Agreement Between Two Fluorescence Light Devices in the Assessment of Infected Complex Wounds

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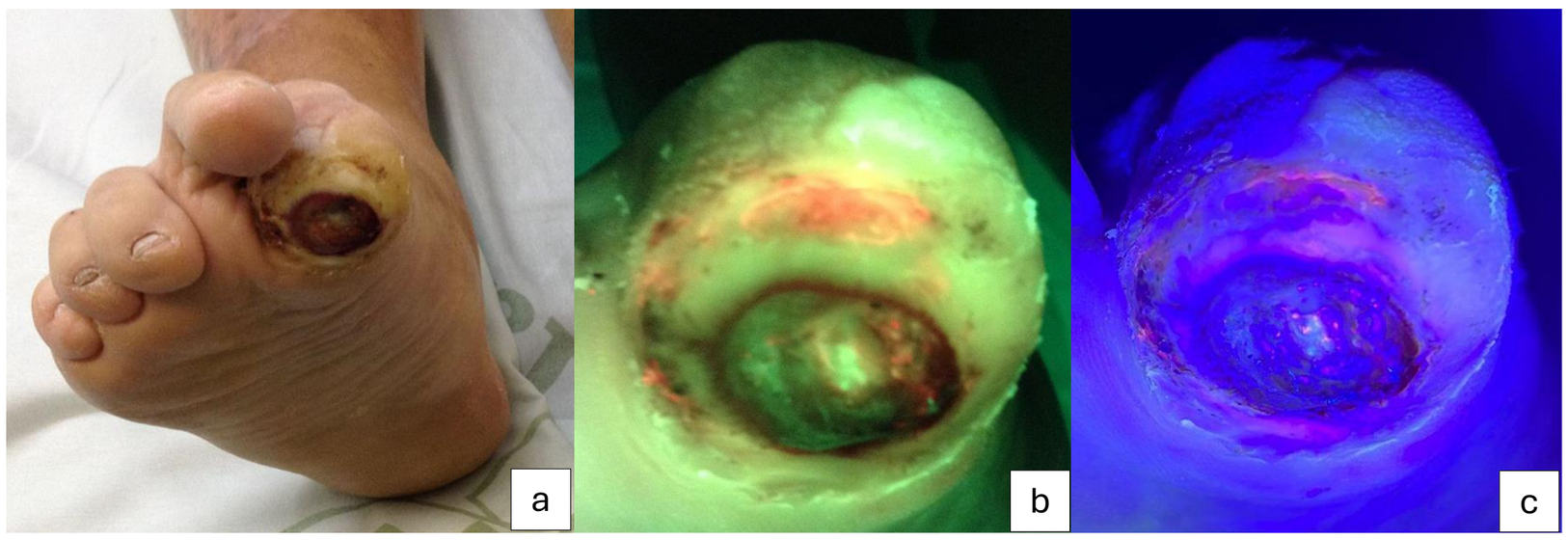
Objective

The use of autofluorescence for detecting bacterial presence in complex wounds has gained clinical relevance. However, the accessibility of advanced imaging devices like MolecuLight i:X® may be limited in low-resource settings. This study investigates the agreement between MolecuLight i:X® (ML) and a low-cost conventional fluorescence (CL) light device, assessing their diagnostic performance in infected complex wounds.

Methods

A retrospective, observational study was conducted at a tertiary care hospital in Brazil. A total of 27 patients with 33 complex wounds were evaluated using both the MolecuLight i:X® and a 395 nm LED-based CL device with a 12-megapixel camera. Autofluorescence images, clinical data, and wound aspirate cultures were analyzed. The cultures were obtained via dermal needle aspiration guided by autofluorescence signals from the MolecuLight device. Agreement metrics included observed/expected concordance and Cohen's kappa coefficient.



Legend:
a) picture of the wound for anatomical reference (right hallux).
b) autofluorescence detected using MolecuLight i:X ®.
c) autofluorescence detected using a standard lamp with a 12-megapixel camera. Note that the areas of fluorescence detected are completely overlapping.

Figure 1. Wound on right hallux of a diabetic foot with autofluorescence. Source: image bank of the researchers' wound management strategy.

Results

Among wounds with positive autofluorescence, total spatial concordance between ML and CL was found in 14.8% of cases, and partial concordance in 85.2%. Agreement for fluorescence detection (positive vs. negative) was moderate, and color-based concordance ranged from moderate to substantial. However, no significant correlation was found between fluorescence color and the specific pathogen isolated. The most frequent isolates were Staphylococcus aureus and Escherichia coli, followed by other Gram-negative bacilli.

Conclusion

The conventional CL device demonstrated moderate agreement with the MolecuLight i:X® for bacterial autofluorescence detection. While not recommended for therapeutic guidance, it may serve as a feasible screening tool in wound assessment. Further prospective validation with larger samples and robust statistical models is needed to confirm diagnostic accuracy and clinical utility.

Reference

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State "I have no conflict of interest"

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