation	Cannot swallow (Test not attempted)
Speech following counting aloud from 1-50 (onset of dysarthria)	None at #50	Dysarthria (#30-49)	Dysarthria at #10-29	Dysarthria at #9
Arm outstretched (90° sitting)	≥40	90-239	10-89	0-9
Head, lifted (45°supine)	120	30-119	1-29	0
Leg outstretched (45°supine)	100	31-99	1-30	0

Laboratory test for MG

- Acetylcholine receptor antibody**
 - 85 % of generalized MG and 60 % of ocular MG patients
 - No correlation with the severity of disease
 - Seronegative patients (anti-MuSK antibody)
- Repetitive nerve stimulation test (Jolly test)**
 - Decremental response
 - Normal response in ocular MG



Thymus in MG

- Thymic hyperplasia (65 %)
- Thymoma (10-15 %)
- Thymectomy is never, never, never emergency!!!



Drugs inducing or exacerbating myasthenic weakness

Category	Drugs
Anesthetic agent	Nondepolarizing neuromuscular blocking agents Local anesthetics (e.g., procaine, xylocaine)
Antibiotics	Aminoglycosides (e.g., gentamycin, tobramycin) Beta-lactamase (e.g., ampicillin, penicillin) Fluoroquinolones (e.g., ciprofloxacin, norfloxacin) Macrolides (e.g., azithromycin, erythromycin) Sulfonamides, Tetracyclines, Clindamycin Others (e.g., polymyxin B, vancomycin)
Anti-rheumatic agents	Penicillamine, chloroquine
Cardiovascular agents	Antiarrhythmics (e.g., lidocaine, procainamide, quinidine) Beta-blockers (e.g., atenolol, propranolol) Calcium channel blockers (e.g., verapamil) Diuretics
Anticonvulsants	Barbiturates, benzodiazepines, gabapentin, phenytoin
Others	Magnesium salts, lithium, corticosteroid, estrogen, narcotics

Management of myasthenic Crisis

- General Airway assistance and ventilation
- Discontinue anticholinesterases and any offending drug (e.g. antibiotic, β -blocker)
- Cardiac monitoring Identify and treat infection
- Prophylaxis for deep vein thrombosis
- Initiate specific treatment
 - Plasma exchange (removal of 1–1.5 times plasma volume on each session x5)
 - Intravenous immunoglobulin (0.4 mg/kg/day x5)
 - High dose corticosteroids (prednisolone 1 mg/kg/day)

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Focal neuropathies in ER

Acute compression

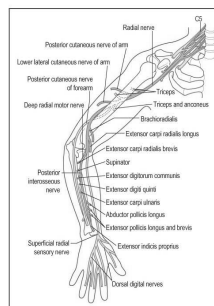
Often abrupt onset
Severe weakness
Less pain and sensory

Entrapment neuropathy

Slowly progressive
Late feature of weakness
Prominent pain and sensory

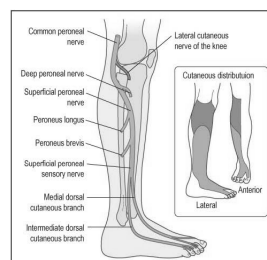
Radial neuropathy

- External compression at the spiral groove (Saturday night palsy)
- DDx with central lesion
- Supportive wrist and finger extension brace



Foot drop in Peroneal neuropathy

- External compression at the fibular head
- Weak ankle dorsiflexion and eversion with preserved plantar flexion and inversion
- Sensory abnormality in dorsum of foot



Commonly prescribed steroid

Corticosteroids	Glucocorticoid potency	Equivalent dose (mg)	Mineralocorticoid potency
Short			
Cortisol (hydrocortisone)	1	20	Yes (1)
Prednisone	4	5	No
Prednisolone	4	5	No (0.8)
Methylprednisolone	5	4	No (0.5)
Intermediate			
Triamcinolone	5	4	No
Long			
Betamethasone	25	0.6	No
Dexamethasone	30	0.75	No (<0.2)

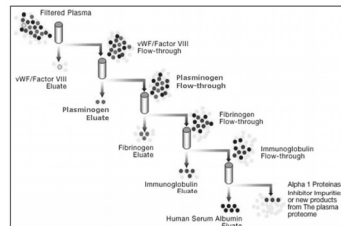
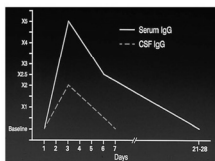
Methylprednisolone 1g = Prednisolone 800 mg, Dexamethasone 16 mg = Prednisolone 120 mg

Steroid pulse therapy

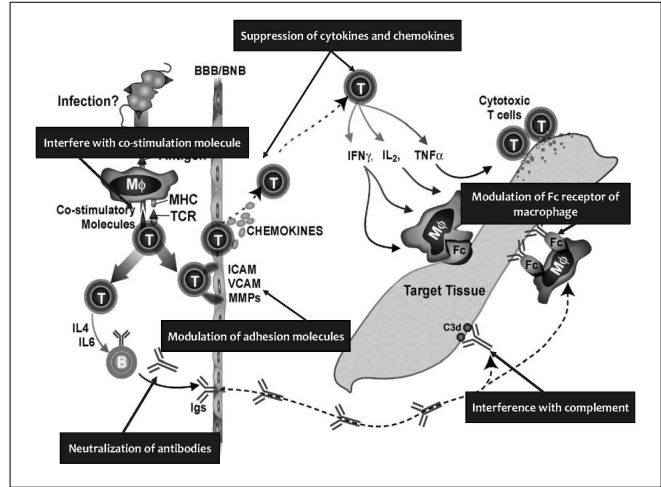
- Infusion of a large dose of corticosteroid
(1g methylprednisolone over 30 min)
- Adverse effect
 - Sudden death / ventricular dysrhythmia
 - Severe infection
 - Hyperglycemia / Pancreatitis
 - Gastrointestinal hemorrhage
 - Acute psychosis

IV Immunoglobulin

- Cold ethanol fraction of human plasma derived from pools of 3,000~10,000 donors → stabilized with glucose, maltose, glycine, sucrose, mannitol or albumin
- IgG (95%), IgA (2.5%), IgM
- Half life: 18-32 days



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Administration of IVIg

- Dosage: 2g/kg (0.4g/kg for 5 days) or 1g/kg for 2 days
- Common minor adverse effect
Headache, chill, myalgia, fever, fatigue
- Major adverse effect
Thromboembolic event, aseptic meningitis
Severe anaphylactic reaction (in case of severe deficiency of IgA)
Renal tubular necrosis: reversible, pre-existing kidney disease or dehydration
- No need to pretreatment of steroid or antihistamine