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Wound Care- Current Global Perspective

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Abstract

The current era has evolved from topical wound therapy to the concept of holistic wound management. There was a time when the wound was considered as a "hole" for the treatment purposes but now the management has changed to treatment of the wound as "whole". The slow rate of healing, complications, wastage of resources and associated cost is detrimental to the patients with chronic wounds and a burden to the organizations. Now, the spectrum of wound care has expanded to an international inter-professional wound care approach. The "Diabetic Foot" is a leading cause of chronic wound and has become a pandemic as per experts in the field. The awareness about wound care is growing up day by day and all the contributions are from various sources that include setting up of local wound care teams and practices in the hospitals, streamlining the work, knowledge sharing and of course publication of scientific data in the reputed journals. This review is an attempt to update the current status of wound care at a global scale in order to identify issues from the perspective of patients, care providers, logistics and management of wounds. The newer advances and approaches in the wound care have been discussed. This might help in formulating future strategies for better outcomes.

Keywords: Wound; Surgery; International; Interprofessional; Care; NERDS; STONEES

Abbreviations: CDC: Center for Disease Control; NERDS: Non-healing, Exudate, Red-friable tissue, Debris, Smell; STONEES: Size increasing, Temperature, Os (probe to bones), New breakdown, Erythema, Edema, Smell; IIWC: International Interprofessional Wound Care; AI: Artificial Intelligence; COVID-19: Corona Virus Disease-2019; WBPP: Wound Bed Preparation Paradigm

Introduction

The wound care history dates back to early civilizations and have been evolving with availability of new information from time-to-time. The concepts of germ theory, availability of surgical methods and individual or social belief and faith have been instrumental in progress of science of wound healing for centuries [1]. The Indian medical history described "Sushrutaa" who performed surgeries and wound management 2000 years ago in ancient time and described details in his book "Sushrutaa Samhita" (Wikipedia). The earlier known methods included washing, plastering and bandaging of the wounds. Various cultures had different methods of wound management. Egyptians were known to apply plaster bandages and used honey, grease and lint. Greeks on the other hand were credited for wound cleaning with water, vinegar or wine. The emergence of surgery was an important factor during 18th Century that has led to the brainstorming on wound healing and care. Moreover, 19th Century witnessed the concepts of antisepsis and antibiotics which was instrumental in availability of various topical agents (anti septic) for wound healing. In the 20th Century, we have seen tremendous advances in the wound management and related technology leading to availability of multiple topical agents, dressings, surgical and debridement techniques, hyperbaric oxygen, negative pressure therapy and bio-engineering [1].

Discussion

The current era has evolved from topical wound therapy to the concept of holistic wound management. There was a time when the wound was considered as a "hole" for the treatment purposes but now the management has changed to treatment as "whole".

Now, the spectrum of wound care has expanded to an international inter-professional wound care approach. The "Diabetic Foot" is a leading cause of chronic wound and has become a pandemic as per experts in the field. It is estimated that there will be more than 400 million diabetics worldwide by 2025, with the greatest increases in Asia, Africa, and South America [2]. Other causes of wounds such as trauma, chronic infections,

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lymphedema, surgical site infections, malignancy and population/country specific infections like Burili ulcer, and mycobacterium-related infections are prevalent in different populations [2].

The slow rate of healing, complications, wastage of resources and associated cost is detrimental to the patients with chronic wounds and a burden to the organizations. This was recognized by expert in the field and various wound care societies in recent years. The outcome of their studies was helpful in recognition of multiple factors affecting wound care management in relation to the patients, families, organizations and the hospitals. Presently, the major shift is to focus on holistic wound care which is evidence-based and follows concept of international interprofessional care [3].

In the curriculum of majority of medical schools, during teaching on the wound management the focus is mainly on the specialty-related approach and management. It is addressed in the context of specialties such as surgery (including sub specialties), medicine and dermatology, infectious diseases control department, clinical pharmacology and microbiology [4]. The similar trend follows during surgical trainings. The Center for Disease Control (CDC) criteria for diagnosing the wound infection is widely accepted and followed in clinical situations. However, the chronic wound management, mnemonic NERDS and STONEES criteria or other aspects, such as wound debridement, choice of suitable wound dressings, and advanced therapy are not adequately covered [4].

In addition, the role of nurses in the wound management have been increasingly found to be significant and therefore the involvement of nursing team is crucial to the patient care in chronic wounds. This also has led to the establishments of wound care nursing teams in various health care centers.

The International Interprofessional Wound Care (IIWC) concept has created not only a platform where wound care nurse, physician, surgeon, podiatrist and social worker contribute as a team in consultation with the patient and families but the international interprofessional groups now a days are well-recognized and collaborating with each other in order to exchange and share knowledge, skills and expertise to promote wound healing [3,4]. Teaching and training has been incorporated at regional and international levels and it has been instrumental in acquiring new experience required for improvement in wound care outcomes. The interprofessional wound care model was introduced by “Krasner” et al in their land mark paper and has revolutionized the wound management not only from the perspective of the patients but also for the health-care systems. The advantages were translated in terms of efficient and cost effective treatment for all involved [3,4].

The initiatives were taken through various wound care groups and societies to implement the concept in different units in multiple places. It included teaching and training the health care staff and the members of organizations in order to familiarize the strategy and then implement [5]. The benefit of this will also extends to the hospitals, insurance agencies and other financial agencies related to the patient management. The overall benefit ultimately goes to the community.

For example, in the United Arab Emirates, the International Interprofessional Wound Care Course was started 10 years back in collaboration with the International Interprofessional Group. The curriculum is designed for wound care specialists with some wound care education and experience, physicians, surgeons, nurses, and other health professionals involved in the wound care. The objective is to provide a comprehensive educational experience to translate new knowledge into practice.

In addition, various wound care courses, seminars and conferences now providing opportunities for interaction, presentations and knowledge exchange between the experts and participants at global scale. It has also helped in successful implementations of new concepts and introduction of innovative pathways for management of different types of wounds, for example post-surgical acute and chronic wounds in adults and children [6].

Presently, majority of the work related to wound management is centered on diabetic wounds, ostomy care and pressure injuries. The chronic wounds are difficult to manage and need specialized care. The COVID-19 pandemic has opened up a hybrid approach to use technology at onsite and online platforms simultaneously for interactions and exchange of information for problem solving and education in wound care. This is another example of sharing and spreading knowledge on current concepts of wound care in the present time.

The most important factor in the management of wound is to prevent or identify predisposition to infection. The local or systemic infection in a wound is associated with high mortality, prolonged hospital stays and high cost of the treatment [7]. In this context, a turning point came through the land mark study by Woo and Sibbald ’et al’. Their cross-sectional validation study of using NERDS and STONEES to assess bacterial burden in the wounds in adult population had concluded that any three criteria were found to provide sensitive and specific information about the amount of bacteria present in the wound when used by expert clinicians. This study has validated that by collating any three clinical signs exhibited in the assessed wounds, the sensitivity for NERDS increased to 73.3% (specificity 80.5) and to 90% (specificity 69.4) for STONEES. Therefore, a knowledge of NERDS and STONEES criteria is crucial during initial assessment of chronic (diabetic) wound and may help in identifying critical colonization or local infection [8].

Chronic wounds are usually polymicrobial in nature and usually accompanied by formation of biofilms that show a resistance to antibiotic therapy. The most prevalent pathogens in chronic wounds are P. aeruginosa and S. aureus. In general, combined infections are more harmful. In addition, Bacteroids fragilis has been identified as the most common anaerobic bacterium isolated in diabetic wounds [9]. It is not only the bacteria itself causes the tissue damage but interactions between host and agent, product of microorganism, interaction with tissue, and secretion of cytokines, growth factor, interleukins and other unknown chemical products may induce damages to the tissues [9]. In future, there is a need to identify the secreted components produced by microorganism and tissue chemicals. It would be a significant step forward in understanding wound microbial environment, microbial populations, communication and interaction with other microbial communities, and interplay with the host cell. Moreover, management of resistant flora, Methicillin resistant staphylococci, antibiotic resistance and search for better antibiotics will always be areas for further improvements.

A significant impact has been made in the assessment of wounds after the introduction of Wound Bed Preparation Paradigm (WBPP). In fact, the WBPP substantiate the fact that a

schematic management of chronic wound can be formulated by incorporating principles outlined in the WBPP [10]. The knowledge of etiology, patient centered concerns and the wound bed care provides a holistic and comprehensive management plan for a better outcome. The diabetic foot patients were benefitted the most. However, the concept has a scope to be applied for other wounds. Recently, there are attempts to apply similar concepts in acute and post- surgical pediatric wounds. However, it is yet to be validated [6].

The awareness about wound care is growing up day by day and all the contributions are from various sources that include setting up of local wound care teams and practices in the hospitals, streamlining the work, knowledge sharing and of course publication of scientific data in the reputed journals. In fact, the societies and journals now recognize and encourage the innovations and research work activities in order to generate interest among the health care workers and organizations. This tradition will definitely promote improvement in the quality and efficient care of the patients with wounds (https://www.jwcawards.com).

The emergence of Artificial Intelligence (AI) is a new tool in all the industries. The AI based methodology and algorithm may be applied in the field of wound care. In fact, there are availability of different commercial platforms to capture images, perform wound measurements, and make a diagnosis. As the AI-based systems are still in their infancy, we are not far from a time when the better AI –based modalities will be available to guide and manage all sorts of wounds. The accuracy, quality imaging, faster data recording and option of differential diagnosis is going to be better and will help in achieving clear decision making for better outcomes [11].

Mobile applications guiding diagnosis and predicting risks and benefits are already available and increasing in numbers [12]. The diabetic foot self- care mobile application is an example and there are other applications that track and guide the progress and care of other chronic wounds. This service alarms the patients before the occurrence of potential complications and avoid poor outcomes [12]. Surely, the scope will expand. The awareness of the patient will be crucial while using such applications and therefore, the role of education is paramount.

The global connectivity through media and web is already making an impact in dissemination of knowledge, experience and collaborations, world-wide. Difficult wound cases can be discussed and managed efficiently even in the remote places with expert's advice. Faster data transmission, quality imaging through high resolution capture devices and accessibility is improving gradually and therefore, it can be said that the wound management has already reached at global platform.

Acute post surgical wounds especially in difficult to heal areas such as sternal wounds in children is now managed successfully using principles of IIWC, Schematic Pathways, WBPP, -Staged surgical closures and negative pressure therapy [6].

Conclusion

There has been a progress in the wound care management world-wide over time and greater awareness, improvement in technologies and application of evidence-based concepts with interprofessional approach will improve outcomes of wound–related ailments in the future at a global scale. There is a need for continuous efforts to improve and innovate in the field of wound care at international level.

References

1. Shah JB. The history of wound care. J Am Col Certif Wound Spec. 2011; 3: 65-6.
2. Serena TE. A global perspective on wound care. Adv Wound Care. 2014; 3: 548-52.
3. Krasner DL, Rodeheaver GT, Sibbald RG, Woo KY. International interprofessional wound caring in chronic wound care. In: A clinical source book for health care professionals. 5th ed Malvern, PA: HMP Communications. 2012; 1: 1-10.
4. Bergendahl L, Werner F, Schmidt A, Ronika M, Renner R, Erfurt-Berg C. Development and evaluationof an interprofessional teaching concept for modern wound management. JDDG. 2020; 18: 977-982.
5. Frank JR, Snell LS, Cate OT, Holmboe ES, Carraccio C, Swing SR, et al. Competency-based medical education: theory to practice. Med Teach. 2010; 32: 638-45.
6. Jha NK, Shafique M, Thomas R, Pangilinan Cruz SP, Tariq G, Kiraly L. The sternal wound management in pediatric cardiac surgical patients: implementation of wound care pathways incorporating principles of wound bed preparation paradigm and early advanced therapy. Adv Skin Wound Care. 2022.
7. Lindholm C, Searle R. Wound management for the 21st century: combination of effectiveness and efficiency. Int Wound J. 2016; 13: 5-15.
8. Woo KY, Sibbald RG. A cross-sectional validation study of using NERDS and STONEES to assess bacterial burden. Ostomy Wound Manage. 2009; 55: 40-8.
9. Sachdeva C, Satyamoorthy K, Murali TS. Microbial interplay in skin and chronic wounds. Curr Clin Microbiol Rep. 2022; 9: 21-31.
10. Sibbald RG, Elliott JA, Persaud-Jaimangal RP, Goodman L, Armstrong DG, Harley C et al. Wound bed preparation 2021. Adv Skin Wound Care. 2021; 34: 183-95.
11. Anisuzzaman DM, Wang C, Rostami B, Gopalkrishnan S, Niezgoda J, Yu Z. Image-based artificial intelligence in wound assessment: a systemic review. Adv Wound Care. 2021; 11.
12. Ploderer B, Brown R, Seng LSD, Lazzarini PA, van Netten JJ. Promoting self-care of diabetic foot ulcers through a mobile phone app: user-centered design and evaluation. JMIR Diabetes. 2018; 3: e10105.