

# **Status of Vascular Involvement in Egyptian Patients with Budd-Chiari Syndrome: Relation to Etiology and Impact on Clinical Presentation**

## **Thesis**

*Submitted for Partial Fulfillment of Master Degree  
in Tropical Medicine*

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# List of abbreviations

<b>Abbrev.</b>	<b>Meaning</b>
<b>ACAs</b>	Anticardiolipin Antibodies
<b>ACL IgG</b>	Anticardiolipin IgG
<b>ACL IgM</b>	Anticardiolipin IgM
<b>ANA</b>	Anti nuclear antibody
<b>APAs</b>	Antiphospholipid antibodies
<b>APC</b>	Activated protein C
<b>APCR</b>	Activated protein C resistance
<b>APS</b>	Antiphospholipid syndrome
<b>AT III</b>	Antithrombin III
<b>BCS</b>	Budd-Chiari syndrome
<b>BD</b>	Behcet Disease
<b>BM</b>	Bone marrow
<b>DVT</b>	Deep venous thrombosis
<b>FV</b>	Factor V
<b>FVa</b>	Activated factor V
<b>FVLM</b>	Factor V Leiden mutation
<b>HCC</b>	Hepatocellular carcinoma
<b>Hetero</b>	Heterozygous
<b>Homo</b>	Homozygous
<b>HVO</b>	Hepatic venous obstruction
<b>HVOO</b>	Hepatic venous outflow obstruction
<b>HVs</b>	Hepatic veins
<b>IVC</b>	Inferior vena cava

<b>IVCO</b>	inferior vena cava obstruction
<b>IVCT</b>	inferior vena cava thrombosis
<b>JAK2</b>	Janus tyrosine kinase-2
<b>LAC</b>	Lupus Anticoagulant
<b>LCF</b>	Liver cell failure
<b>LHV</b>	Left hepatic vein
<b>LMWH</b>	Low molecular weight heparin
<b>MHV</b>	Middle hepatic vein
<b>MOVC</b>	Membranous obstruction of IVC
<b>MPDs</b>	Myeloproliferative disorders
<b>MTHFR</b>	Methylene tetra hydro-folate reductase
<b>OCPs</b>	Oral Contraceptive Pills
<b>PC</b>	Protein C
<b>PGM</b>	Prothrombin gene mutation
<b>PNH</b>	Paroxysmal nocturnal hemoglobinuria
<b>PS</b>	Protein S
<b>PV</b>	Portal vein
<b>PVT</b>	Portal vein thrombosis
<b>RHV</b>	Right hepatic vein
<b>SD</b>	Standard deviation
<b>SLE</b>	Systemic lupus erythematosus
<b>TIPS</b>	Transjugular Intrahepatic Portosystemic Shunt
<b>VOD</b>	Veno-occlusive disease
<b>VTE</b>	Venous throboembolism
<b>WHO</b>	World Health Organization

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## **Introduction:**

Budd-Chiari syndrome (BCS) is a rare but potentially life threatening hepatic disorder that results from obstruction of the hepatic venous outflow tract. Obstruction can occur at any level from the hepatic venules to the right atrium (*Khan, 2005 and Valla, 2009*).

*George Budd (1845)*, a British internist, described three cases of hepatic vein thrombosis due to abscess-induced phlebitis, and *Hans Chiari (1899)* an Austrian pathologist, added the first pathologic description in three additional cases of hepatic vein occlusion due to phlebitis. Inferior Vena Cava (IVC) involvement was present in one of the three cases (*Musa et al., 2007*).

According to the etiology, BCS can be classified as primary (due to intrinsic intraluminal thrombosis or webs) or secondary (due to intraluminal invasion by a parasite or malignant tumor or extraluminal compression by an abscess, cyst or solid tumor) (*Aydinti & Bayraktar, 2007*).

Hepatic venous outflow obstruction causes centrilobular congestion and hepatocyte necrosis, which if not treated can lead to hepatic lobulation and cirrhosis. The evolution and severity of these changes vary widely and depend upon the cause, degree and extent of obstruction. Thus, the clinical presentation of BCS has a wide spectrum

and ranges from asymptomatic cases to fulminant hepatic failure (*Menon et al., 2004*). The classic triad of abdominal pain, ascites, and hepatomegaly is nonspecific (*Roy, 2006*).

According to duration of symptoms and signs of liver disease, BCS can be presented in acute, subacute or chronic form; the most common presentation is the chronic form. A high index of suspicion is necessary for diagnosis because clinical manifestations and laboratory results are non specific (*Valla, 2002*).

Radiological imaging plays an important role in the evaluation of a patient suspected to have BCS. In fact, under current consensus recommendations, radiological imaging is sufficient to make a diagnosis of BCS. A liver biopsy is required only if radiological imaging is inconclusive. The relevant imaging modalities are Doppler ultrasonography, computed tomography (CT), magnetic resonance imaging (MRI) and hepatic venography (*Kamath, 2006*).

**Classification of BCS according to site of obstruction  
(Ludwig et al., 1990).**

<b>Designation</b>	<b>Definition</b>
Small hepatic veins	Veins that cannot be shown clearly on hepatic venograms or by ultrasound studies; they include intercalated veins and interlobular veins.
Large hepatic veins	Veins that are regularly demonstrable on hepatic venograms and ultrasound studies; segmental branches of hepatic veins are generally included
Inferior vena cava (IVC)	A segment of the IVC which extends from the entry level of the right, middle and left hepatic veins to the junction between the IVC and the right atrium
Combined obstruction	Combination of obstruction in the large hepatic veins and IVC

The site of obstruction is in general easily determined through non-invasive imaging (Doppler-ultrasound, magnetic resonance (MRI), computed tomography (CT)) or conventional venography (*Janssen et al., 2003*).

Recently, BCS has been classified according to the site of venous obstruction into 3 types and 6 subtypes (*Zhang and Li, 2007*):

***Type I: “IVC lesions”:***

- a: Membranous lesions.
- b: Short segmental occlusion (<5cm).

c: Long segmental occlusion (>5cm).

***Type II: “lesions of HVs”:***

a: Membranous lesions.

b: Diffuse occlusion.

***Type III:***

Mixed type (type I & II).

The goals of treatment are to prevent extension of thrombosis in the hepatic veins and to alleviate venous obstruction in order to decrease hepatic congestion. Few patients respond to medical treatment (anticoagulation with or without thrombolytic therapy, diuretics). However, most of patients need more invasive procedures to restore the hepatic blood flow including percutaneous angioplasty with or without stenting, transjugular intrahepatic portosystemic shunt (TIPS) or shunt surgery (*Slakey et al., 2001*).

**Aim of the Work:**

**Primary Aim:** To study the pattern of vascular involvement in Egyptian patients with BCS.

**Secondary Aim:** To demonstrate its relation to etiology and impact on clinical presentation in these patients.