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Brief Summary



GUIDELINE TITLE

Summary algorithm for venous ulcer care with annotations of available evidence.

BIBLIOGRAPHIC SOURCE(S)

- Association for the Advancement of Wound Care (AAWC). Summary algorithm for venous ulcer care with annotations of available evidence. Malvern (PA): Association for the Advancement of Wound Care (AAWC); 2005. 25 p. [147 references]

GUIDELINE STATUS

This is the current release of the guideline.

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RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Strength of evidence ratings (A-C) are defined at the end of the "Major Recommendations" field.

A. Venous ulcer diagnosis consisting of:

1. Patient history

- Prior phlebitis, deep vein thrombosis, (DVT), **C** (Aharinejad et al., 2001; Berard et al., 2002, Nicolaidides et al., 2000)
- Lower leg swelling/edema **A** (Duby et al., 1993; Wipke-Tevis et al., 2000; Shebel, 2002)
- Ache or tiredness in leg **C**
- Trauma/intimal damage **C** (Nicolaidides et al., 2000)
- Maternal venous ulcer **C** (Berard et al., 2002)
- Vigorous exercise **C** (Berard et al., 2002)
- Hypercoagulation **B** (Blomgren et al., 2001; Fink et al., 2002)
- Multiple pregnancy **C** (Berard et al., 2002)

2. Differential diagnosis

- Doppler ankle: brachial index **A** (McGuckin et al., 2002; Bjellerup, 2003; Kazmers et al., 1996; Ghauri et al., 1998)
- Duplex scanning ultrasound **B** (Yosadhara et al., 2003; Labropoulos, Landon, & Jay, 2002)
- Plethysmography **A** (Alexanderhouse Group, 1992; Cordts et al, 1992; Garcia-Rinaldi et al., 2002; Perrin, Hiltbrand, & Bayott, 1999; Ghauri et al., 1998)
- Ambulatory venous flow or refill time **B** (Yosadhara et al., 2003; Heit et al., 2001; Nelzen et al., 1991; Phillips, 1999)
- Transcutaneous PO₂ **A** (Stacey et al., 1990; Alexanderhouse Group, 1992)
- Elevated temperature **C**
- Factor VIII related antigen **C** (Wilkinson, Emery, & Palmer, 1990)

3. Physical exam

- Clinical severity, etiology, anatomy, pathophysiology (CEAP) **A** (Navarro, Konstantinos, & Ribeiro, 2002; Carpentier et al., 2003; Kalodiki & Nicolaidides, 2002)
- Edema **A** (Burton, 1993; Duby et al., 1993; Ennis & Meneses, 1995; Lippmann et al., 1994; Shebel, 2002)
- Stasis dermatitis **C** (Alguire et al., 1997; Cherry et al., 1993)
- Hemosiderin **C** (Burton, 1993)
- Lipodermatosclerosis **C** (Kirsner et al., 1993)
- Medial lower leg site **A** (McGuckin et al., 2002; Phillips, 1999)
- Varicosities **C** (Weiss, 1995)
- Measure ulcer size **A** (McGuckin et al., 2002; Kantor & Margolis, 2000; van Rijswijk, 1993)

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- B. Remove ulcer cause or address ulcer etiology by aiding venous return and providing skin care
1. Patient education **A** (McGuckin et al., 2002; Shebel, 2002; Stacey et al., 2002.)
 2. Lower leg elevation **C** (Alexanderhouse Group, 1992; Kerstein et al., 2001)
 3. Ambulation or exercise **C** (Alexanderhouse Group, 1992; Kerstein et al., 2001)
 - Use a multidisciplinary team **C** (Lee, et al., 2004)
 4. Compression options
 - Elastic compression bandage heals more than inelastic compression **A** (Blair et al., 1988; Cullum, Nelson, & Fletcher, 2002; Callam et al., 1992; Gould 1998; Northeast et al., 1990)
 - Multi-layer (2, 3, or 4 layers) sustained, elastic high-compression bandage **A** (Cullum, Nelson, & Fletcher, 2002; Charles, 1991; Callam et al., 1992; Gould et al., 1998; Meyer et al., 2003; Patel et al., 2004; Vowden et al., 2000; Wilson, et al., 2002)
 - Elastic high-compression stockings to heal venous ulcers **A** (Benigni, et al., 2003; Horakova & Partsch & Horakova, 1994; Korn, et al., 2002; Partsch & Horakova, 1994; Johnson, et al., 1982; Veraart & Neumann, 1996; Morrell et al., 1998).
 - Elastic multiple-layer high-compression stockings to heal venous ulcers **A** (Mayberry et al., 1991; Polignano, Guamera, & Bonadeo, 2004; Samson & Showalter, 1996; Samson, 1993).
 - Duke Boot or Unna Boot + elastic compression **A** (Arnold & Stanly, 1994; Burton, 1993; Lyon et al., 1998; Eriksson, 1986; Eriksson et al., 1984; Lippmann et al., 1994).
 - Gradient compression better than uniform compression **C** (Sigel et al., 1975)
 - Short stretch bandage **A** (Duby et al., 1993; Charles, 1991; Gould et al., 1998; Charles, 2002).
 - Unna boot zinc paste impregnated bandage **A** (Kitka et al., 1988; Rubin et al., 1990; Sikes, 1985; DePalma et al., 1999).
 - Intermittent pneumatic compression **A** (Pekanmaki et al., 1991; Smith et al., 1990; Mani, Vowden, & Nelson, 2001).
 - Non-elastic compression with Circaid **B** (Spence & Cahall, 1996; Villavicencio 1994)
 - Sequential-gradient pneumatic compression **C** (Smith et al., 1990)
 5. Manage peri-wound skin
 - Moisturize **C**
 - Protect **C**
 - Manage peri-ulcer inflammation, edema, and circulation **B** (Myers, Rightor, & Cherry, 1972; Mayrovitz & Larsen, 1994; Wilson et al., 1991)
 - Manage peri-wound skin infection **C**
- C. Local Wound Care
1. Cleanse wound with safe cleanser, 8-15 psi **C**
 2. Debride necrotic tissue
 - Sharp **C** (Donati et al., 1994)
 - Enzymatic **B** (Bergemann et al., 1999; Romanelli, 1997)
 - Autolytic **A** (Romanelli, 1997; Mulder et al., 1993)
 - Mechanical **C** (Donati et al., 1994)
 3. Fill deep wounds (**C**) (Beitz & van Rijswijk, 1999)
 4. Manage excess exudate
 - Alginate **A** (Armstrong & Ruckley, 1997; Bergemann et al., 1999; Ingram, Wright, & Ingoldby, 1998; Lyon et al., 1998; Sayag, Meaume, & Bohbot, 1996)
 - Hydrofiber **A** (Armstrong & Ruckley, 1997; Harding et al., 2001; Quintinal, 1999)
 - Foam dressings **C** (Pessenhoffer & Stangl, 1989; Samson, 1993)
 - Composite dressing **AB** (Daniels et al., 2002; Jones, 2003; Vanscheidt, Sibbald, & Eager, 2004)
 5. Maintain moist wound environment for healing or venous ulcer (VU) pain management
 - Hydrocolloid **A** (Arnold & Stanley, 1994; Bergemann et al., 1999; Charles, 1991; Charles, 2002; Cordts et al., 1992; Eriksson, 1986; Friedman & Su, 1984; Kerstein et al., 2001; Koksai & Bozkurt, 2003)
 - Hydrogel **B** (Romanelli, 1997)
 - Film dressings **B** (Davis, McCulloch, & Neal, 1992)
 6. Antimicrobial wound care if no healing is seen in 30 days
 - Limit systemic antibiotics to known, identified pathogens **C** (Centers for Disease Control and Prevention [CDC])
 - Iodine-containing dressings **A** (Hilstrom, 1888; Holloway et al., 1989; Hansson, et al., 1998)
 - Silver-containing dressing **C** (Sibbald et al., 2001)
 7. Biologic dressings if no healing is seen in 30 days
 - Collagen/collagen combinations **C** (Vin, Teot, & Meaume, 2002)
 - Hyaluronic acid or other matrix molecular dressings **C** (Ortonne, 1996)
 8. Surgical options to cover wound if no healing is seen in 30 days
 - Skin replacement
 - Split-thickness or cultured autografts **B** (Turczynski & Tarpila, 1999; Puonti & Asko-Seljavaara, 1998)
 - Pinch grafts **B** (Christiansen, Ek, & Tegner, 1997; Oein, Hansen, & Hakansson, 1998)
 - Cultured epidermal autografts **C**
 - Allografts **C** (Mosti, et al., 2002; Bolivar-Flores & Kuir-Harcuch, 1999; Lindgren, Marcusson, & Toftgard., 1998)
 - Bioengineered skin **B** (Falanga et al., 1998; Kirsner et al., 1993; Brem et al., 2001; Brassard, 2002)
- D. Other modalities to apply if conservative therapy does not work in 30 days
1. Biophysical modalities
 - Electrical stimulation **A** (Feedar, Kloth, & Gentzkow, 1991; Houghton et al., 2003; Kloth & Feedar, 1988)
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- Vacuum (Negative Pressure) **B** (Evans & Land, 2002; Argenta & Morykwas, 1997; Morykwas et al., 1997)
 - Warming **C** (Robinson & Santilli, 1998; Santilli et al., 1999)
 - Electromagnetic/radiofrequency (RF) stimulation **A** (Kenkre et al., 1996; Stiller et al., 1992; Jeran et al., 1990; Todd et al., 1991)
 - Laser **C** (Flemming & Cullum, "Laser therapy," 2002)
 - Infrared (IR) stimulation (e.g. monochromatic) **C**
 - Hyperbaric oxygen **C** (Hammarlund & Sundberg, 1994; Fischer, 1975)
 - Ultrasound stimulation **B** (Flemming & Cullum, "Therapeutic ultrasound," 2002; Lundberg et al., 2000; Callam et al., 1987)
 - Whirlpool **C** (McCulloch & Boyd, 1992)
2. Pharmaceutical modalities
 - Defibrotide **C** (Jull, Waters, & Arroll, 2002)
 - Platelet derived growth factor **C** (Wieman, 2003)
 - Trental (pentoxifylline) **A** (Falanga et al., 1998; Jull, Waters, & Arroll, 2002)
 - Stanozolol **C** (Stacey et al., 1990)
 - Acetylsalicylic acid/aspirin **C** (Layton et al., 1994)
 - Solcoseryl (topical + systemic) **C** (Biland et al., 1985)
 3. Vein closure
 - Laser coagulation **C**
 - Sclerotherapy **C**
 4. Corrective vascular surgery
 - Subfascial endoscopic perforating vein surgery with ligation and stripping (SEPS) **A** (Barwell et al., 2004; TenBrook et al., 2004; Tawes et al., 2003)
 - Superficial vein surgery **A** (Barwell et al., 2004; Bello et al., 1999; Stacey, 2001)
 - Valve repair or reconstruction **B** (Perrin, Hiltbrand, & Bayott, 1999; Raju & Fredericks, 1988; Jessup & Lane, 1988)
 - Transplant or graft valve **C** (Garcia-Rinaldi et al., 2002)
- E. Local wound care (under C above) until healed **A** (Kerstein, 1996; Mayberry et al., 1991; McGuckin et al., 2002)
- F. Compression, elevation, ambulation post healing to prevent recurrence **A** (Alexanderhouse Group, 1992; Kerstein, 1996; Mayberry et al., 1991; Veraart & Neumann, 1996; McGuckin et al., 2002; Nelson, Bell-Syer, & Cullum, 2003; Samson & Showalter, 1996; Stacey et al., 2002).

Definitions:

Strength of Evidence Ratings

- A. Results of two or more randomized controlled trials (RCTs) in humans provide support (or for diagnostics or risk analysis: cohort (CO) studies)
- B. Results of two or more historically controlled trials (HCTs) or convenience assignment or non-randomized controlled trials (CCTs) or a CCT and a RCT in humans provide support or when appropriate, results of two or more controlled trials in an animal model provide indirect support.
- C. This rating requires one or more of the following:
 1. Results of one controlled trial (e.g. RCT or CCT or HCT)
 2. Results of at least two case series (CS) or descriptive studies or a cohort study in humans
 3. Expert opinion (EO)

CLINICAL ALGORITHM(S)

The original guideline document contains the "Annotated Venous Ulcer Algorithm."

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EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

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TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of evidence supporting each recommendation is identified and graded (see the "Major Recommendations" field). Appendix 1 of the original guideline document lists the references and summarizes the evidence supporting each item in the algorithm.

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IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

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available evidence. Malvern (PA): Association for the Advancement of Wound Care (AAWC); 2005. 25 p. [147 references]

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

2005

GUIDELINE DEVELOPER(S)

Association for the Advancement of Wound Care - Private Nonprofit Organization

SOURCE(S) OF FUNDING

Association for the Advancement of Wound Care

GUIDELINE COMMITTEE

Not stated

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

Some members of this task force have conducted industry-supported research on venous ulcers with various product categories listed in the algorithm.

GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the [Association for the Advancement of Wound Care Web site](#).

Print copies: Available from the Association for the Advancement of Wound Care, 83 General Warren Blvd., Suite 100, Malvern, PA 19355

AVAILABILITY OF COMPANION DOCUMENTS

None available

PATIENT RESOURCES

The following is available:

- Dress and compress for success (a guide to healing your venous ulcer). Pamphlet. The Association of the Advancement of Wound Care; 2009. 1 p. Available in Portable Document Format (PDF) from the [Association of the Advancement of Wound Care Web site](#).

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