

# TOPICAL HONEY TO TREAT AN ABSCESS CAUSED BY *STAPHYLOCOCCUS AUREUS*: A CASE REPORT

R Heru Prasetyo<sup>1</sup> and Erma Safitri<sup>2</sup>

<sup>1</sup>Department of Parasiology, Faculty of Medicine, Universitas Airlangga, Surabaya;

<sup>2</sup>Department of Veterinary Reproduction, Faculty of Veterinary Medicine, and Stem Cells Research Division of Institute Tropical Disease, Universitas Airlangga, Surabaya, Indonesia

**Abstract.** *Staphylococcus aureus* has developed resistance to antibiotics. Honey has been found to have antibacterial properties. We aimed to determine if honey could be used topically to treat an abscess caused by *Syntaphylococcus aureus*. The patient was a 64 year old male with no history of diabetes mellitus type 2 who presented to the hospital with a 1 week history of a right thumb abscess. The abscess has already opened up and was draining purulent exudate. The abscess extended to the bones which was visible in the base. The abscess was cleaned and then honey soaked gauze was placed on the wound. The wound was dressed every two days in this manner and by 30 days the wound had healed. A culture obtained from the wound prior to beginning the honey treatment revealed *Staphylococcus aureus*. Honey may be considered as a therapeutic option for superficial abscesses due to *Staphylococcus aureus*.

**Keywords:** honey, topical therapy, abscess, *Staphylococcus aureus*

## INTRODUCTION

*Staphylococcus aureus* is a common cause of skin abscesses but there is a problem of increasing resistance of antibiotics (Li, 2018). Honey has been used for both nutritional and medical purposes (Molan, 1999; Mandal and Mandal, 2011; Aggad and Guemour, 2014), including as therapy for wounds (Mandal and Mandal, 2011). There have been no reports of microbial

resistance to honey (Aggad and Guemour, 2014). It has been found to have antibacterial activity (Evan and Flavin, 2008; Aggad and Guemour, 2014). Honey has been used to treat several infectious diseases (Bell, 2007; Malone and Tsai, 2016; Arawwawala and Hewageegana, 2017). Several *in vitro* studies have found honey can inhibit growth and proliferation of *Staphylococcus aureus*, including methicillin resistance *Staphylococcus aureus* (MRSA) (Molan, 2001; Sherlock *et al*, 2010; Stewart *et al*, 2014). It has been suggested honey be used topically to treat *Staphylococcus aureus* infected wounds (Arawwawala and Hewageegana, 2017). We report here a case where honey was used *in vivo* to treat an abscess caused by *Staphylococcus aureus*.

\*Correspondence : Dr Erma Safitri, Department of Veterinary Reproduction, Faculty of Veterinary Medicine, Universitas Airlangga, Kampus C-Universitas Airlangga, Mulyorejo, Surabaya, 60115, East Java, Indonesia.

Tel : +62 87853431053

E-mail : rma\_fispro@yahoo.com

## CASE REPORT

The patient was a 64-year-old male, who presented to the hospital with a week history of a draining abscess on his right thumb. He has been treated for this by an antibiotic. The past medical history was negative for diabetes. The social history was positive for smoking 10 cigarettes/day. On physical examination the patient had a temperature of 37.1°C. He was ill kempt and had a dressing on his right thumb which when removed revealed a draining abscess with foul smelling exudate present at the bottom of his thumb. The abscess was 6 cm in diameter. It was surrounded by dark, tender skin (Fig 1). The patient stated he had no finances and did not want the thumb amputated as suggested previously to him. He was offered treatment using honey for free and gave written informed consent to have this done and for permission to report this case.

A culture swab was obtained prior to starting treatment, which eventually grew out *Staphylococcus aureus*. The abscess was cleaned without disinfectant and then honey was used to soak gauze and placed in the wound. The honey used for the gauze was unprocessed honey obtained from a beekeeper from Lawang, East Java, Indonesia. The honey soaked gauze was placed directly into the abscess and covered with a piece of clean, untreated gauze. The patient was asked to come back every 2 days and the wound was cleaned each time without the disinfectant and more honey soaked gauze was then placed on the wound. At the onset of treatment, the bones of the thumb were visualized in the base of the abscess. By 20 days the wound was debrided by the gauze changes at the skin had begun epithelialize. By 30 days the wound had closed (Fig 2).

## DISCUSSION

In this paper we report a 64 year old man with a severe thumb abscess caused by *Staphylococcus aureus* treated successfully to healing using only honey soaked gauze. We used raw honey because it is most reliable than processed honey. We



Fig 1-Abscess on the thumb of the right hand of the patient seen from two different angles.



Fig 2-The patient's thumb after treatment.

used gauze soaked honey because it has also been reported to have debriding activity (Molan, 1999). We found this activity evident when changing the dressing noting necrotic tissue present on the gauze. The honey also had deodorizing activity. This may be due to the high glucose rather than amino acids. The lactic acid produced by the honey replaced the ammonia produced by amino acids and dead tissue in wounds (Molan, 1999). The wound formed good granulation tissue and epithelialized well with the honey treatment. Honey has been reported to promote tissue regeneration through stimulation of angiogenesis and growth of fibroblasts and epithelial cells (Molan, 1999; Molan, 2001; Adifitrian *et al*, 2012; Kreshanti *et al*, 2012; Mahandaru *et al*, 2012). It may be through the production of hydrogen peroxide that honey promotes rapid healing of wounds since hydrogen peroxide has been found to stimulate proliferation of fibroblasts (Molan, 2001). Honey may promote repairs of damaged intestines and stimulate growth of new tissues (Mandal *et al*, 2011; Prasetyo and Safitri, 2016, Prasetyo and Hestianah, 2017; Safitri *et al*, 2016; Safitri *et al*, 2017). Honey has antiinflamatory effects and immunomodulatory activity (Molan, 2001; Arawwawala and Hewageegana, 2017). The honey aided in debridement, had antibacterial activity, anti-inflammatory activity, reduced odor, and maintained moisture in the wound (Cooper *et al*, 1999; Adifitrian *et al*, 2012; Diah *et al*, 2012; Mahandaru *et al*, 2012; Samarghandian *et al*, 2017). Honey has a high osmotic pressure, is acidic, and has high antioxidant activity (Molan, 1999; Molan, 2001; Mandal *et al*, 2011; Aggad and Guemour, 2014; Malone and Tsai, 2016).

In conclusion, we successfully used honey to treat a severe thumb abscess

cause by *Staphylococcus aureus*. Further studies are needed to determine the applicability and methods needed to treat skin abscesses caused by *Staphylococcus aureus*.

## ACKNOWLEDGEMENTS

The authors gratefully acknowledge the patient for permitting us to publish this case.

## CONFLICTS OF INTEREST

The authors declare that we have no conflicts of interest.

## REFERENCES

- Adifitrian T, Sudjatmiko G, Surachman AS, Dachlan I. Application of honey and transparent dressing to split thickness skin graft donor site and its effect on epithelialization rate. *J Plastik Rekonstruksi* 2012; 1: 333-7.
- Aggad H, Guemour D. Honey antibacterial activity. *Med Aromat Plants* 2014; 3: 152-3.
- Arawwawala L, Hewageegana H. Health benefits and traditional uses of honey: a review. *J Apither* 2017; 2: 9-14.
- Bell SG. The therapeutic use of honey. *Neonatal Netw* 2007; 26: 247-51.
- Cooper RA, Molan PC, Harding KG. Antibacterial activity of honey against strains of *Staphylococcus aureus* from infected wounds. *J R Soc Med* 1999; 92: 283-5.
- Diah A, Sundoro A, Sudjatmiko G. Antibacterial activity of Indonesia local honey against strains of *P. aeruginosa*, *S. aureus* and MRSA. *J Plastik Rekontruksi* 2012; 1: 177-81.
- Evan J, Flavin S. Honey : a guide for healthcare professionals. *Br J Nurs* 2008; 17: S24,S26, S28-30.
- Kreshanti P, Sudjatmiko G, Bangun K. The effect of honey give as oral drops in precipitating epithelialization of lateral palatal defect post two-flap palatoplasty. *J Plastik Rekonstruksi* 2012; 1: 15-22.
- Li Z. A review of *Staphylococcus aureus* and the

- emergence of drug-resistant problem. *Adv Microbiol* 2018; 8: 65-76.
- Mahandaru D, Sudjatmiko G, Kristaninta B. Modified two-flap palatoplasty with leaving lateral periostum and application of honey pack : a preliminary study. *J Plastik Rekonstruksi* 2012; 1: 67-73.
- Malone M, Tsai G. Wound healing with apitherapy: a review of the effects of honey. *J Apither* 2016; 1: 29-32.
- Mandal MD, Mandal S. Honey: its medicinal property and antibacterial activity. *Asian Pac J Trop Biomed* 2011; 1: 154-60.
- Molan PC. The role of honey in the management of wounds. *J Wound Care* 1999; 8: 415-8.
- Molan PC. Potential of honey in treatment of wounds and burns. *Am J Clin Dermatol* 2001; 2: 13-9.
- Prasetyo RH, Safitri E. Effects of honey to mobilize endogenous stem cells in efforts intestinal and ovarian tissue regeneration in rats with protein energy malnutrition. *Asian Pac J Reprod* 2016; 5: 198-203.
- Prasetyo RH, Hestianah EP. Honey can repair-  
ing damage of liver tissue due to protein energy malnutrition through induction of endogenous stem cells. *Vet World* 2017; 10:711-5.
- Samarghandian S, Farkhondeh T, Samini F. Honey and health: a review of recent clinical research. *Pharmacog Res* 2017; 9: 121-7.
- Safitri E, Utama S, Widiyatno TV, Sandhika W, Prasetyo RH. Auto-regeneration of mice testicle seminiferous tubules due to malnutrition base on stem cells mobilization using honey. *Asian Pac J Reprod* 2016; 5: 31-5.
- Safitri E, Widiyatno TV, Prasetyo RH. Honeybee product therapeutic as stem cells homing for ovary failure. *Vet World* 2017; 9: 1324-30.
- Sherlock O, Dolan A, Athman R, et al. Comparison of antimicrobial activity of Ulmo honey Chile and Manuka against methicillin-resistant *Staphylococcus aureus*, *Escherichia coli* and *Pseudomonas aeruginosa*. *BMC Compl Alternat Med* 2010; 10: 47.
- Stewart JA, McGrane OL, Wedmore IS. Wound care in the wilderness: is there evidence for honey ? *Wilderness Environ Med* 2014; 25: 103-10.