

Median	I	NI	MADM	Rating	Agree	Disagree
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**Upper Extremity Venous Evaluation**

**Table 1. Venous Duplex of the Upper Extremities for Patency and Indication**

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	Median	I	NI	MADM	Rating	Agree	Disagree	
<b>Limb Swelling</b>																							
1	·	Unilateral – acute	9	9	9	9	9	9	9	8	9	8	9	9	9	9	9	9	0.1	A	+		
2	·	Unilateral – chronic, persistent	7	7	7	6	7	6	7	9	7	7	8	7	8	7	8	7	0.5	A	+		
3	·	Bilateral – acute	9	9	7	8	7	6	9	8	8	9	5	9	9	7	6	8	8	8	1.1	A	+
3	·	Suspected central venous obstruction																					
3	·	Bilateral – chronic, persistent																					
3	·	No alternative diagnosis identified (e.g., no CHF or anasarca from hypoalbuminemia)	9	8	7	7	7	6	8	7	7	8	5	7	9	7	6	7	7	7	0.7	A	+
4	·	Suspected central venous obstruction																					
<b>Limb Pain (Without Swelling)</b>																							
5	·	Non-articular pain in the upper extremity (no indwelling upper extremity venous catheter)	5	6	6	8	8	6	4	7	5	6	2	5	4	4	2	5	6	4	1.4	U	
6	·	Non-articular pain in the upper extremity with indwelling upper extremity venous catheter	5	7	8	8	7	7	5	6	8	7	7	5	8	7	5	7	7	7	0.9	A	
7	·	Tender, palpable cord in the upper extremity	8	9	9	8	7	7	9	9	8	7	8	9	9	8	9	8	8.5	8	0.7	A	+
<b>Shortness of Breath</b>																							
8	·	Suspected pulmonary embolus (no indwelling upper extremity venous catheter)	5	4	5	4	3	3	7	5	3	7	2	9	3	4	2	4	4.5	3	1.5	U	
9	·	Suspected pulmonary embolus with indwelling upper extremity venous catheter	5	5	7	7	5	6	4	6	6	7	2	8	6	7	4	6	5.5	6	1.1	U	
10	·	Diagnosed pulmonary embolus (no indwelling upper extremity venous catheter)	5	6	3	4	2	5	1	3	4	7	2	9	2	4	2	4	3.5	4	1.7	U	
11	·	Diagnosed pulmonary embolus with indwelling upper extremity venous catheter	5	6	5	6	4	7	6	3	6	7	7	9	8	6	4	6	5.5	7	1.1	U	
<b>Fever</b>																							
12	·	Fever of unknown origin (no indwelling upper extremity venous catheter)	5	2	3	4	5	1	1	2	1	6	1	4	1	4	2	2	2.5	2	1.5	I	
13	·	Fever with indwelling upper extremity venous catheter	5	5	7	7	3	4	9	3	1	7	1	4	1	6	3	4	5	3	2.0	U	
<b>Known Upper Extremity Venous Thrombosis</b>																							
14	·	New upper extremity pain or swelling while on anticoagulation	7	8	7	7	4	7	7	7	3	7	8	7	9	9	8	7	7	8	0.9	A	+
15	·	New upper extremity pain or swelling, not on anticoagulation (i.e., contraindication to anticoagulation)	7	8	7	7	4	7	8	7	5	7	8	8	9	9	8	7	7	8	0.9	A	+
16	·	Before anticipated discontinuation of anticoagulation treatment	7	6	5	3	5	4	7	5	6	7	8	5	5	3	5	5	5	5	1.1	U	
17	·	Shortness of breath in a patient with known upper extremity DVT	3	7	3	3	3	3	1	3	3	7	3	9	3	3	2	3	3	3	1.1	I	+
18	·	Surveillance after diagnosis of upper extremity superficial phlebitis	3	3	7	7	5	4	4	6	8	7	3	6	9	6	2	6	4.5	6	1.7	U	
18	·	Not on anticoagulation, phlebitis location < 5 cms from deep vein																					
18	·	Surveillance after diagnosis of upper extremity superficial phlebitis																					
19	·	Not on anticoagulation, phlebitis location > 5 cms from deep vein	3	5	5	6	2	1	3	3	8	6	3	5	7	4	2	4	3	5	1.7	U	
<b>Vein Mapping Prior to Bypass Surgery (Coronary or Peripheral)</b>																							
20	·	In the absence of adequate leg vein for harvest	9	8	7	8	8	8	8	8	8	7	7	5	9	9	7	8	8	7	0.7	A	+
21	·	In the presence of adequate leg vein for harvest	3	5	3	5	4	5	4	5	3	3	2	7	3	4	3	4	4.5	3	1.0	U	
<b>Screening Examination for Upper Extremity DVT</b>																							
22	·	Prior to pacemaker or implantable cardiac defibrillator placement	3	5	3	6	2	3	4	4	7	4	1	2	3	4	2	3	3.5	3	1.2	I	
22	·	Prolonged ICU stay (e.g., > 4 days)																					
23	·	No indwelling upper extremity venous catheter	1	4	3	5	2	1	1	3	2	3	1	2	3	1	2	2	2.5	2	0.9	I	+

24	· Prolonged ICU stay (e.g., > 4 days)	3	4	3	5	3	3	3	4	3	4	1	2	6	2	2	3	3	2	0.9	I	
25	· Indwelling upper extremity venous catheter	1	3	3	2	2	1	1	3	3	3	1	2	2	2	1	2	2	2	0.7	I	+
26	· In those with high-risk: acquired, inherited or hypercoagulable	1	4	2	6	2	1	1	3	3	3	1	6	2	2	2	2	2	2	1.1	I	+
27	· Positive D-dimer test in a hospital inpatient	1	1	2	5	1	1	1	1	3	3	1	5	3	1	2	1	1	3	1.1	I	+

**Lower Extremity Venous Evaluation**

**Table 2. Venous Duplex of the Lower Extremities for Patency and**

**Indication**

**Limb Swelling**

28	· Unilateral – acute	9	9	9	9	9	9	9	8	9	9	8	9	9	9	9	9	9	0.1	A	+	
29	· Unilateral – chronic, persistent	7	6	7	6	8	6	7	8	7	7	8	6	9	7	7	7	7	0.6	A	+	
30	· Bilateral – acute	9	6	7	8	7	7	9	8	8	9	5	7	9	8	7	8	7.5	8	0.9	A	+
31	· No alternative diagnosis identified (e.g., no CHF or anasarca from hypoalbuminemia)	7	7	5	6	5	4	6	7	7	7	5	7	7	6	5	6	6	7	0.9	U	

**Limb Pain (Without Swelling)**

32	· Non-articular pain in the lower extremity (e.g. calf or thigh)	5	7	7	8	5	7	6	7	7	7	5	6	7	6	6	7	7	6	0.7	A	
33	· Knee pain	3	1	5	2	2	5	7	5	5	4	1	5	5	1	1	4	4	4	1.7	U	
34	· Tender, palpable cord in the lower extremity	9	8	8	8	4	7	9	8	8	7	8	8	9	8	9	8	8	8	0.7	A	+

**Shortness of Breath**

35	· Suspected pulmonary embolus	9	3	7	7	9	7	9	7	7	8	7	9	9	9	9	8	7	9	1.2	A	+
36	· Diagnosed pulmonary embolus	9	6	5	7	7	5	5	5	8	8	6	9	9	8	5	7	5.5	8	1.4	A	

**Fever**

37	· Fever of unknown origin (no indwelling lower extremity venous catheter)	3	1	5	7	6	5	1	2	1	5	1	5	2	7	5	5	4	5	1.9	U	
38	· Fever with indwelling lower extremity venous catheter	3	5	5	7	3	7	6	6	1	7	5	5	5	8	5	5	5.5	5	1.3	U	

**Known Lower Extremity Venous Thrombosis**

39	· Surveillance of calf vein thrombosis for proximal propagation in patient with contraindication to anticoagulation (within 2 weeks of)	5	7	8	7	7	7	7	9	8	8	7	7	9	7	7	7	7	7	0.6	A	+
40	· New lower extremity pain or swelling, while on anticoagulation	7	9	7	7	7	7	7	7	7	7	8	7	8	9	8	7	7	8	0.5	A	+
41	· New lower extremity pain or swelling, not on anticoagulation (i.e., contraindication to anticoagulation)	7	9	9	7	7	7	7	8	7	7	8	8	9	8	8	8	7	8	0.7	A	+
42	· Before anticipated discontinuation of anticoagulation treatment	3	6	7	2	5	4	4	3	7	6	7	5	6	3	5	5	4	6	1.3	U	
43	· Shortness of breath in a patient with known DVT	3	6	5	7	3	6	3	3	5	7	1	8	5	4	5	5	4	5	1.5	U	
44	· Surveillance after diagnosis of lower extremity superficial phlebitis	3	7	7	8	7	7	7	6	7	8	5	6	9	6	5	7	7	6	1.0	A	
45	· Not on anticoagulation, phlebitis location < 5 cms from deep vein	3	4	5	6	6	6	5	5	7	7	5	5	7	5	5	5	5	5	0.8	U	+
45	· Not on anticoagulation, phlebitis location . 5 cms from deep vein	3	4	5	6	6	6	5	5	7	7	5	5	7	5	5	5	5	5	0.8	U	+

**Vein Mapping Prior to Bypass Surgery (Coronary or Peripheral)**

46	· In the absence of prior lower extremity vein harvest or ablation	9	8	8	8	8	8	7	7	8	8	8	5	9	9	7	8	8	8	0.6	A	+
47	· In the presence of prior lower extremity vein harvest or ablation	9	8	7	6	9	9	7	8	8	8	8	6	9	8	8	8	8	8	0.7	A	+

**Screening Examination for lower extremity DVT †**

48	· After orthopedic surgery	3	3	4	7	2	6	3	3	1	5	2	6	7	2	3	3	3	3	1.5	I	
49	· Prolonged ICU stay (e.g., > 4 days)	3	5	3	7	2	6	3	3	1	5	1	5	6	2	2	3	3	2	1.5	I	
50	· In those with high-risk: acquired, inherited or hypercoagulable	3	3	3	7	3	3	1	4	1	5	1	7	7	2	2	3	3	2	1.5	I	
51	· Positive D-dimer test in a hospital inpatient	5	1	3	2	1	5	1	3	1	3	1	6	2	1	5	2	2.5	2	1.5	I	+

**Post Endovenous (Great or Small) Saphenous Ablation**

52	· Lower extremity swelling or pain	7	9	8	7	9	8	9	8	8	8	7	7	9	7	8	8	8	8	0.6	A	+
53	· Routine post procedure follow-up, no lower extremity pain or swelling	3	6	7	7	6	7	5	7	8	7	2	6	9	7	5	7	6.5	7	1.3	A	
	· Within 10 days post procedure																					

**Other Symptoms of Vascular Disease**

**Indication**

54	· Physiologic testing positive for venous obstruction	9	7	5	4	7	7	7	9	7	7	8	6	9	7	7	7	7	0.9	A	+
55	· Patent foramen ovale with suspected paradoxical embolism for patient without lower extremity pain or swelling obstruction	3	5	7	7	8	7	9	7	7	7	8	6	9	7	7	7	7	0.9	A	+

**Table 3. Duplex Evaluation for Venous Incompetency**

**Indication**

**Venous Insufficiency (Venous Duplex with Provocative Maneuvers for Incompetency)**

56	· Active venous ulcer	9	9	9	9	9	6	9	7	9	8	8	6	9	7	7	9	9	8	0.9	A	+
57	· Healed venous ulcer	3	7	7	7	9	7	7	7	9	6	7	5	9	6	5	7	7	6	1.1	A	
58	· Spider veins (telangiectasias)	3	3	3	3	2	2	3	6	6	2	2	5	5	4	2	3	3	4	1.1	I	
59	· Varicose veins, entirely asymptomatic	3	5	5	6	2	3	1	5	5	3	1	5	9	7	3	5	4	5	1.7	U	
60	· Varicose veins with lower extremity pain or heaviness	7	7	7	7	9	5	8	7	7	7	7	6	9	7	5	7	7	7	0.7	A	+
61	· Visible varicose veins with chronic lower extremity swelling or skin changes of chronic venous insufficiency (e.g., hyperpigmentation,	7	7	7	8	9	7	9	9	9	8	7	7	9	7	7	7	7.5	7	0.8	A	+
62	· Skin changes of chronic venous insufficiency without visible varicose veins (e.g., hyperpigmentation, lipodermatosclerosis)	7	7	5	8	9	7	7	9	9	8	4	6	8	6	4	7	7	6	1.3	A	
63	· Lower extremity pain or heaviness without signs of venous disease	3	6	5	6	7	5	6	6	5	4	8	6	5	5	5	5	6	5	0.9	U	+
64	· Mapping prior to venous ablation procedure	5	7	8	8	8	8	8	8	9	8	8	8	9	7	7	8	8	8	0.5	A	+
65	· Prior endovenous (great or small) saphenous ablation procedure with new or worsening varicose veins in the ipsilateral limb	7	7	8	8	9	8	6	8	9	8	8	7	9	8	7	8	8	8	0.6	A	+
66	· Prior endovenous (great or small) saphenous ablation procedure with no residual symptoms.	1	5	5	3	3	2	3	7	3	2	2	4	5	4	5	3	3	4	1.3	I	

**Table 4. Venous Physiological Testing (Plethysmography) With Provocative Maneuvers to Assess for Patency and/or Incompetency**

**Indication**

**Limb Pain, Swelling or Other Signs of Venous Disease**

67	· Active venous ulcer	9	7	7	8	7	6	4	7	9	6	7	5	7	8	6	7	7	7	0.9	A	
68	· Varicose veins, entirely asymptomatic	1	5	5	7	2	3	3	5	9	5	2	4	5	7	2	5	4	5	1.7	U	
69	· Varicose veins with lower extremity pain or heaviness	7	5	7	7	4	7	4	7	9	7	8	6	5	8	5	7	7	7	1.1	A	
70	· Varicose veins with chronic lower extremity swelling or skin changes of chronic venous insufficiency (e.g., hyperpigmentation or	7	5	7	7	4	8	4	8	9	7	7	7	7	7	2	7	7	7	1.1	A	+
71	· Skin changes of chronic venous insufficiency without visible varicose veins (e.g., hyperpigmentation or lipodermatosclerosis)	7	5	7	7	8	8	4	8	9	8	3	7	4	7	2	7	7	7	1.5	A	
72	· Lower extremity pain or heaviness without signs of venous disease	7	4	3	7	8	5	2	7	9	6	2	6	1	7	2	6	6	6	2.1	U	-
73	· Limb swelling: unilateral – acute	9	3	3	7	2	1	2	7	9	5	2	7	2	3	4	3	3	4	2.2	I	-
73	· Suspected acute venous thrombosis																					

**Shortness of Breath**

74	· Suspected pulmonary embolus	9	1	3	6	2	1	1	6	1	3	1	8	1	3	2	2	2.5	2	2.0	I	+
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**Duplex Evaluation of the Inferior Vena Cava (IVC) and Iliac Veins**

**Table 5. Duplex of the IVC and Iliac Veins for Patency and Thrombosis)**

**Indication**

**Prior to IVC filter placement**

75	· Prior to IVC filter placement	9	7	7	7	6	4	3	8	3	7	3	7	3	6	5	6	7	5	1.7	U	
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**Evaluation for suspected deep vein thrombosis**

76	· Lower extremity swelling - unilateral or bilateral – as a “stand alone test” without a venous duplex of the lower extremities	3	1	3	2	3	1	1	3	3	3	1	7	1	3	1	3	2.5	3	1.1	I	+
77	· Lower extremity swelling – unilateral or bilateral – combined routinely with a venous duplex of the lower extremities	9	1	5	2	5	2	1	5	1	3	1	7	5	4	5	4	3.5	4	2.0	U	

78	· Lower extremity swelling – unilateral or bilateral –performed selectively – when the lower extremity venous duplex is normal	9	6	5	7	7	2	4	7	1	7	2	6	1	7	5	6	6.5	5	2.0	U	
79	· Lower extremity swelling – unilateral or bilateral –performed selectively – when the lower extremity venous duplex is positive for	9	9	7	8	7	7	7	7	9	5	7	8	9	7	6	7	7	7	0.9	A	+
80	· Selectively - When the flow pattern in one or both common femoral veins is abnormal	9	9	9	8	8	8	8	8	7	7	7	7	7	8	7	8	8	7	0.6	A	+
<b>Evaluation for suspected pulmonary embolus</b>																						
81	· Pulmonary symptoms (suspected pulmonary embolus) - as a “stand alone test” without a venous duplex of the lower extremities	3	1	3	2	2	1	1	2	1	3	1	8	2	3	1	2	2	2	1.1	I	+
82	· Pulmonary symptoms (suspected pulmonary embolus) – combined routinely with a venous duplex of the lower extremities	9	1	5	2	4	5	3	6	1	3	1	8	8	4	4	4	4.5	4	2.0	U	
<b>Evaluation of Other Symptoms or Signs of Abdominal Vascular Disease</b>																						
83	· Abdominal pain	3	3	3	4	4	2	1	3	1	3	1	5	4	2	3	3	3	3	0.9	I	+
84	· Abdominal bruit	3	3	3	3	4	2	1	3	1	1	1	5	4	2	3	3	3	2	0.9	I	+
85	· Fever of unknown origin	3	1	3	5	1	1	1	3	1	3	1	5	3	4	3	3	2	3	1.1	I	+

**Table 6. Duplex of the Hepatoportal System (portal vein, hepatic veins, splenic vein, superior mesenteric vein, inferior vena cava) for Patency, Thrombosis, and Flow Direction †**

**Indication**

**Evaluation of Hepatic Dysfunction or Portal Hypertension**

· Abnormal liver function tests																						
86	· No alternative diagnosis identified (e.g. medication related or infectious hepatitis)	7	5	9	7	6	4	6	7	5	6	6	6	4	7	5	6	6.5	6	0.9	U	
87	· Cirrhosis with or without ascites	7	6	8	8	2	7	7	7	1	6	7	5	5	7	7	7	7	6	1.3	A	
· Jaundice																						
88	· As an initial diagnostic test	7	4	5	2	2	2	3	6	1	6	2	2	3	4	1	3	3.5	2	1.5	I	
· Jaundice																						
89	· No alternative diagnosis identified (e.g. biliary obstruction)	7	5	5	7	4	6	5	7	1	5	6	6	2	7	7	6	5.5	6	1.3	U	
90	· Hepatomegaly and/or splenomegaly	7	7	7	7	7	7	6	7	1	5	3	6	7	7	7	7	7	6	0.9	A	
91	· Portal hypertension	7	7	9	7	9	8	9	7	5	5	7	6	9	8	8	7	7.5	7	1.1	A	+

**Surveillance following Portal Decompression Procedure**

92	· Follow-up of a TIPS	7	7	9	9	9	8	9	7	9	7	7	6	9	8	7	8	8.5	7	0.9	A	+
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**Evaluation of Symptoms or Signs of Abdominal Vascular Disease**

93	· Abdominal pain	3	3	7	7	4	2	6	7	1	3	1	4	4	5	4	4	5	4	1.5	U	
94	· Fever of unknown origin	3	3	5	5	2	2	1	5	1	3	1	5	3	4	2	3	3	3	1.2	I	

**Evaluation of Cardiac and/or Pulmonary Symptoms**

95	· Pulmonary symptoms (suspected pulmonary embolus)	5	1	3	6	1	2	1	3	1	3	1	8	3	2	3	3	2.5	3	1.5	I	+
96	· Cor pulmonale	5	1	5	5	2	2	1	3	5	3	1	7	3	3	4	3	2.5	3	1.4	I	

**Table 7. Duplex of the Renal Veins for Patency and Thrombosis\***

**Indication**

**Evaluation for Suspected Renal Vein Thrombosis – Potential Signs and/or Symptoms**

97	· Gross hematuria	9	2	7	3	5	2	1	5	5	4	1	6	2	2	3	3	4	3	1.9	I	
98	· Acute renal failure	9	5	3	7	7	3	4	5	1	6	1	6	8	2	4	5	5	4	2.0	U	
99	· Acute flank pain	9	4	3	6	7	5	3	5	5	5	1	6	3	2	3	5	5	3	1.6	U	

**Evaluation of Cardiac and/or Pulmonary Symptoms**

100	· Pulmonary symptoms (suspected pulmonary embolus)	3	2	3	5	1	2	1	3	1	3	1	8	7	2	3	3	2.5	3	1.5	I	+
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**Evaluation of Other Symptoms or Signs of Abdominal Vascular Disease**

101	· Drug-resistant hypertension (suspected renal artery stenosis)	3	2	3	2	2	2	5	3	1	3	1	5	2	3	3	3	2.5	3	0.9	I	+
102	· Microscopic hematuria (prior to urological evaluation)	3	4	5	3	2	2	1	3	1	3	1	4	2	2	2	2	3	2	0.9	I	+

103	· Fever of unknown origin	3	4	5	7	1	2	1	4	1	3	1	4	1	2	2	2	3.5	2	1.4	I	
104	· Epigastric bruit	3	4	2	3	3	2	1	3	1	3	1	3	2	2	2	2	3	2	0.7	I	+
<b>Hemodialysis Vascular Access Duplex Ultrasound</b>																						
<b>Table 8. Preoperative Planning and Postoperative Assessment of a Vascular Access Site*</b>																						
<b>Indication</b>																						
<b>Assessment Prior to Access Site Placement</b>																						
105	· Preoperative Mapping Study (Upper extremity arterial and venous duplex) ≥3 months prior to access placement	5	5	3	5	3	1	3	4	1	3	1	7	1	6	5	3	3.5	3	1.6	I	
106	· Preoperative Mapping Study (Upper extremity arterial and venous duplex) ≤3 months prior to access placement	9	8	8	8	9	9	9	7	9	7	8	7	9	8	8	8	8.5	8	0.6	A	+
<b>“Failure to Mature”</b>																						
107	· “Failure to Mature” on basis of physical examination 0-6 weeks after placement	5	6	8	4	9	9	7	6	7	5	1	6	5	4	8	6	6.5	5	1.6	U	
108	· “Failure to Mature” on basis of physical examination >6 weeks after placement	9	8	9	7	5	9	9	8	7	8	8	6	8	8	7	8	8.5	8	0.8	A	+
<b>Symptoms and Signs of Disease*</b>																						
109	· Signs of access site malfunction during dialysis (e.g., low blood flows, kt/V, recirculation times or increased venous pressure)	9	8	9	7	5	8	7	8	9	8	8	7	9	7	7	8	8	8	0.8	A	+
110	· Mass associated with an AVF/AVG	9	6	9	9	5	8	9	8	9	8	8	7	1	8	7	8	8.5	8	1.3	A	+
111	· Loss of palpable thrill of AVF/AVG	9	7	9	9	8	8	2	8	9	7	8	7	8	8	8	8	8	8	0.9	A	+
112	· Arm swelling	9	7	8	8	8	5	9	8	9	7	8	7	8	8	8	8	8	8	0.6	A	+
113	· Hand pain, pallor, and/or digital ulceration (i.e., evaluation for suspected arterial steal syndrome)	9	8	9	8	4	1	9	8	9	8	8	7	8	8	9	8	8	8	1.1	A	+
114	· Cool extremity	9	5	3	6	2	1	3	4	7	2	2	6	3	3	3	3	3.5	3	1.6	I	
115	· Without pain, pallor, or ulceration	9	8	8	6	6	8	9	6	8	7	8	7	8	8	7	8	8	8	0.7	A	+
115	· Difficult cannulation by multiple personnel on multiple attempts	9	8	8	6	6	8	9	6	8	7	8	7	8	8	7	8	8	8	0.7	A	+
<b>Asymptomatic†</b>																						
116	· Routine surveillance of a functioning AVF or AVG	3	3	5	5	5	1	1	3	1	3	1	6	7	3	3	3	3	3	1.4	I	+