

In-time bedside measurement of the pH value of (chronic) wounds

A new measurement device and first results in chronic wounds

Eberlein T^a, Mustafi N^b, Abel M^c

^a College of Medicine and Medical Sciences, Arabian Gulf University, Manama, Kingdom of Bahrain

^b Krankenhaus Nordwest, Frankfurt/M, Germany

^c Lohmann&Rauscher GmbH&Co KG, Rengsdorf, Germany

Introduction

Wound pH remains in the focus of scientific considerations for the diagnosis and treatment of chronic wounds as emphasized in recent studies. This conclusion is supported by abundant evidence that rapid acute wound healing occurs with low, acidic pH values at starting points below a pH value of 3. This difference in the wound environmental pH value in acute and chronic wounds has been shown to be relative to differences in the character of exudate which affects pH value. Progress in treatment of these wounds is accompanied by reduction in pH.

Until now there has been no simple, convenient and inexpensive instrument to measure pH of wounds in the clinical environment or bed-side treatment.

Current means for measuring and monitoring pH in wounds is both time consuming and an expensive laboratory procedure. Measurements are done in clinical laboratories on specimens using expensive equipment with typical glass electrodes that require frequent recalibrations making use in physician offices or bedside measurement impractical.

Material and Methods

In a timeframe of nearly one year a monitoring of pH value by using a new technology of online measurement of 76 chronic wounds took place. Data were collected based on patients with chronic, non-healing wounds of different etiologies. Measurement operation is shown in fig. 2.

This diagnostic-device makes first possible real-time measurement of pH values directly from the wound using well-known and established ISFET (Ion Selective Field Effect Transistor)–technology.

Measurement can be easily and economically done as simply as taking temperature or blood pressure:

- without prior calibration
- directly in the wound without prior extraction of wound exudate
- coinciding with a temperature measurement in approximately 20 to 30 sec.

The reliability of this monitoring technology has been well validated in modern food processing, and is also being introduced in other forms of medical use. The measurement device is demonstrated in fig. 1.



Fig.1: Measurement device (NAWA, Nuremberg, Germany)

References

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Fig.2: Realisation of measurement

Results and Discussion

Chronic wounds with different etiologies show a typical shift to alkaline ranges. Alkalisations seems to be a part of chronification process (according to Romanelli et al. 2003 – 2009).

The range was about one pH unit for all observed etiologies beside venous leg ulcers. Measurement needs half a minute to a minute time *in praxi*.

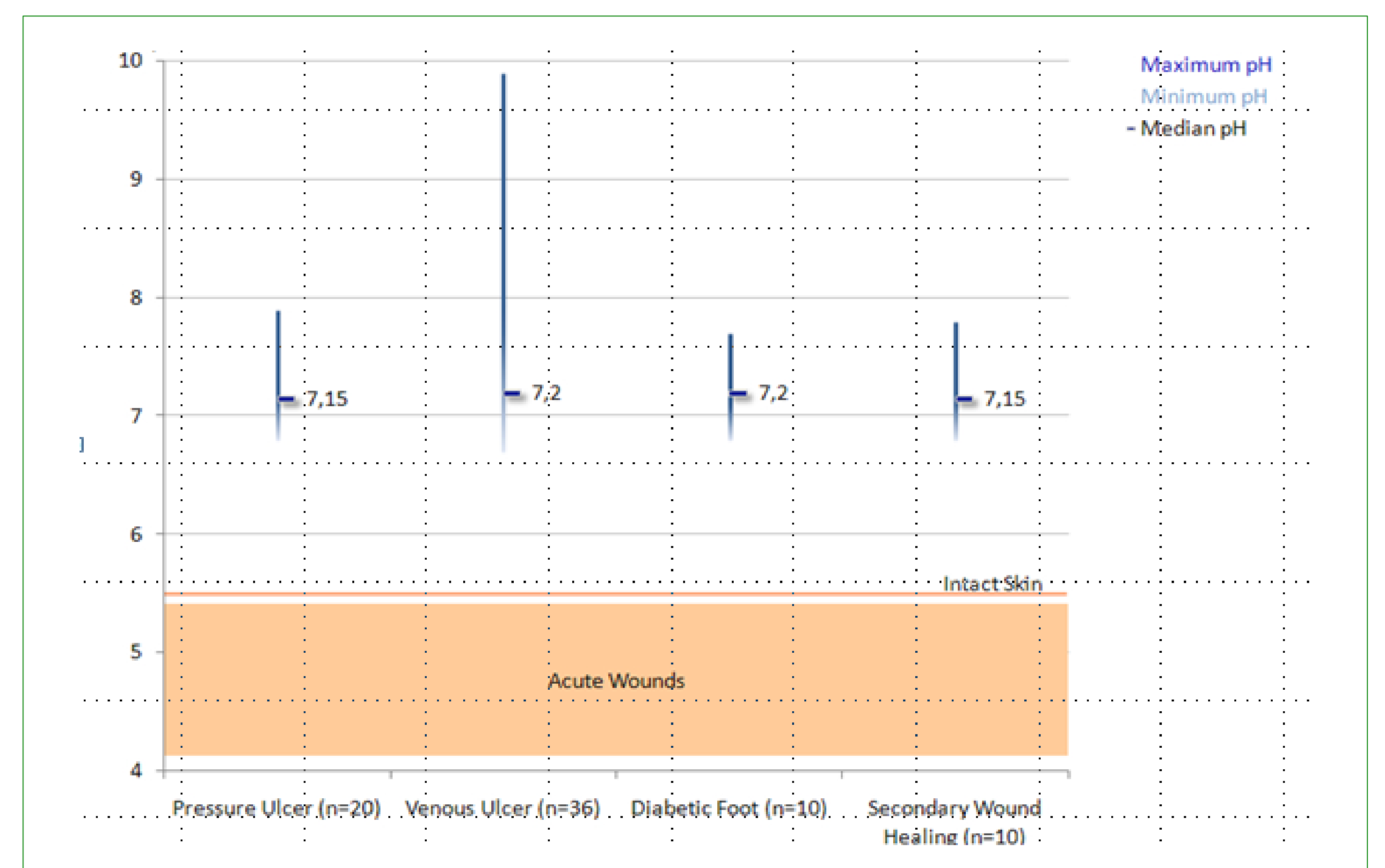


Fig.3: Results of pH value in 76 cases of chronic wounds of different origin, compared with own data about acute wounds and the skin basic pH line (according to: Eberlein, Tsioras and Riesinger 2010)

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