

CLINICAL OBSERVATIONS ON THE USE OF HONCRIVINE IN THE CHEMICAL DEBRIDEMENT OF WOUNDS

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ABSTRACT

Background: Chronic and non healing wounds, necrotic wounds and contused and devitalized wounds require debridement to rid the wounds of all these impediments that encourage bacterial growth and multiplications with consequent impairment of wound healing. Whereas there are several methods of wound debridement with their peculiar indications, merits and demerits, the ideal method of debridement is yet to be discovered.

Aim: The aim of this study is to investigate clinically the ability of honcrivine (honey plus acriflavine 0.1%) to chemically debride various wounds in routine clinical practice.

Patients and Method: One hundred and eighty nine consecutive patients managed by the author between June 1995 and June 2005 were included in this study. They were 125 males and 64 females and their ages ranged between 6 and 78 years. Initially swab was taken for bacterial culture from each wound before being cleaned with normal saline, then dressed daily with gauze soaked in honcrivine. Bacterial culture was repeated fortnightly. Antibiotics were administered as dictated by culture and sensitivity report.

Results: Wound debridement progressed rapidly and impressively with necrotic and devitalized tissues as well as tenacious pus and fibrin deposits being replaced with healthy granulation tissue. Patients age, sex and bacterial burden did not influence the rate of debridement, rather wound age and necrotic burden were inversely proportional to the debridement rate. Honcrivine did not provoke any inflammatory response nor was any allergic reaction observed.

Conclusion: It is one of the oldest remedies known to mankind and is still useful and versatile today as it was 2000 years ago. It is a very effective chemical wound debridant.

Key words: Chemical debridement, Acriflavine, honcrivine, honey

(Accepted 5 December 2008)

INTRODUCTION

Dead and devitalized wounds such as found in crush injury, contused wound Fournier's gangrene, cancrum oris, decubitus ulcer, diabetic gangrene, diabetic neuropathic ulcer and chronic non-healing ulcers encourage growth and multiplication of bacteria¹. These bacteria elaborate chemicals and enzymes such as haemolysins, hyaluronidase, collagenase, elastase, protease, lipase ribonuclease, nuclease, coagulase, staphylokinase, lecithinase etc.² which impair wound healing. In order to eliminate the deleterious effect of these organisms on wound healing, such wounds are either debrided or excised. Wound debridement requires the removal of all dead and devitalized tissues from wound until the wound is clean and fresh³⁻⁵. There are several methods of wound debridement, each with its own indications, merits and demerits⁶⁻¹⁰. The most commonly used methods are surgical or sharp debridement, autolytic, mechanical, enzymatic or

chemical and biological or maggot wound debridement^{6,7}. The Chemical debridement of wounds is now a well-established procedure. The two commonly used agents are collagenase derived from a bacterium *Clostridium histolytica* and papain derived from *carica papaya* fruit^{11,12}. Following reawakening of interest in the use of honey in wound healing, this author and indeed other authors have demonstrated that honey has some wound debridement property¹³⁻¹⁶. This study investigates the use of honey in the form of honcrivine in chemical debridement of chronic wounds and gangrenous ulcers in clinical practice.

PATIENTS AND METHODS

Between June 1995 and June 2004, 189 consecutive patients with wounds and necrotic ulcers seen by the author at the University of Calabar Teaching Hospital and Eso Foundation Infirmary were chemically debrided using honcrivine a honey-based formulation by the author containing 0.1% acriflavine. Informed consent was obtained from all patients included in this study and approval for the study was not

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Obtained because the hospital's ethical committee did not exist during the period of study. Wound swab for bacterial culture and sensitivity were taken from every wound at the beginning and fortnightly before being dressed with gauze soaked in honcrivine. Deep, tunnel or cavity wounds were filled with honcrivine before being packed with honcrivine gauze. This procedure was repeated daily until the wounds were completely debrided. The extent and thoroughness of debridement were accessed clinically by naked eye observation of the rate elimination and replacement of devitalized and neurotic tissues with healthy granulation tissue Note was also taken of the abolition of odor, exudates indurations and wound oedema and also the rate of decrease of bacterial burden. The bacterial burden of the wounds was accessed by the bacteriological report such as "heavy growth", "moderate", "scanty" or "no-growth" after 48 hours of incubation. Antibiotic therapy was instituted as dictated by the bacterial culture and antibiotic sensitivity result. All patients with abdomino-perineal wounds, penetrating injuries and wounds in the lower extremities were placed empirically on metronidazole to take care of anaerobic organisms since anaerobic culture was not undertaken.

RESULTS

Out of the 189 patients whose wounds were debrided with honcrivine 125 were males while 64 were females. The ages ranged from 6 years to 78 years median 39years. The wounds included fungating breast cancer 55, Fournier's gangrene 35, diabetic gangrene 26, traumatic wounds 19, decubitus ulcer 16, gunshot wounds 16, miscellaneous cases 16 (see Table 1).

Table 1: **Wounds Debrided Chemically with Honcrivine.**

Wounds	Male	Female	Total
Fungating breast cancer	2	52	55
Fournier's gangrene	34	1	35
Diabetic gangrene	24	2	26
Traumatic ulcer wounds	19	6	25
Decubitus ulcers	14	2	16
Gunshot wounds	16	-	16
Miscellaneous	16	-	16
Total	125	64	189

Table 2: **Frequency of Organisms Cultured from Wounds.**

Organisms	Frequency	Percentage
Staphylococcus areus	106	23
Pseudomonas pyocynaesus	100	21.75
Escherichia coli	81	17.65
Mixed coliforms	66	14.20
Pseudomonas eruginosa	38	8.10
Proteus mirabilis	29	6.10
Klesiella species	21	4.50
Streptococcus faecalis	16	3.55
Straptococcus pyogenes	5	1.00
Total	462	100

Sloughs, dead and devitalized tissues, necrotic tissue and eschar became detached from the wound bed gradually and were easily swabbed off or lifted off with a pair of forceps. It took between two to six weeks to accomplish complete debridement with honcrivine. The rate of debridement was faster for wounds like Fournier's gangrene and traumatic wounds and fungating breast cancer with complete debridement being achieved in two weeks on the average, while it took much longer for wounds like necrotising fasciitis, diabetic ulcers and decubitus ulcer 4 to 6 weeks. In addition to wound debridement honcrivine caused wound oedema and fetid odour to disappear between 48 hours and one week. This was particularly pronounced in ulcerated breast cancer that produced the most repugnant odor and yet most rapidly deodorized. Initial swab culture yielded growth of such organisms as Staphylococcus aureus, Pseudomonas pyocyanus, Escherichia coli mixed coliforms, Pseudomonas eruginosa, Proteus mirabilis, Klebsiella species, Streptococcus Faecalis, Streptococcus pyogenes (see table 2). Sensitive to such antibiotics as ciprofloxacin, perflacin, co-amoxiclav, gentamycin cefoxitin, sparfloracin and metronidazole. Debridement activity was confined entirely to devitalized and dead tissue with no damage to normal healthy tissue. There was no blood loss and no allergic reaction. When debridement was complete continued application of honcrivine prevented further formation of necrotic tissue especially in decubitus ulcers and diabetic gangrene (maintenance debridement) until the wounds healed.



Figure 1a.
A 23 year old man with grossly contaminated contused, divitalized and grossly infected wound suffered from road traffic accident. The wound contained pieces of broken glass and was draining pus freely. After toileting with dilute savlon[®] solution the wound was dressed daily with layers of gauze soaked in honcrivine for five weeks.



Figure 1b.
After 5 weeks of chemical debridement with honcrivine the wound was now ready for skin grafting. The green stain around the wound edge is due to the colour of honcrivine.



Figure 1c.
Final result after skin grafting.

Seven limbs out of 10 diabetic limbs referred for amputation were salvaged following successful debridement and healing of the limbs. Wound debridement rate was not related to patients age even though the overall healing rate was inversely proportional to age of the wound. There was no sex difference in wound debridement rate with honcrivine. Bacterial burden did not seem to affect debridement rate. Wound debridement rate was slower in long standing wounds and also wounds with heavier necrotic burden.

DISCUSSION

Whereas the wound healing potential of honey the main ingredient of honcrivine is now very well acknowledged, the wound debridement property has only sporadically been highlighted,¹³⁻¹⁶. This is the first clinical study that specifically demonstrates the wound debridement properties of honey with special reference to honcrivine. Even though as observed

Clinically honey digests the tissues as well as liquefying thick tenacious pus and fibrin, the exact mechanism by which this is done is not known. It digest devitalized and non living tissues whether infected or not hence ragged contused wounds are completely debrided leaving healthy granulating tissue ready for skin grafting (See figure 1). While being optimized for mastectomy or cytotoxic therapy, patients with fungating foul swelling breast cancer had their breast ulcers debrided, deodorized, cleansed and made less offensive to other patients in the same ward and the nursing staff with the use of honcrivine. Fresh traumatic wounds, acute wounds, gunshot wounds and Fournier's gangrene show amazing response to debridement with honcrivine, averaging 2 weeks while chronic ulcers like bed sores, diabetic gangrene neuropathic ulcers and various ulcers took much longer. Attention was also paid to co-morbid condition of the patient like diabetes mellitus, venous insufficiency etc. Honcrivine did not provoke any bleeding nor any adverse effect with concomitant application of topical antibiotics like gentamycin or metronidazole and no allergic reaction was observed. By its hygroscopic property of drawing fluid from surrounding wound oedema unto itself and the surface of the wound it may like hydrocolloids, hydrogels and alginate that moisten wound bed enable endogenous proteolytic enzymes to carry out autolytic debridement as well¹⁷. Thus reinforcing chemical wounds debridement activity. Chronic wounds like decubitus ulcers, diabetic gangrene, neuropathic ulcers, continued application of honcrivine obviated the need for repeated debridement by arresting progression of necrosis and gangrene i.e. honcrivine carries out maintenance debridement until the wound heals or skin grafted. Honcrivine is cheap and its derivative honey easily available and is very effective. It does not require hospital environment and like other chemical debridants. Its application requires no anesthesia. Unlike papain-urea combination it is not associated with any inflammatory response and pain¹⁸. Even though advancing age showed inverse relationship to overall healing of the wounds it showed no relationship to debridement rate. Necrotic burden also showed an inverse relationship to debridement rate but bacterial burden did not. May be because of the intrinsic antibacterial activity of honcrivine.

CONCLUSION

Honcrivine, a honey based compound is a cheap tolerant and easily available chemical debridant of wounds.

ACKNOWLEDGEMENT

I wish to sincerely thank the following, Dr. A. Etiuma, Dr. M. Asuquo, Dr. I. Ikpeme, Dr. A. Usoro who took part in dressing the wounds of these patients during their residency training in my unit.

They did not however participate long enough in the management of these patients to warrant their names being included as authors.

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