Evidence-Based Decisions for Choice of Wound Dressings

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Background: Diabetes Epidemiology

- CDC estimates that in 2014 there were 29.1 million adults in the U.S. with diabetes, or 9.3% of the adult population

- Of those 65 and older, the CDC estimates that 11.2 million, or 25.9%, have diabetes

- AHRQ emphasizes that podiatric care is one of four core recommended diabetes related services not received by diabetes sufferers in general

Background: Ulceration Epidemiology

- About 5-7% of diabetics suffer from foot ulceration
  - 20% ischaemic
  - 50% neuropathic
  - 30% both ischaemic and neuropathic

- Annual incidence is 2%

- Lifetime risk of ulceration is 15%

- Ulcer healing is not definitive
  - One study estimated the reulceration rates after healing were 34%, 61% and 70% at 1, 3, and 5 years

Background: Amputation Epidemiology

- The risk of lower extremity amputation in diabetics is roughly 10 fold greater than in the rest of the population
- This risk may increase even further in diabetics with foot ulceration
- 85% of all lower extremity amputation in diabetics is preceded by an ulceration

Background: Ulceration/Amputation/Death

- Among diabetics with ulcers, mortality is roughly double that of diabetics without ulcers

- A VA study showed that diabetics with ulcers had 37% five year mortality compared to 19% in age, gender, race and diabetes duration matched diabetics

- Another study shows five year mortality after initial ulceration is about 43%, and among those who end up with an amputation the rate is 47%

Background: Trajectory of Care

- Cost to resolve an ulcer
  - $6000+ to heal, $45,000 for amputation
  - $28,000 over two years after presentation

- Roughly $38 billion in the US to care for DFU in the next two years

Guidelines: 2006 Wound Healing Society

Chronic Wound Care Guidelines

- Diagnosis
  - rule out arterial disease, check for neuropathy
  - look at systemic issues such as smoking, nutrition
- Prevention
  - protective footwear and offloading for those with amputation risk
  - prevent recurrence with good footwear
- Wound care
  - initial debridement
  - if no progress within a few weeks of debridement, infection assessment is needed
- Dressings and adjuvants
  - moist wound environment, wet to dry is inappropriate, manage exudate, minimize shear, protect periwound skin, **effective given the etiology**
  - clean after dressing change - no antiseptics
  - more research needed on adjuvants

Guidelines: 2010 Wounds

- Diagnosis
  - multidisciplinary team
  - look for neuropathy, vascular disease
  - ESR, CRP, lipid profile

Consensus Recommendations On Advancing The Standard Of Care For Treating Neuropathic Foot Ulcers In Patients With Diabetes

- Prevention
  - offloading (TCC) is recommended and proven to work

- Wound care
  - debridement - remove biofilm, nonviable tissue, promote healing
  - if no progress within a few weeks of debridement, infection assessment is needed
  - grade ulcer using one of the grading schemes, look for dermatologic changes, examine ulcer characteristics, wound edges, exudate, check for necrosis or pain
  - look for cellulitis, osteomyelitis, Charcot (PCR, MRI, bone culture)

- Dressings and adjuvants
  - moist dressing, **“appropriate” depending on wound characteristics**
  - some adjuvants are recommended, but few have proved useful

Guidelines: 2012 Infectious Diseases Society of America

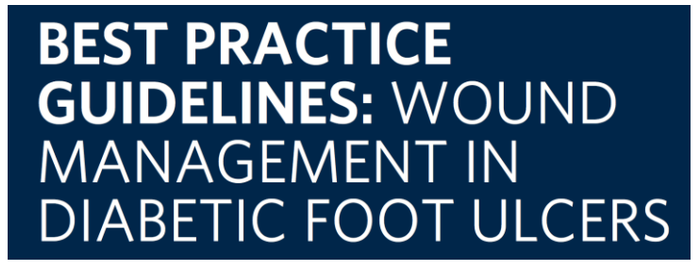
2012 Infectious Diseases Society of America Clinical Practice Guideline for the Diagnosis and Treatment of Diabetic Foot Infections[a]

- Diagnosis OF INFECTION
  - special concern for DM patients
  - look for standard signs of infection, PTB, recurrence, trauma

- Wound care
  - initial debridement, preferably with sharps
  - offloading, especially for plantar wounds

- Dressings and adjuvants
  - “The principal function of a wound dressing is to help achieve an optimal healing environment” - moisture
  - **appropriate dressing** depends on the wound (location, necrosis, infection, periwound tissue, amount of exudate)
  - insufficient evidence to recommend one modality, though hydrogels are effective

Guidelines: 2014 Wounds International



- Diagnosis
  - multidisciplinary team
  - full history, wound history, DFU, PVD, neuropathy
  - is wound ischemic, neuropathic, or both

- Wound care
  - examine, size, depth, location, color of wound bed, exposed bone, periwound tissue, exudate
  - look for necrosis or gangrene, malodor, pain
  - grade ulcer using one of the grading schemes
  - treat underlying disease, debride, ensure adequate blood flow, offload

- Dressings and adjuvants
  - control inflammation and infection, balance moisture, facilitate epithelialization, aseptic dressing changes
  - use dressing **that best matches** clinical appearance and site of wound, and meets patient preference
  - clinical trials of dressings are often poorly designed

Guidelines: 2015 IWGDF

IWGDF Guidance on the diagnosis and management of foot infections in persons with diabetes

- Diagnosis OF INFECTION
  - infection diagnosis based on systemic and local signs
  - vital signs, blood tests, probe depth of wound and infection
  - osteomyelitis to be diagnosed using several modalities

- Wound care
  - grade infection using IDSA/IWGDF scale
  - initial debridement

- Dressings and adjuvants
  - dry wounds need moisture, wounds with exudate need absorption, dressings to be changed often
  - dressing should NOT be used to prevent or cure infection
  - do NOT use adjunctive therapies to cure infection
  - TCC not appropriate for infected wounds needing dressing changes
  - systematic reviews show **no benefit of one dressing type over another, and no evidence supporting use of antimicrobials**

What is Appropriate? Evidence

IWGDF Guidance on use of interventions to enhance the healing of chronic ulcers of the foot in diabetes

- There is little evidence on which to make decisions
  - difficult to design trials, due to heterogeneity of disease and endpoints
  - topical preparations: “In general, the evidence to support the adoption of any particular intervention is poor, because the available studies are small and at high risk of bias”

Diabetic foot problems: prevention and management

NICE guideline
Published: 26 August 2015

- More trials are needed to explor

Present and new techniques and devices in the treatment of DFU: a critical review of evidence

Finn Gottrup[1*]
Jan Apelqvist[2,3]

- “that there are limited evidence [illegible] in routine clinical practice”, “little evidence that any one dressing … has a place in the management of chronic foot ulcers in diabetes”
- “complete healing” is hard to define

- Very few RCTS compare dressing types, very few studies demonstrate advantage of any modality

What is Appropriate? Appropriate Use

Wound Dressings in Diabetic Foot Disease

J. R. Hilton, D. T. Williams, B. Beuker, D. R. Miller, and K. G. Harding

- "Dressing choice should be guided by the characteristics of the ulcer, the requirements of the patient, and costs."

IWGDF Guidance on use of interventions to enhance the healing of chronic ulcers of the foot in diabetes

- "Select dressings principally on the basis of exudate control, comfort and cost."
- "Do not use antimicrobial dressings with the goal of improving wound healing or preventing secondary infection."

What is Appropriate? General Goals

- Dressings should
  - be comfortable, acceptable to patient, cause no pain, withstand shear
  - control exudate in order to avoid maceration
  - allow wound drainage AND maintain moist environment
  - control microbes and foreign particles, be sterile
  - allow gas exchange
  - provide thermal insulation
  - be easily changeable
  - not negatively impact periwound skin

Wound Dressings in Diabetic Foot Disease J. R. Hilton, D. T. Williams, B. Beuker, D. R. Miller, and K. G. Harding

Choice of wound care in diabetic foot ulcer: A practical approach

Karakkattu Vijayan Kavitha, Shalbha Tiwari, Vedavati Bharat Purandare, Sudam Khedkar, Shilpa Sameer Bhosale, Ambika Gopalakrishnan Unnikrishnan

Treating the chronic wound: A practical approach to the care of nonhealing wounds and wound care dressings

Margaret A. Fonder, BS, Gerald S. Lazarus, MD, David A. Cowan, MD, Barbara Aronson-Cook, BSN, RN, CWOCN, Angela R. Kohli, RN, BSN, and Adam J. Mamelak, MD

What is Appropriate? Dressing Types

Low Adherence	Simple, Hypoallergenic, Inexpensive, Good for packing	Minimally absorbent, Wet-to-dry, Poor barrier
Hydrocolloids	Absorbent, Need less frequent changes, Aid autolysis, Occlusive	Inappropriate for infection, May cause periwound maceration, Fluid trapping, Skin stripping, Contraindicated for dry/necrotic wounds
Hydrogels	Absorbent, Aid autolysis, Donate fluid, Pain relieving	Inappropriate for infection, May cause periwound maceration
Foams	Thermal insulation, Absorbent, Mold to contours, Easily manipulated, Occlusive	Can adhere to wound, Cause dermatitis, May cause periwound maceration, Contraindicated for dry/necrotic wounds
Alginates	Highly absorbent, Bacteriostatic, Hemostatic, Mold to contours	Needs wetting before removal, Contraindicated for dry/necrotic wounds
Iodine Preparations	Antiseptic	Iodine allergy, Contraindicated for dry/necrotic wounds
Silver Impregnated	Antiseptic, Absorbent, Decrease exudate, May reduce pain, Need less frequent changes,	No proven advantage, Cost
Films	Inexpensive, Easy to manipulate, Gas and fluid permeable, Deter microbes	Needs wetting before removal, Inappropriate for infection, Fluid trapping, Skin stripping

What is Appropriate? Indications

High Exudate	Absorb moisture	Gauze, Alginate, Foam
Low Exudate	Maintain moisture	Hydrocolloid, Foam, Film (secondary)
No Exudate	Add moisture	Hydrogel, Film + hydrogel, Hydrocolloid
Infected	Wick away exudate, Clean wound	Daily dressing change, Dressing based on exudate, Non-occlusive dressing, Avoid hydrogels in dry gangrene
Infection Risk	Prevent infection	Regular dressing change, Dressing based on exudate, Non-occlusive dressing

What is Appropriate? Indications

Location	Prevent contamination, Prevent maceration	Avoid hydrocolloid on planatar aspect - periwound maceration
Skin Quality	Fragile skin, Periwound maceration	Film can be problematic with periwound fragility, Hydrocolloids not good for fragile periwound skin, ischemic ulcers, Alginates can cause periwound maceration
Necrotic	Promote autolysis, Hydrate	Hydrogel, Hydrocolloid if not infected
Sloughy	Promote autolysis, Hydrate, Maintain moisture	Hydrogel, Hydrocolloid
Granulating	Promote healing, Maintain moisture	Nonadherent, Wet-to-dry, Hydrogel, Hydrocolloid
Epithelializing	Promote healing, Maintain moisture	Nonadherent, Wet-to-dry, Hydrogel, Hydrocolloid