



POCKET **RADIOLOGIST**™

Vascular

Top 100 Diagnoses

Bradley

Zwiebel

Roberts

Osborn

Harnsberger

Tanenbaum



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Top 100 Diagnoses

Additional contributions by:

Michele Brown MD
Eric Chen MD
Lane F Donnelly MD
Thomas M Grist MD
Gabriella Iussich MD
Barry Katzen MD
John Kaufman MD
Tom Kinney MD
Kevin R Moore MD
Karen L Salzman MD
Richard H Wiggins III MD

With 200 drawings and radiographic images

Drawings:

Lane R Bennion MS
Richard Coombs MS
James A Cooper MD
Jill Rhead MA
Walter Stuart MFA

Image Editing:

Ming Q Huang MD
Danielle Morris
Melissa Petersen

Medical Text Editing:

Richard H Wiggins III MD



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William G Bradley Jr MD PhD

Professor and Chairman, Department of Radiology
University of California San Diego
San Diego, California

William J Zwiebel MD

Professor of Radiology, University of Utah School of Medicine
Staff Radiologist, VA Salt Lake City Health Care System
Salt Lake City, Utah

Anne Roberts MD

Professor of Radiology
University of California San Diego
LaJolla, California

Anne G Osborn MD

University Distinguished Professor of Radiology
William H and Patricia W Child Presidential Endowed Chairholder
University of Utah School of Medicine
Salt Lake City, Utah

Amersham Health Visiting Professor in Diagnostic Imaging
Armed Force Insititue of Pathology
Washington, DC

H Ric Harnsberger MD

Professor of Radiology
R C Willey Chair in Neuroradiology
University of Utah School of Medicine
Salt Lake City, Utah

Lawrence N Tanenbaum MD

Section Chief MRI, CT and Neuroradiology
Edison Imaging / New Jersey Neuroscience Institute
Edison, New Jersey

Preface

The **PocketRadiologist™** series is an innovative, quick reference designed to deliver succinct, up-to-date information to practicing professionals "at the point of service." As close as your pocket, each title in the series is written by world-renowned authors. These experts have designated the "top 100" diagnoses or interventional procedures in every major body area, bulleted the most essential facts, and offered high-resolution imaging to illustrate each topic. Selected references are included for further review. Full color anatomic-pathologic computer graphics model many of the actual diseases.

Each **PocketRadiologist™** title follows an identical format. The same information is in the same place - every time - and takes you quickly from key facts to imaging findings, differential diagnosis, pathology, pathophysiology, and relevant clinical information. The interventional modules give you the essentials and "how-tos" of important procedures, including pre- and post-procedure checklists, common problems and complications.

PocketRadiologist™ titles are available in both print and hand-held PDA formats. Currently available modules feature Brain, Head and Neck, Orthopedic (Musculoskeletal) Imaging, Pediatrics, Spine, Chest, Cardiac, Vascular, Abdominal Imaging and Interventional Radiology. 2003 topics will include Obstetrics, Gynecologic Imaging, Breast, and much, much more. Enjoy!

Anne G Osborn MD
Editor-in-Chief, Amirsys Inc

H Ric Harnsberger MD
Chairman and CEO, Amirsys Inc

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PocketRadiologist™

Vascular

Top 100 Diagnoses

The diagnoses in this book are divided into 7 sections in the following order:

Brain

Head & Neck

Spine

Thorax

Abdominal

Renal

Upper/Lower Extremity

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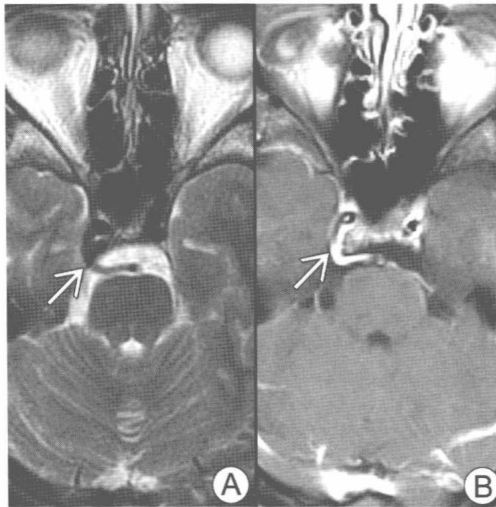
PocketRadiologist™

Vascular

Top 100 Diagnoses

BRAIN

Persistent Trigeminal Artery



Persistent trigeminal artery (PTA). Axial T2WI (A) and contrast enhanced T1WI (B) show a persistent trigeminal artery (arrows). (Courtesy Anne G Osborn MD)

Key Facts

- Definition: Persistent (embryonic) carotid basilar anastomosis (PCBA) between cavernous ICA and basilar artery (BA)
- Classic imaging appearance
 - Vascular channel from cavernous ICA courses posteriorly, then medially to join distal BA
 - Sagittal MR shows "trident sign"
- PTA = most common PCBA
 - Present in 0.1-0.2% of cerebral angiograms
- 25% prevalence of other vascular anomalies (e.g., aneurysm)
- Less common carotid-basilar communications
 - Persistent hypoglossal artery
 - Persistent otic artery
 - Proatlantal intersegmental artery

Imaging Findings

General Features

- Best imaging clue: Anomalous vessel bridges anterior (ICA) and posterior (BA) circulations **below** level of PCoA (circle of Willis)

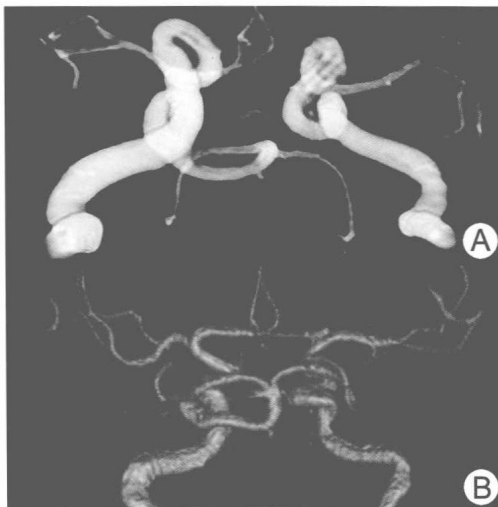
CT Findings

- CECT: Large caliber vessel courses between basilar artery and ICA
- CTA delineates presence and course of vascular anomaly, associated abnormalities (e.g., saccular aneurysm)

MR Findings

- Prominent flow void bridging anterior and posterior circulation
 - Sagittal T1WI: Looks like "Neptune's trident"
 - Axial T1-, T2WI: Prominent but anomalous vessel passes posteriorly from ICA (either around or directly through dorsum sellae) to BA
- MRA readily depicts anatomical variant; careful (right-left) segmentation of MRA data advised to avoid misinterpretation

Persistent Trigeminal Artery



Persistent trigeminal artery. Inferior (A) and posterior (B) volume rendered MRA views demonstrate anomalous communication between ICA and hypoplastic basilar artery.

Angiography Findings

- Two types
 - Saltzman type I
 - PTA supplies entire distal vertebrobasilar system
 - BA below anastomosis usually hypoplastic
 - PCoAs usually absent
 - Saltzman type II
 - PTA fills superior cerebellar arteries
 - Posterior cerebral arteries supplied via patent PCoAs
- Other vascular anomalies in 25% of cases
 - Aneurysms in 10-15% of cases

Imaging Recommendations

- May be incidental finding on MR or CT
- Confirm with MRA or CTA
- Look for other vascular lesions

Differential Diagnosis: Persistent Carotid-Vertebrobasilar Anastomoses (CVBAs)

Persistent Hypoglossal Artery

- Second most common carotid vertebrobasilar anastomoses (CVBA)
 - Found in 0.03-0.26% of angiograms
 - Connects cervical ICA (approximately C1-2 level) with BA
 - Courses through enlarged hypoglossal canal, not foramen magnum
 - Partly parallels CN XII

Persistent Otic Artery (POA)

- Very rare
- Courses from petrous ICA through internal acoustic meatus to caudal BA
- Vertebral arteries may be absent or hypoplastic, therefore POA may be dominant or only supply to basilar artery
- Rarely identified at angiography

Persistent Trigeminal Artery

Proatlantal Intersegmental Artery (PIA)

- Most caudal of PCBAs
- Originates from cervical ICA (approximately C2-3 level) or (less commonly) from ECA
- Communicates with **vertebral artery** coursing between the arch of C1 and occiput
- Vertebral arteries may be absent or hypoplastic, therefore PIA may be dominant or only supply to basilar artery

Pathology

General

- General Path Comments
 - Increased incidence of intracranial aneurysms and vascular malformations
- Embryology
 - Several transient segmental connections between primitive carotid, hindbrain circulations appear in early fetal development
 - Connections are named according to the cranial nerves they parallel
 - Embryonic trigeminal artery supplies basilar artery before definitive PCoA and vertebral arteries develop
 - Embryonic trigeminal artery usually regresses as definitive circulation develops
 - Failure to regress results in PTA
- Anatomy
 - PTA arises from cavernous ICA near posterior genus
 - Runs posterolaterally along trigeminal nerve (41%) or directly through dorsum sellae (59%)
 - Usually associated with small PCoA, vertebral arteries, proximally hypoplastic BA

Clinical Issues

Presentation

- Most common presentation: Incidental finding at imaging (anomalous vessel noted on MR/CT/DSA)
- May cause intracranial hemorrhage if other associated vascular anomaly is present

Treatment

- No treatment for PTA itself is required

Selected References

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