NHS Foundation Trust

The Use of Hydrogen Peroxide in the Treatment of Infected Burn Wounds: A Systematic Review and National Survey of Current Clinical Practice in the United Kingdom

Toni Mihailidis¹, Bethany Patenall², Amber Young³

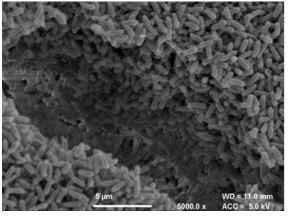
1. University of Bristol Medical School, 2. Department of Chemistry, University of Bath 3. Bristol Royal Hospital for Children

Introduction

- Aim: to investigate the current use of hydrogen peroxide (H₂O₂) in the treatment of infected burn wounds
- Current treatment of infected burn wounds is with antibiotics and/or debridement¹, however bacterial resistance remains a significant problem.²
- Pseudomonas aeruginosa and Staphylococcus aureus have especially high frequency in burn wounds (up to 85%). Infection with these multi-drug resistant bacteria (MDR) lead to an increase in hospital stay, increased surgical intervention and increased mortality rates.³

Methods

- An 11-question survey on the use of H₂O₂ in the treatment of infected burn wounds was sent to all burn services in the United Kingdom (list obtained from the British Burns Association)
- A systematic review on the current clinical use of H_2O_2 in the treatment of infected burn wounds was performed using four main databases.





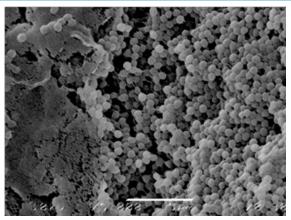


Figure 1 A SEM of *P. aeruginosa* biofilm **B** image of biofilm associated bacterial infection with burn **C** SEM of *S. aureus* biofilm.

Discussion

- A 72.7% response rate was achieved. Of these,
 75% do not currently use H₂O₂. Of the 25% which do, there is no established protocol on its use.
- The systematic review generated 1168 papers, with only one addressing the research question.
- This RCT demonstrated that soaking with 2% H₂O₂ prior to grafting improved graft take rate in infected burn wounds compared with grafts treated with saline prior to grafting.⁴

Conclusions

- H₂O₂ has been shown to be effective against MDR bacteria in vitro but only one RCT shows H₂O₂ to be an effective burn wound disinfectant
- Based on our research and the responses to the questionnaire, H₂O₂ could be used to treat superficial, contaminated burn wounds in theatre under general anaesthetic
- More large-scale research in this field is required to determine whether H₂O₂ may offer an alternative to antibiotic resistance in infected burn wounds.

	Use H_2O_2 ?	Use as treatment	Time Limit?	Wound Swab	Who?	Where?	Concentration?	Volume?
ı	11202:	adjunct?		Prior?				
Ī	4/16	4/4	1/4 at initial	2/4	Plastic	Theatre	2/4 2:1 saline:H ₂ O ₂ ;	2/4 minimal;
	services	services	presentation		Surgeon		1/4 50:50 saline;	1/4 200 or
					or Lead		1/4 3% diluted in	400 ml;
					Nurse		saline	1/4 500ml

Table 1 | Summary of Survey

References:

- 1. Lachiewicz A, Hauck C, Weber D, Cairns B, van Duin D. Bacterial Infections After Burn Injuries: Impact of Multidrug Resistance. Clinical Infectious Diseases. 2017;65(12):2130-2136.
- 2. Keen E, Robinson B, Hospenthal D, Aldous W, Wolf S, Chung K et al. Prevalence of multidrug-resistant organisms recovered at a military burn center. Burns. 2010;36(6):819-825.
- 3. van Langeveld I, Gagnon R, Conrad P, Gamelli R, Martin B, Choudhry M et al. Multiple-Drug Resistance in Burn Patients. Journal of Burn Care & Research. 2017;38(2):99-105.
- 4. Mohammadi A, Seyed Jafari S, Kiasat M, Pakyari M, Ahrari I. Efficacy of debridement and wound cleansing with 2% hydrogen peroxide on graft take in the chronic-colonized burn wounds; a randomized controlled clinical trial. Burns. 2013;39(6):1131-1136.