



Case report

Treating extravasation injury by honey antibacterial wound dressing in a neonate: A case report

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ABSTRACT

Introduction and importance: Phlebitis, vessel rupture and drug leaks or serum are the most complication of peripheral venous catheterizations in neonates. Extravasation injury is characterized by the leakage of injected medications from blood vessels causing injury to the surrounding tissues, skin necrosis, and even amputation. **Case presentation:** This case was a 37-week- and 6-day-old male neonate with a birth weight of 2150 g, a height of 41 cm, and a head circumference of 31 cm who was born to a 28-year-old mother by cesarean section at Mahzad Obstetrics and Gynecology Hospital, Urmia, Iran. On the fourth day of hospitalization at neonatal intensive care unit (NICU), an extravasation injury happened in the neonate's left hand in size approximately 2 × 2 cm by a peripheral intravenous catheter. The extravasation did not heal despite extensive intravenous antibiotic therapy and rinsing with normal saline. The neonate was referred to our wound management team. The extravasation injury was treated by using of honey antibacterial wound dressing (Medihoney™) twice a day for a month. The infant's extravasation injury was relatively healed after two weeks, and he was discharged from our wound treatment team after four weeks in good general condition.

Clinical discussion: Neonates are more susceptible to extravasation injury compared to adults as their peripheral vascular walls are more sensitive and thinner.

Conclusion: This case revealed that honey antibacterial wound dressing (Medihoney™) could be an alternative to other common dressings in neonates suffering from extravasation injury.

1. Introduction

In the neonatal intensive care unit (NICU), intravenous catheter placement is a prevalent approach for venipuncture, administering intravenous fluids, intravenous nutrition, and drug [1]. Phlebitis, vessel rupture and drug leaks or serum are the most complication of peripheral venous catheterizations in neonates [2]. Extravasation injury is characterized by the leakage of injected medications from blood vessels causing injury to the surrounding tissues, skin necrosis, and even amputation [3]. Neonates are more susceptible to infiltration and extravasation injury compared to adults as their peripheral vascular

walls are more sensitive and thinner. Thinner venous networks, weaker vessels, and a high percentage of adipose tissue, make these complications more feasible [2]. The incidence of extravasation in neonates which have been reported, is 78 %, and 11 % respectively. Approximately 4 % of injuries from extravasation in the neonatal intensive care unit may result in cosmetic or functional scars [4].

Many studies have shown that honey products have inhibitory effects on about 60 species of bacteria, including aerobic, anaerobic, gram-positive, and gram-negative types [5,6]. The high concentration of glucose in honey inhibits the growth of bacteria and fungi. The hydrogen peroxide in honey, which releases slowly and remains on the tissue

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Fig. 1. Extravasation injury in the infant.

adjacent to the wound for up to 24 h, plays an important role in eliminating microbial agents in infectious wounds [6]. After application of honey on wounds topically, based on osmosis it draws water from the wound into itself, so helping to dry the infected area and reduce bacterial proliferation. It also has a direct anti-inflammatory effect on wounds [7]. The combination of these features and previous reports led us to trial honey antibacterial wound dressing in a case of extravasation injury in a neonate. This case report was reported according to the SCARE 2020 Guidelines to ensure the quality of reporting [8] (Fig. 1).

2. Case presentation

This case is a 37-week- and 6-day-old male fetus weight of 2150 g, a height of 41 cm, and a head circumference of 31 cm who was born to a 28-year-old mother by cesarean section at Mahzad Obstetrics and Gynecology Hospital, Urmia, Iran. The newborn's vital signs at birth were as follows: Temperature (T): 36.6, heart rate (HR): 167 bpm, respiration rate (RR): 55 bpm, blood pressure (BP): 61/25 mm Hg, oxygen saturation: 98 %. The mother comes from a large family with moderate socioeconomic status. During this pregnancy, she had regularly visited a gynecologist for health examinations, during which the fetus was found to be in perfect health on the color Doppler ultrasound. She had no history of drug taking and denied a history of smoking, alcohol, and drug abuse. Moreover, she did not state any history of diseases. The newborn

was hospitalized to the NICU ward and a peripheral intravenous (IV) catheter (a purple catheter in the newborn's left hand) was inserted to receive necessary fluids and electrolytes, intravenous nutrition, and medications. The newborn received intravenous antibiotics, including Gentamicin 4.5 mg BID, Ampicillin 100 mg BID, and Cefotaxime 120 mg BID. On the fourth day of hospitalization at neonatal intensive care unit (NICU), an extravasation injury happened in the neonate's left hand in size approximately 2×2 cm by a peripheral intravenous catheter. The extravasation did not heal despite extensive intravenous antibiotic therapy and rinsing with normal saline. The neonate was referred to our wound management team. The extravasation injury was treated by using of honey antibacterial wound dressing (Medihoney™) twice a day for a month. Medihoney™ antibacterial wound gel has been manufactured by the American company Derma Sciences, Inc. (Fig. 2). During this period, the newborn also received antibiotic therapy. The infant's extravasation injury was relatively healed after two weeks (Fig. 3), and he was discharged from our wound treatment team after four weeks in good general condition (Fig. 4).

3. Discussion

When a drug is inadvertently administered out of the vessel, extravasation can occur. Children, especially neonates, are particularly susceptible to extravasation injury [5]. Despite the fact that treatment



Fig. 2. Honey antibacterial wound gel dressing (Medihoney™).



Fig. 3. Extravasation injury two weeks after dressing with honey antibacterial wound gel.

options are many and varied, there is no agreement on the optimal approach to management, with guidelines sometimes presenting conflicting recommendations [9]. Therefore, it is evident that the policies appear to be largely based on historical practice in hospitals or on expert opinion, rather than published guidelines [10].

Honey, due to its antimicrobial, anti-inflammatory and antioxidant properties, improves the strength of the immune system, debridement action and stimulating role in wound regeneration, contributes significantly to wound healing processes [6].

In line with our study, Selma Atay et al. have reported a case of a 9-year-old girl with severe brain damage and quadriplegia, who hospitalized in the pediatric intensive care unit (PICU), diagnosed with intestinal sepsis episodes. The patient suffered from a stage IV ulcer with severe tissue necrosis of her right forearm, because of drug's extravasation. The necrotic epidermis was surgically debrided and medical grade honey (MGH) monotherapy began to further improve autolytic debridement and healing. Two weeks after the start of MGH treatment, the wound showed the formation of granulation tissue from the edges towards the center and further reduction of necrotic tissue. The size of the wound had decreased, and necrotic tissue was completely absent after week 3. During week 5, the wound gradually epithelialized with healthy granulation tissue and the new blood vessel formation under the skin indicated by bright color. After 56 days of MGH therapy, the wound

properly healed [11]. Smaropoulos et al. showed that Honey pomade was effective for an 8-month-old male infant who had suffered from a second-degree with partial thickness burn trauma of his left hand [12]. Moreover, Parizad et al. in a case report revealed that surgical site infection in an infant can be successfully treated with honey-containing antibacterial wound gel [5].

4. Conclusion

Repairing skin damage caused by extravasation injury in infants is one of the major challenges in many countries. This case revealed that honey antibacterial wound dressing (Medihoney™) could be an alternative to other common dressings in neonates suffering from extravasation injury.

Consent

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.



Fig. 4. Extravasation injury four weeks after dressing with honey antibacterial wound gel.

Provenance and peer review

Not commissioned, externally peer-reviewed.

Ethical approval

All ethical principles were considered in conducting this case report. All patient information kept confidential.

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Guarantor

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CRediT authorship contribution statement

NF, RA, MGH, BM and RG contributed in data collection, manuscript drafting and reviewing, and approval of final manuscript. RG and NF have contributed in case management, data collection, manuscript drafting and reviewing, and approval of final manuscript. RG performed the study supervision.

Declaration of competing interest

None.

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