CN III

Describe the course of CNIII

1. arise in the rostral midbrain at level of superior colliculus
   Rostral to CNIV nuclear complex
   Inferolateral to MLF
2. Edinger Westphal nucleus-cephalad and dorsomedial
   carries parasympathetic preganglionic efferent innervation
   To ciliary muscle and pupillary sphincter
3. Subnuclei: paired nuclei: MR. IR, IO
   Shared nucleu: LP
   Crossed nuclei: SR
4. Fascicular runs ventrally through red nucleus and corticospinal fibers

5. Subarachnoid space travels below PCA and above SCA
   aneurysms occur at junction PCA and ICA

6. Penetrates arachnoid between free and attached borders of tentorium cerebelli.
7. Pierces dura at lateral side of posterior clinoid process traversing roof of cavernous sinus above CN IV

8, superior CNIII : SR AND LP
   inferior CNIII: MR, IR, IO and parasymp fibers

Nuclear third paresis:
1. contralateral SR
2. bilateral ptosis
3. ipsilateral IR, IO and MR

Third nerve fascicle syndrome

Nothnagel's syndrome
  superior cerebellar peduncle
  ipsi CNIII and cerebellar ataxia

Benedikt's syndrome
  red nucleus

ipsi CNII with contralateral hemitremor

Weber's syndrome

cerebral peduncle

contralateral hemiparesis

Claude's syndrome= Benedikt's syndrome and Nothnagel's syndrome

uncle herniation syndrome

space occupying lesion in cerebral hemisphere causing downward displacement and herniation of uncus across the tentorial edge

post communicating artery aneurysm

pupillary involvement

cavernous sinus syndrome

ass with CN IV, V, VI

all muscles not equally involved

orbital syndrome

inferior vs sup division

pupil sparing third

ischemic

w/u: BP, CBC, ESR, glucose, VDRL, FTABS, ANA

observe, >40 with HPT, DM or migraine

recovery by 2 mos, max 6

imaging if pupil invoved, no improvement in 3 mos, aberrant regeneration, or new neuro findings

aberrant regeneration of CN III

lid gaze diskinesis ; pseudo - von Graefe's (lid retraction on downgaze)

Inverse Duane's lid retraction with adduction

pupil gaze dyskinesis: pseudo Argyll Robertson

Pupil constrict in downgaze

Describe the circle of Willis

basilar artery ➔ PCA ➔ Posterior communicating➔ MCA ➔ ACA➔ ant

communicating→ACA→MCA→posterior communicating→PCA→BA

CN IV

Anatomy:

1. Located in caudal mesencephalon at the level of inferior colliculus, continuous with CNIII
2. Curve dorsocaudally and cecussate in ant medullary velum
3. Exits brainstem beneath the inferior colliculus
4. Curves around brain stem beneath the free edge of tentoriumand passes between PCA and post cerebellar artey
5. In cavernoous sinus runs below CNIIIand above V1
6. Enters orbit in SOF above annulus of Zinn

nuclear-fascicular syndrome

fascicular ass with contra Horner's
caused by hg, infarct,demyelination, trauma

subarachnoid space syndrome

bilateral, ant medullary velum, caused by trauma, pinealoma, tentorial meningioma, meningitis and neuro trauma

cavernous sinus syndrome

in conjunction with CNIII, CNVI, CN V
test intorttion in abduction and depression

orbital syndrome

ass with chemosis proptosis and CNIII, CNVI, CN V involvement

isolated fourth

congenital: large fusional amplitude, old photos
acquired: acute diplopia

CNVI (abducens)

1. Floor of fourth ventricles, beneath facial colliculus in caudal pons, nucleus contains motoneurons that supply LR and internuclear neurons that project via the MLF to the MR subdivisionof the contra oculomotor nucleus
2. MLF medial

3. Fascicular portion runs ventrally through PPRF and exits pons in pontomedullary junction
4. Subarachnoid on surface of clivus
5. Through Dorello's canal and enters cavernous sinus

nuclear VI

ipsi conjugated horizontal palsy

brainstem syndrome

ipsilateral Horner's : oculosympatheric central neuron

ipsi INO: MLF

contra hemiparesis: pyramidal tract

Millaer Gubler syndrome: CN 6, ipsi CN 7 and contra hemiparesis

Raymond's syndrome: Cn 6 and contrahemiparesis

Foville's syndrome: nuclear 6, ipsi CN 5, 7, 8 and ipsi Horner's

subarachnoid space syndrome

Increased ICP in Idio intracranial hypertension, also hg, ID, Inflam, infiltra

petrous apex syndrome

Gradenigo's syndrome

cn6, ipsi decreased hearing, ipsi facial pain 5, ipsi facial paralysis

petrous bone fracture

cn 5, 6, 7,8,

pseudo Gradenigo's

nasopharyngeal ca + CS INVASION cn6

cerebellopontine angle tumor

Cavernous sinus syndrome

orbital apex syndrome

isolated Cn 6

observe patients under 15 and over 40

Image pts between 15 and 40

DDX: to

mg

duanes'I

near reflex spasm

blowout ftacture

CET fusion break

CNV

nuclei

mesencephalic: proprioception and deep sensation from masticatory, facial and extraocular muscles

main sensory

Light touch skin and mucous membranes

spinal nucleus and tract

Sensory from V1, V2, V3 in onion skin topography

motor nucleus in the pons

Motor to mastication muscles

Gasserian ganglion

located in Meckel's cave, in proximity to the ICA and post cavernous sinus

V1 : frontal, lacrimal, and nasociliary
V2: infraorbital
V3: motor to masticatory muscles

DECREASED SENSATION
DDX corneal

HSV, post-op, cerbellopontine angle tumors, dysautonomia, congenital

DDX V1:

neoplasm orbital apex, SOF, CS, middle fossa, aneurysm

DDX V2, orbit floor fracture, maxillary antrum ca, perineural spread skin ca, neoplasm in foramen rotundum spheno-pterygoid fossa
DDXV3, nasopharyngeal ca, middle fossa tumour

all divisions: nasopharyngeal ca, cerebellopontine angle, brainstem lesions, intracavernous sinus, demyelination

PAIN

ocular: tear film, ocular inflammation, COD
V1: migraine. Raeder's paratrigeminal neuralgia, HZV< referred, tic douloureux
V2: tic, dopuloureux, nasopharyngeal, temporal mandibular syndrome, dental,
sinusitis
V3: tic, dental
CNVII
sensory root: nervus intermedius tearing salivation and taste
travels with the CNVIII through the internal auditory canal coursing
through the petrous bone exiting thru the stylomastoid foramen
supranuclear facial palsy
contra weakness of lower 2/3 of face
cerebellopontine angle tumor
total ipsi facial weakness, decreased tearing, hyperacusis, decreased
taste to ant 2/3 of tongue,
ass V, VI, VII, Horner's gaze palsy, nystagmus, papilledema, cerebellar
dysfunction
geniculate ganglionitis Ramsay Hunt syndrome
total ipsi facial weakness, decreased tearing, hyperacusis, decreased
taste to ant 2/3 of tongue
Zoster vesicles on tympanic mb
isolated tear deficiency
vidian nerve affected nasopharyngeal , may have CNVI
Bell's palsy
total ipsi facial weakness, decreased tearing, hyperacusis, decreased
taste to ant 2/3 of tongue
isolated total ipsi facial palsy
mastoidopathy, facial trauma
facial diplegia
brainstem contusion, stroke, glioma
Moebius syndrome, ass with bil vi, palatal lingual palsy, deafness,
Deciencies of pectoral and lingual muscles
Extremity defects : dyndactyly, supernumary digits, absent
fingers and toe
MG
Crocodile tears
Spastic facial contractures
pontine neoplasm, unilateral contractur ass with facial weakness

Blepharospam, bil, awake
hemifacial, unilateral , ocurs while sleep

Horizontal gaze abnormalities
conjugate gaze palsy
    Cn VI or PPRF
INO: decrease add in gaze away from MLF lesion, abd nys of contra eye
Cogan's posterior: convergence is intact
Cogan's anterior: absence of convergence, bilateral
WEBINO:bilateral INO
1 and 1/2: ipsi CNVI nucleus, and ipsi MLF