

AS POST-LONG BONE FRACTURE FIXATION WOUND DRESSING.

Surianty Shafei¹, Mohd Ariff Sharifudin², Mohd Shukry Ismail¹, Shaifuzain Ab Rahman³, Abdul Nawfar Sadagatullah³.

¹ Department of Orthopaedics, Hospital Raja Perempuan Zainab II (HRPZII), Kota Bharu, KELANTAN

² Department of Orthopaedics, Traumatology and Rehabilitation, International Islamic University Malaysia (IIUM), MALAYSIA

³ Department of Orthopaedics, School of Medical Sciences, Universiti Sains Malaysia (USM), MALAYSIA



STUDY BACKGROUND

Surgical site infection in implant related surgery is an important issue among patients particularly in orthopaedic field. Method of dressing is one of the task that need peculiar attention in reducing surgical site infection following fixation of long bone fracture with an implant. Honey base item also has a potential benefit in treating wound in implant related surgery. It is widely use as an alternative remedies in treating wound and other medical problems due to its antimicrobial activities and healing potentials. Tualang honey spray is a new dressing agent that may provide the similar wound quality and outcome as compared to other product. This is a preliminary study in Malaysia that involve human as the subject.

OBJECTIVE

General Objective:

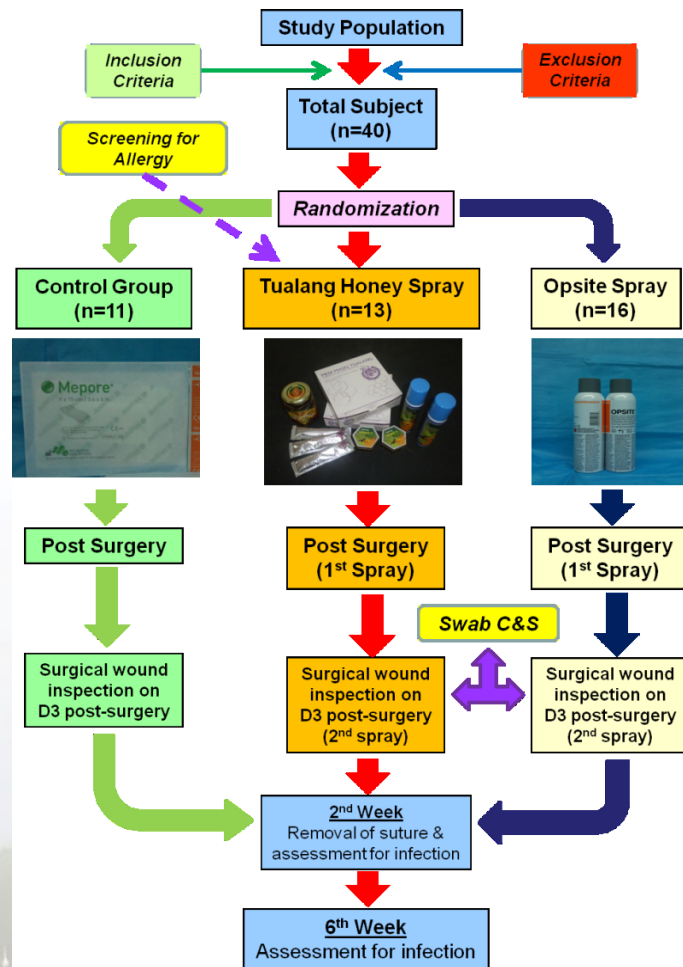
This is a study to compare the use of Tualang Honey spray versus Opsite spray for surgical wound dressing after fixation of long bone fracture.

Specific Objectives:

- To evaluate the presence of adverse events following the use of Tualang honey spray or Opsite® spray as a dressing material after long bone fracture fixation (local skin reaction, discharge or erythema and blister formation).
- To identify the presence of wound commensals microorganism following the dressing.
- To assess the wound healing in term of wound dehiscence and formation of scar .
- To identify any factors that influence the wound healing and surgical wound infection .

MATERIALS & METHODS

This is a prospective, randomized, unblinded, controlled trial involving patients with closed diaphyseal fracture of tibia or femur treated with open reduction and internal fixation (plates or intramedullary devices) at a single tertiary centre. Forty patients were randomly divided into three groups according to the dressing material used; film spray (Opsite®) dressing (n=16), Tualang honey spray (n=13), and control group (n=11). Each group used a same wound protocol except for the control group in which involve application of non-adhesive film (Mepore) only. Dressing materials were applied immediately after surgery and on day three post-surgery. Wound assessment was done on day 14 and day 42 post-surgery. Outcomes evaluated include wound complications, and the effects on skin commensals. On day 42, infection rate (wound dehiscence) and scar formation were also evaluated.



RESULTS

a. Demographic Data

Mean age of 19 years old (range from 15 to 45). There were 17 females and 23 males patients. No patient developed allergic reaction to Tualang honey spray application. Thirty-three (82%) patients had femoral fractures and only 7 (18%) had tibial fractures. One patient had bilateral fracture femur, which was in the Opsite® spray group. Thirty-eight (38) patients underwent open reduction and plating as compared to intramedullary devices (2). There were 3 polytrauma patients and each subjects fall in each type of dressing group. Severity of soft tissue injuries almost equally distributed in grade 1 (19 (47.5%)) and 2 (18 (45%)) with only 3 patients had grade 3 soft tissue injury. The mean duration from injury to surgery in overall cases is 139 hours (5 days and 19 hours). The mean duration of surgery is 80 minutes. The mean length of surgical wound in all cases was 16.11cm.

b. Wound complications

No clinical signs of infection noted in all three groups on day 3 post-surgery. On day 14 post-surgery, a patient from Opsite spray group had superficial wound gapping with serous discharge. Fisher exact test was used to analyse the correlation between dressing material and wound complications showed insignificant result ($p < 0.950$).

c. Wound commensals microorganism

Only one patient from the control group had microorganism (*Acinobacter* species) isolated via swab culture from the surgical wound on day 3 post-surgery. Fisher exact test was used to find association between dressing method and its effect on wound commensals microorganism. The result showed $p > 0.275$.

d. End results of the wound (at day 42 post-surgery)

All wounds healed without any infection at the end of the study. Tualang honey spray have a significant influence in reducing the risk of hypertrophic scar formation and has similar wound outcomes as compared to Opsite® spray (Table 1).

Table 1: Association between method of dressing and wound healing

Method of dressing	D42 Wound healing		χ^2 stat (df)	p value*
	Grade 1	Grade 2		
Mepore only	3 (13.6)	8 (44.4)	5.951 (2)	0.051
Tualang Honey Spray	10 (45.5)	3 (16.7)		
Opsite Spray	9 (40.9)	7 (38.9)		

* Chi-square statistics



Example of hypertrophic scar formation in Opsite® spray patient



Example of normal scar formation in Tualang honey dressing patient.

e. Statistical analysis

Table 2: Multiple logistic regression analysis to identify factors influencing wound healing

Variables	B	Adjusted OR (95% CI)	p value
Method of dressing			
Mepore only		1	
Tualang Honey Spray	-2.185	0.113 (0.018, 0.716)	0.021
Opsite Spray	-1.232	0.292 (0.056, 1.525)	0.144

Backward LR method applied

Hosmer and Lemeshow test, p value = 0.866

Classification table 67.5% correctly classified

Area under Receiver Operating Characteristic (ROC) curve was 0.708

DISCUSSION

The wound healed similarly in Tualang honey spray group and Opsite® spray wound. The additional point is Tualang honey spray able to promote a good wound healing with a low risk of hypertrophic scar formation. This study also showed no identifiable factors that influence the wound healing. Contradict to some other studies, it promotes good wound healing with a low risk of hypertrophic scar formation. The different results in this study were due to multifactorial and one of them is the limitations of the research. This is an unblinded study and the main component of the research is wound evaluation that involved subjective factors. The limitation of data and subjects also influence the overall result. Many factors were beyond our control such as different surgeons, duration of surgery and variable waiting operating times. The above issues may lead to a bias result in the study.

CONCLUSION

Tualang honey spray may be considered as a safe alternative for a dressing material and comparable to the usual Opsite® spray as supported by this study.

REFERENCES

- Andeagarchew Mulu, Belay Tessema, Felene Derbie, Ethiop J. : In vitro assessment of the antimicrobial potential of honey on common human pathogens. J Health Dev. 2004;18(2):107-111.
- Barbara Piepers : Honey based dressing and wound care; An Option for Care in the United States. : J Wound Ostomy Continence Nurs. 2009;36(1):60-66. Mosby; 2000. p 51-84
- Hern Tze Tan, Rosliza Abdul Rahman, Siew Hua Gan, Ahmad Sukari Halim, Siti Asma' Hassan, Siti Amrah Sulaiman, and Kirpal-Kaur B. : The antibacterial properties of Malaysian tualang honey against wound and enteric microorganisms in comparison to manuka honey. BMC Complement Altern Med. 2009; 9: 34.
- J. C. Wille and A. Blussé van Oud Alblas. A comparison of four film-type dressings by their anti-microbial effect on the flora of the skin. Journal of Hospital Infection. Volume 14, Issue 2, August 1989. Pages 153-158.
- Manivannan L, Mohd Ali N A, Halim A S, Othman N H, Banga K K S, Boukara L, Febriyenti, Baei S, Sulaiman S A. Evaluations of Tualang honey spray and gel on full thickness burn wound. A preliminary study. 16th National Conference on Medical and Health Sciences. 2011.
- Molan P. C. : The Evidence Supporting the Use of Honey as a Wound Dressing. LOWER EXTREMITY WOUNDS 5(1):2006 pp. 40-54.
- Molan P. C. : Re-introducing honey in the management of wounds and ulcers - theory and practice. Ostomy Wound Manage 2002 Nov;48(11):28-40.