

ARTIFICIAL INTELEGENCE TECHNOLOGY IS SHAPING THE WOUND CARERonald Winardi Kartika¹, Soegianto Ali²**ABSTRACT**

Chronic wounds cause significant morbidity and mortality in the health care system.1 Patients with chronic wounds require frequent visits for evaluation by health professionals. The main indicator of healing is wound reduction surface area that helps doctors determine the progress of healing and choose the right therapy. conventional wound care using photo planimetry is the safest and most effective way to provide wound care and to ensure continuous monitoring; this. Telemedicine approaches that involve remote monitoring are more suitable from both an economic and patient experience point of view. However, prompt intervention is proving difficult, and healthcare professionals must be able to ensure a high standard of care. Several technological support tools for wound care professionals that have provided ulcer morphology measurements are able to provide automatic diagnostic information through a standard wound classification scale using the Artificial Intelligence (AI) method.

Keyword: Wound-Artificial Intelligence- Shape Wound Care

ABSTRAK

Luka kronis menyebabkan morbiditas dan mortalitas yang signifikan dalam sistem perawatan kesehatan.1 Pasien dengan luka kronis memerlukan kunjungan yang sering untuk evaluasi oleh profesional kesehatan. Indikator utama penyembuhan adalah pengurangan luas permukaan luka yang membantu dokter menentukan kemajuan penyembuhan dan memilih terapi yang tepat. perawatan luka konvensional menggunakan foto planimetri adalah cara teraman dan paling efektif untuk memberikan perawatan luka dan untuk memastikan pemantauan terus menerus; ini. Pendekatan telemedicine yang melibatkan pemantauan jarak jauh lebih cocok dari sudut pandang ekonomi dan pengalaman pasien. Namun, intervensi segera terbukti sulit, dan profesional kesehatan harus dapat memastikan standar perawatan yang tinggi. Beberapa alat pendukung teknologi untuk profesional perawatan luka yang telah menyediakan pengukuran morfologi ulkus mampu memberikan informasi diagnostik otomatis melalui skala klasifikasi luka standar menggunakan metode Artificial Intelligence (AI).

Kata Kunci: Luka-Kecerdasan Buatan- Bentuk Perawatan Luka

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INTRODUCTION

Artificial intelligence (AI) and machine learning (ML) will change the way conventional healthcare is delivered. AI using computer software can simulate intelligent tasks that are usually carried out by humans. While ML is an AI domain that involves computers that automatically learn from data without a priori programming. Now that AI is taking on a bigger role in clinical practice, different levels of oversight are needed. However, with proper supervision, the trust in this technology cannot be overstated by clinicians. This viewpoint outlines the steps that can enable doctors to engage and invest in healthcare that includes AI especially wound care.¹

SKEPTICISM OF ARTIFICIAL INTELLIGENCE

The promising potential of AI in healthcare in the media and academia contributed to the hype, including predicting that certain specialties will be replaced by machines and ML technology developers. New technologies being introduced into clinical practice, skepticism about AI awaits strong evidence of consistent success and benefits in a clinical setting.²

AI is not the first application of information technology to provide more efficient and effective health services.

Several introductions of electronic health records (EHRs) have previously been introduced in the world of health, as part of machine learning. EHR system. can improve patient safety, especially around the use of drugs.^{2,3}

A decade after the transformation of healthcare from a pen-and-paper-based record keeping system to an EHR-based enterprise, AI represents entering a new era of technology that has the potential to change practice. Billions of dollars are invested in healthcare AI and related research. Most importantly, equipping physicians with the skills, resources and support necessary to use AI-based technologies is now recognized as critical to the successful application of AI in healthcare. To do so, clinicians need to have a realistic understanding of the potential uses and limitations of medical AI applications. Ignoring this fact risks physician cynicism and suboptimal patient outcomes.³

AI CONFIDENCE IN WOUND CARE.

The development of AI is getting more and more so that it needs government support. The potential for regulatory problems, legal liability, and social bias will all occur if the healthcare world adopts AI, and policy makers are also likely to get involved in this problem. Given the broad

potential implications and potential wide-scale harm caused by AI algorithms, guidelines, policies, and laws at the international, federal, and state levels are needed.⁴

The use of AI in routine clinical practice health care settings, AI models continue to be marketed and used. A recent example is the use of wound care documentation to improve patient outcomes in clinical settings compared to conventional wound care evaluation. Although wound care using AI has not yet developed enough, the future is very open.^{3,4}

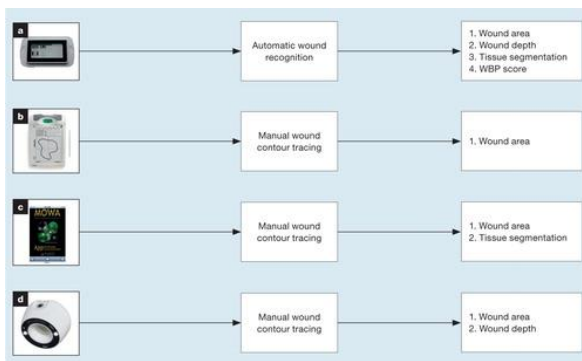


Fig 1. Devices, procedures and results obtained with the different systems used in the trial: Wound Viewer (a); VISITRAK (b); MOWA (c); Silhouette (d). The parameters calculated by each system are listed on the right for each device. WBP—wound bed preparation³

CRITICAL ASSESSMENT GUIDELINES

Clinicians as the front line are starting to be introduced in clinical AI. Evidence-based medicine (EBM) will create a user guide that equips physicians

with the skills to read and apply the proper use of AI in wound care.⁴

Additional guidance is needed to facilitate the evaluation of studies using AI to help answer questions regarding prognosis, harm, therapy, and cost-effectiveness. While the development and promotion of appropriate user guides will help support this transformation for clinicians using AI in wound care.⁴

THE ROLE OF AI IN DECISION MAKING.

When the EBM movement was launched, it simultaneously made decisions in the management of wound care. As AI-based predictions and algorithms continue to inform medical decisions, patients and clinicians must rethink decision-making through AI-derived algorithms. Clinicians need to explain the role of AI in recommendations in wound care. Decision making using AI is very helpful for clinicians because AI will help make decisions that are faster, more accurate, and more consistent by leveraging pre-existing data sets with AI. In contrast to conventional decisions made by humans, AI can analyze large data sets in seconds without error, freeing healthcare professionals to focus on other health care/treatments.⁵

THE USE OF AI IN WOUND CARE

Accurate measurement of the wound area is critical to optimizing outcomes for patients with:

chronic wounds. While many methods can be used to measure wound area, many clinics still use manual ruler-based, which is subject to high variability and can measure actual exaggerations

surface area as much as 40%.^{4,5}

Manual digital planimetry of wound photos improves accuracy but still a lot variability and can be too time-consuming to integrate into a high-volume wound care centre. In addition to the wound area, the percentage of healthy granulation tissue at the wound bed. It is important to determine whether the wound will heal or is ready for definitive closure by the skin graft or cap. Doctors visually estimate granulation tissue (PGT) based on color as: indicator of healing. Excessive dark red granulation can be cured, while pale granulation tissue may show poor angiogenesis and blood supply in the wound bed.⁵ However, visual PGT estimation is imprecise and is subject to high inter-clinical variability. That algorithm accurately measure granulation tissue can improve wound care decisions.⁶

For example, recent work has shown that analysis of granulation tissue

color images can predict healing outcomes for pressure ulcers.

There is currently no standard wound assessment method. Criteria. However, the promised move in artificial intelligence (AI) enables automatic analysis of diagnostic images. advances in wound imaging devices and software, such as the Silhouette.

This is various artificial intelligence techniques to shape wound care:

1. Selection of Digital Wound Images and Associated Data
2. Definition of Wound Area and Granulation Tissue
3. Wound Area and Granulation Tissue Tracing
4. Quantitative Analysis of Wound Tracings

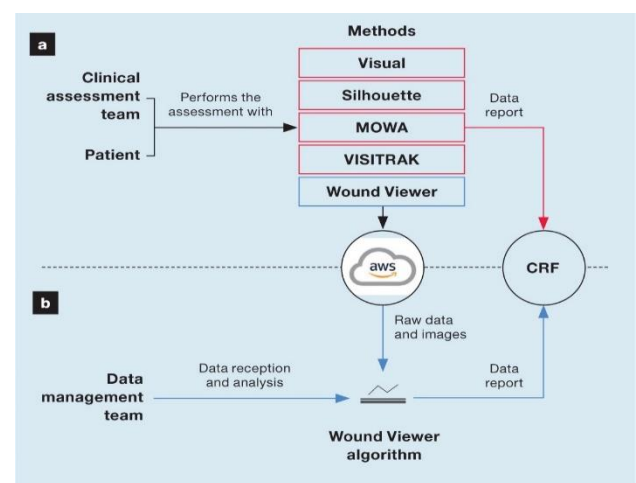


Fig 2. Workflow of the clinical trial performed at San Luca (a) and the Politecnico di Torino (b). CRF—clinical research folders^{3,4}

To evaluate the quantitative performance of AI-based wound area and granulation tissue tracings, we statistically compared error distributions between a test AI trace and a reference human trace (AI vs human) with the error distributions between 2 independent human tracings (human vs human).

This paper establishes the importance of accurate wound assessment, both quantitatively and qualitatively. For proper wound management and monitoring. Two key points in wound care using AI are:

- a) Define standard wound area criteria and granulation tissue formation for various types of wounds.
- b) AI technology has the capacity to evaluate wounds quickly and precisely.⁷

CONCLUSION

AI will soon develop in healthcare including wound care. Implementation strategy lessons are continually being designed, to consider the clinician's key role as end-users of AI-developed algorithms, processes, and risk predictors. Physicians must have the knowledge and skills to assess and determine the appropriate application of AI outputs, for clinical practice because of AI as a new technology.

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