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The Utility of Gram Stains and Culture in the Management of Limb Ulcers in Persons with Diabetes, Dar es Salaam, Tanzania

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Goals and objectives: Limited microbiology services preclude routine microbiological identification of microorganisms involved in the pathogenesis of infected ulcers in Tanzania. Therefore, we conducted this study to characterize the microorganisms involved in the pathogenesis of infected ulcers. **Purpose:** to determine the utility of a Gram stain alone versus culture in guiding antimicrobial therapy of persons with diabetes who present with infected ulcers. **Methods:** During February 2006 -December 2007 (study period), persons with diabetes presenting to the Muhimbili National Hospital diabetes clinic with infected limb ulcers were evaluated following informed consent. Deep biopsies of ulcers were stained with Gram and Ziehl-Nielsen reagents, followed by culture for bacteria, mycobacteria, and fungi. **Results:** Of 128 participants who met the case definition, 95 (74%) were male, 89 (70%) were of African ethnicity (vs. 15% Asian and 15% Arab), and 116 (91%) had diabetes treated with tablets or diet; median age was 56 (range: 14-80) years and 108 (84%) ulcers occurred in the lower limb. All patients were HIV-negative. Of 128 cultures, 118 (92%) yielded bacterial or fungal growth. Of these 118 cultures, 59 (50%) yielded mixed growth (80% included Gram-negative organisms); 38 (32%) and 20 (17%) yielded Gram-negative and Gram-positive organisms alone, respectively. Overall, the predictive value positive of a Gram stain for significant growth was 93% (110/118). On stratification, a Gram-positive stain was 75% (15/20) predictive of Gram-positive growth whereas a Gram-negative stain was 82% (31/38) predictive of a Gram-negative organism. No mycobacteria were isolated. **Conclusion:** In regions with limited resources, a Gram stain alone of a deep biopsy of an ulcer is largely predictive of the microorganism causing infection. Management of infected diabetic foot ulcers should include a Gram stain of deep tissue and broad-spectrum empiric therapy that covers Gram-negative pathogens.