



POCKET**RADIOLOGIST**TM

Abdominal

Top 100 Diagnoses

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PocketRadiologist™

Abdominal

Top 100 Diagnoses

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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

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Chairman and CEO, Amirsys Inc

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PocketRadiologist™

Abdominal

Top 100 Diagnoses

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

Liver

Biliary

Pancreas

Spleen

Gastrointestinal

Genitourinary

Retroperitoneal

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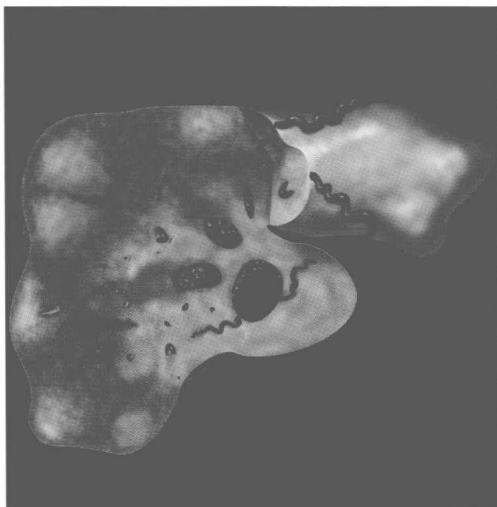
PocketRadiologist™

Abdominal

Top 100 Diagnoses

LIVER

Budd-Chiari Syndrome



The liver is deformed with areas of hemorrhage. Caudate sparing and hypertrophy. Clot within hepatic veins and IVC with intrahepatic and surface collaterals.

Key Facts

- Synonym(s): Hepatic veno-occlusive disease
- Definition: Global/segmental hepatic venous outflow obstruction (at level of large hepatic veins/suprahepatic segment of IVC)
- Classic imaging appearance
 - Absent/reversed/flat flow in hepatic veins & reversed flow in IVC
- Is a rare syndrome
- Primary/secondary based on cause & pathophysiology
- Acute/chronic based on clinical presentation
- Large regenerative nodules are characteristic of Budd-Chiari syndrome

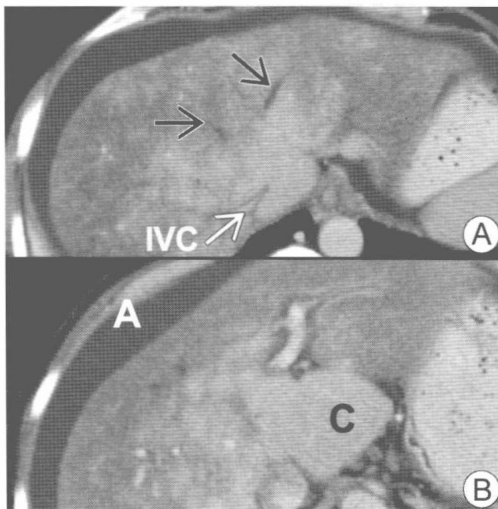
Imaging Findings

General Features

- Best imaging clue: "Bicolored" hepatic veins (due to intrahepatic collateral pathways) are pathognomonic of chronic Budd-Chiari on color Doppler

CT Findings

- NECT: Acute phase
 - Diffuse hypodense enlarged liver, narrowed IVC + hepatic veins & ascites
 - Hyperdense IVC & hepatic veins (due to \uparrow attenuation of thrombus)
- NECT: Chronic phase
 - Diffuse hypodense liver, non-visualization of IVC & hepatic veins
 - Hypertrophy of caudate lobe (ratio of caudate to right lobe > 0.55)
- CECT: Acute phase
 - Classic "flip-flop" pattern is seen
 - Early enhancement of caudate lobe + central portion around IVC
 - \downarrow Enhancement peripherally
 - Later \downarrow enhancement centrally with \uparrow enhancement peripherally
 - Narrowed hypodense hepatic veins & IVC with hyperdense walls
- CECT: Chronic phase



(A) Liver is heterogeneous. Inferior vena cava (IVC) is compressed; hepatic veins are thrombosed (arrows). (B) Caudate lobe (C) is relatively spared and is enlarged. Note ascites (A).

- Total obliteration of IVC & hepatic veins
- Enhancing 1-4 cm hyperdense nodules ± hypodense ring
 - "Large regenerative nodules": Nodular regenerative hyperplasia

MR Findings

- T1WI
 - ↑ Intensity of liver centrally with peripheral heterogeneity
 - Narrowed/absence of hepatic veins & IVC
 - Hyperintense nodules & enlarged caudate lobe
- T2WI: Fail to visualize hepatic veins & IVC, iso-/hypointense nodules
- Gradient-echo: Fails to demonstrate flow in hepatic veins/IVC
- Coronal MR image using GRASS sequence
 - Shows patent IVC with narrow segment at level of hepatic veins
- CEMR: Intense homogeneous enhancement of nodules on T1WI

Ultrasound Findings

- Hepatic veins narrowed/not visualized/filled with thrombus
- Reversed flow in hepatic veins; absent/sluggish flow in IVC
- Communicating collateral vessels

Color Doppler Sonography (Sensitivity is 87.5%) Findings

- Absent/flat flow in hepatic veins & reversed flow in hepatic veins/IVC
- Portal vein: Slow hepatofugal flow (< 11 cm/sec); congestion index > 0.1
- Hepatic artery: Resistive index ≥ 0.75

Nuclear Medicine Study: (Tc-99m Sulfur Colloid) Findings

- Hot caudate lobe; ↓ activity peripherally; wedge-shaped focal defects
- Colloid shift to enlarged spleen + bone marrow

Inferior Venacavography, Hepatic Venacavography Findings

- "Spider web" pattern of collaterals- pathognomonic
- Thrombus in hepatic veins/IVC; narrowing + stretching hepatic arteries
- Long segmental compression of IVC in both acute & chronic phases

Imaging Recommendations

- Color Doppler, helical NECT + CECT, MR, and angiography

Differential Diagnosis

Hepatic Cirrhosis

- Caudate enlargement and ascites are common; patent hepatic veins + IVC

Pathology

General

- Embryology-Anatomy
 - Primary type: Total or incomplete membranous obstruction of hepatic venous outflow
 - Results from deviations of complex embryologic process of IVC
- Etiology-Pathogenesis
 - Classified as primary/secondary based on cause & pathophysiology
 - Primary: Due to membrane (congenital/injury/infection)
 - Secondary: Usually due to thrombosis; rarely (nonthrombotic)
 - Obstruction of central & sublobular veins-chemotherapy/radiation
 - Obstruction of major hepatic veins: Hypercoagulable states
 - Nonthrombotic causes: Hepatic & extrahepatic masses
- Epidemiology
 - Primary (congenital-membranous type): Common in Asia
 - Secondary (thrombotic): Most common in Western countries
 - Secondary (nonthrombotic): 2nd most common in Western countries
 - F > M

Gross Pathologic-Surgical Features

- Acute phase: Liver enlarged/congestion/occlusion of hepatic veins & IVC
- Chronic phase: Liver nodular/cirrhotic/hypertrophy of caudate lobe

Microscopic Features

- Centrilobular congestion/dilated sinusoids/fibrosis/necrosis/cell atrophy

Clinical Issues

Presentation

- Acute: Abdominal pain/tender liver/vomiting/hypotension/ascites
- Chronic phase: Pain/hepatomegaly/splenomegaly/jaundice/ascites/varices
- Location: Classified into three types
 - Type I: Occlusion of IVC ± hepatic veins
 - Type II: Occlusion of major hepatic veins ± IVC
 - Type III: Occlusion of small centrilobular veins
- Complications: Liver failure/emboli from IVC thrombus/variceal bleeding

Treatment

- Medical management with steroids/nutritional therapy/anticoagulants
- Balloon angioplasty/lasers/stent insertion (for membranous occlusion)
- TIPS (transjugular intrahepatic portosystemic shunt)
- Surgical alternatives: Membranotomy/membranectomy/cavoplasty/liver transplantation

Selected References

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2. Rha SE et al: Nodular regenerative hyperplasia of the liver in Budd-Chiari syndrome: CT and MR features. *Abdominal Imaging* 25(3): 255-8, 2000
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Candidiasis



25-year-old man with acute leukemia. Enhanced CT shows innumerable microabscesses within the liver, consistent with candidiasis.

Key Facts

- Definition: A systemic fungal infection
- Classic imaging appearance
 - CT: Multiple well-defined, rounded microabscesses in liver
- Other key facts
 - Most common fungal infection in immunocompromised patients
 - Hepatosplenic candidiasis commonly seen in patients with acute leukemia recovering from profound neutropenia
 - Is termed chronic disseminated candidiasis due to involvement of several tissues

Imaging Findings

General Features

- Best imaging clue: T2WI: Markedly hyperintense small, rounded lesions measuring < 1 cm in liver

CT Findings

- NECT: Multiple small hypodense lesions; scattered areas of calcific density
- CECT: Nonenhancing, hypodense areas with \pm peripheral enhancement

MR Findings

- T1WI: Hypointense
- T2WI fat suppressed spin-echo: Hyperintense
- Short T1 inversion recovery (STIR): Hyperintense
- T1 C+ MR: Non-enhancing hypointense lesions

Esophagram Findings

- Candida esophagitis: Classical "tree bark" appearance

Ultrasound Findings

- Four major patterns of hepatic candidiasis are seen
 - "Wheel within a wheel": Peripheral zone surrounds inner echogenic wheel, in turn surrounds a central hypoechoic nidus (early stage)
 - "Bull's-eye": 1-4 mm lesion with a hyperechoic center that surrounds a hypoechoic rim- seen when neutrophil count returns to normal