BASIC CRANIAL AND CERVICAL NEUROVASCULAR ANATOMY

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CRANIAL ARTERIAL NEUROVASCULAR SYSTEM ORGANIZATION

• ANTERIOR CIRCULATION
  • CERVICAL SEGMENT CA
    • CCA
    • ECA + BRANCHES
    • ICA
  • CRANIAL VASCULAR ANATOMY
    • EXTRADURAL ICA
      • PETROUS SEGMENT + BRANCHES
      • LACERUM SEGMENT
      • CAVERNOUS SEGMENT + BRANCHES
    • INTRADURAL ICA
      • CLINOIDAL SEGMENT + BRANCHES
      • SUPRACLINOIDAL SEGMENT + BRANCHES
  • MCA + BRANCHES
  • ACA + BRANCHES

• POSTERIOR CIRCULATION
  • CERVICAL EXTRADURAL SEGMENT VA
  • INTRADURAL SEGMENT VA + BRANCHES
  • BA + BRANCHES
    • SCA + BRANCHES
    • PCA + BRANCHES
    • PONTINE PERFORATORS
GENERAL ORGANIZATIONAL OVERVIEW

• WHEN WE DISCUSS THE CEREBRAL CIRCULATION WE DISCUSS IT IN TERMS OF THE ANTERIOR AND POSTERIOR CIRCULATIONS
  • THE ANTERIOR CIRCULATION ARISES FROM THE CAROTID ARTERIES
  • THE POSTERIOR CIRCULATION ARISES FROM THE VERTEBRAL ARTERIES

• WHEN WE DISCUSS THE ANTERIOR AND POSTERIOR CIRCULATIONS WE THINK OF THE EXTRADURAL AND THE INTRADURAL SEGMENTS OF THE VESSELS
  • EXTRADURAL SEGMENTS ARISE OUTSIDE AND EXTEND INSIDE THE SKULL, BUT ARE NOT NEXT TO THE BRAIN IN THE SUBARACHNOID SPACE
  • INTRADURAL SEGMENTS ARE IN THE SKULL AND IN THE SUBARACHNOID SPACE AND ARE THEREFORE IMMEDIATELY NEXT TO THE BRAIN
LARGE COMMON ARTERIAL ABBREVIATIONS

- COMMON CAROTID ARTERY
- EXTERNAL CAROTID ARTERY
- INTERNAL CAROTID ARTERY
- MIDDLE CEREBRAL ARTERY
- ANTERIOR CEREBRAL ARTERY
- ANTERIOR COMMUNICATING ARTERY
- VERTEBRAL ARTERY
- BASILAR ARTERY
- POSTERIOR CEREBRAL ARTERY
- OPHTHALMIC ARTERY
- POSTERIOR COMMUNICATING ARTERY
- ANTERIOR CHOROIDAL ARTERY
- SUPERIOR HYPOPHYSEAL ARTERY
- POSTERIOR INFERIOR CEREBELLAR ARTERY
- ANTERIOR INFERIOR CEREBELLAR ARTERY
- SUPERIOR CEREBELLAR ARTERY

CCA  
ECA  
ICA  
MCA  
ACA  
ACommA  
VA  
BA  
PCA  
OA  
PCommA  
AChA  
SupHypA  
PICA  
AICA  
SCA
EXTRACRANIAL/INTRACRANIAL EXTRADURAL CIRCULATION

• ANTERIOR CIRCULATION
  • CCA
    • ICA
    • CERVICAL
    • PETROUS + BR *
    • LACERUM *
    • CAVERNOUS + BR*
    • SUPERIOR HYPOPHYSEAL**
  • ECA
    • ASCENDING PHARYNGEAL
    • SUPERIOR THYROID
    • LINGUAL
    • FACIAL
    • OCCIPITAL
    • POST AURICULAR
    • INTERNAL MAXILLARY + BR
    • SUPERFICIAL TEMPORAL
  • * = INTRACRANIAL EXTRADURAL LOCATION
  • ** = INTRACRANIAL AND +/- EXTRADURAL

• POSTERIOR CIRCULATION
  • VA
    • PRE FORAMEN TRANSVERSARIUM
    • INTRA FORAMEN TRANSVERSARIUM
    • POST FORAMEN TRANSVERSARIUM
INTRACRANIAL INTRADURAL CIRCULATION

• ANTERIOR CIRCULATION
  • INTERNAL CAROTID ARTERY
    • SUPRACLINOID SEGMENT
      • OPHTHALMIC A.
      • POSTERIOR COMMUNICATING A.
        • ANTERIOR THALAMIC PERFOR AA
        • ANTERIOR CHOROIDAL A
  • MCA M1
    • LATERAL LENTICULOOSTRIATE AA
    • ANTERIOR TEMPORAL A
  • MCA M2, M3, M4, M5 ....
  • ACA A1
    • MEDIAL LENTICULOOSTRIATES AA
    • ACOMM A
  • ACA A2, A3, A4, A5 ..... 
    • HEUBNER’S ARTERY

• POSTERIOR CIRCULATION
  • VERTEBRAL ARTERY
    • MEDULLARY PERFORATING AA
    • POSTERIOR INFERIOR CEREBELLAR A (PICA)
  • BASILAR ARTERY
    • SHORT/LONG PONTINE PERFORATING AA
    • ANTERIOR INFERIOR CEREBELLAR AA (AICA)
    • SUPERIOR CEREBELLAR AA (SCA)
  • POSTERIOR CEREBRAL AA P1 (PCA)
    • POSTERIOR THALAMOPERFORTING AA
    • PCA P2, P3, P4 ....
      • POST CHOROIDAL
      • CALCARINE
      • POSTERIOR MEDIAL TEMPORAL BRANCHES
V1: PREFORAMINAL (SUBCLAVIAN TO C6 FORAMINA)
V2: FORAMINAL FROM C6 – C2 FORAMINA
V3: ATLANTIC, EXTRADURAL FROM C2 TO DURAL ENTRY
V4: FROM INTRADURAL PENETRATION TO CONFLUENCE
BASIC ANATOMIC CEREBROVASCULAR CONCEPTS AND TERMS

- CCA BIFURCATION: WHERE CCA DIVIDES INTO ICA AND ECA
- ICA BIFURCATION: WHERE ICA DIVIDES INTO ACA AND MCA
- VA CONFLUENCE: WHERE THE 2 VAs JOIN TO FORM THE BA
- BA APEX (AKA: BA TIP, BA BIFURCATION): WHERE THE BA DIVIDES INTO THE RT AND LT PCAs
- Cavernous Carotid Artery: PORTION OF THE ICA LOCATED WITHIN THE CAVERNOUS SINUS
- Paraclinoid ICA: PORTION OF ICA NEXT TO THE ANTERIOR CLINOID PROCESS
- Posterior Carotid Wall: PORTION OF ICA WHERE PCommA AND AChA ARE LOCATED
- Fetal PCOM: PCOM THAT TRANSITIONS INTO PCA AND NO P1 SEGMENT ARISING FROM BASILAR ARTERY
- Infundibulum: TRIANGULAR DILATATION AT THE ORIGIN OF A BLOOD VESSEL WITH BLOOD VESSEL ARISING FROM THE APEX OF THE TRIANGLE
- Aneurysm is named for the blood vessel located immediately before the aneurysm
- Anterograde Flow: FORWARD FLOW OF BLOOD THROUGH VESSELS
- Retrograde Flow: FLOW THROUGH BLOOD VESSELS THAT IS IN THE BACKWARDS DIRECTION
- Location on a vessel is described as being Ventral, Dorsal, Medial, Lateral
- Genu: WHERE A VESSEL TURNS IN A NEW DIRECTION. USUALLY A MARKED CHANGE IN COURSE
- Intradural: VESSEL LOCATED BETWEEN THE DURA AND BRAIN
- Extradural: VESSEL LOCATED ON SIDE OF DURA THAT IS AWAY FROM THE BRAIN
- Sinus: VENOUS BLOOD THAT MOVES BETWEEN TWO LAYERS OF DURA AND IS CONTAINED BY THE TWO LAYERS OF DURA
- Dolichoectasia: A DILATED ARTERIAL SEGMENT THAT OFTEN TRAVELS ALONG A SERPIGENOUS COURSE
- Candelabra: THE MCA BRANCHES AS SEEN ON AN ARTERIOGRAM AS THEY EXIT THE SYLVIAN FISSURE
- Square and Round Shift: DESCRIBES DISPLACEMENT OF ARTERIES BY A MASS. THE TYPE OF SHIFT CAN HELP LOCALIZE THE MASS.
ICA ANGIOGRAM AP AND LATERAL
ANEURYSM NAMING