

## CASE REPORT

# Combined treatment with chlorhexidine and 0.9% saline in a newborn infant with an infected surgical wound

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Infection; Meningomyelocele; Newborns; Wound

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**Abstract**

Newborns are more susceptible to infection; this makes proper wound care extremely important in them. Unfortunately, in spite of successful surgery, patients can die as a result of wound area infections. Herein, we report a case in which a combined therapy of chlorhexidine (a disinfectant) and saline (a cleansing agent used in wound care) was used effectively to treat the wound in a newborn infant with an antibiotic-resistant, Gram-negative, bacteria-related surgical site infection.

**Introduction**

Newborns are considered as a specific population because of their physiological particularities, such as their higher susceptibility to infection because of their immature immune system and skin barriers (1,2). Even when careful attention is paid to postoperative wound care, infections and delayed wound healing are frequently encountered in this age group (3). Surgical site infections (SSIs) are responsible for increased morbidity and mortality as well as for longer hospital stays and higher hospitalisation costs (4). Herein, we present a new wound care protocol involving the combination of chlorhexidine (CHG) and 0.9% saline for a newborn with a large meningomyelocele defect and postoperative SSI.

**Case report**

An infant born at the 38th gestational week with a birth weight of 3500 g was admitted to the neonatal intensive care unit of our facility because of a large meningomyelocele in the lumbosacral region on the first postnatal day. A physical examination showed that the baby's vital signs were stable, but a lumbosacral myelomeningocele sac measuring 6 × 8 cm<sup>2</sup> in diameter was observed. On the second postnatal day, the defect was repaired with a fasciocutaneous sliding flap, and standard postoperative surgical care was provided daily with povidone-iodine and fucidic acid. However, on the fifth postoperative day, a purulent discharge was observed at the surgical site. After obtaining cultures from cerebrospinal fluid (CSF), blood and wound area, a combination of meropenem and

vancomycin antibiotic therapy was started empirically. Both the aseptically obtained culture of the purulent discharge and the CSF cultures tested positive for *Klebsiella pneumoniae*. The vancomycin therapy was then stopped, but the patient continued to be treated with the meropenem based on the antibiogram results. On the third day of the meropenem therapy, the patient underwent another lumbar puncture, and a direct microscopic examination of the CSF showed eight lymphocytes, a glucose level of 45 g/dl (with a simultaneous blood glucose level of 75 g/dl) and a protein level of 127 mg/dl; the CSF culture was sterile, but the culture from the wound area was positive for *K. pneumoniae*. In addition, surgical suture line dehiscence was observed (Figure 1). Wound care was provided with 0.9% saline and 2% CHG. When the dressings were removed, CHG was applied to the intact skin around the wound area, and the open wound was washed with the 0.9% saline twice daily. On the 16th postoperative day, the culture from wound area was sterile, and tissue healing had started (Figure 2), and at 2 months, the surgical wound area had completely healed (Figure 3).

**Key Messages**

- successful wound healing depends on disinfection and cleansing of wound area
- the wound infection can occur despite the use of povidone-iodine for postoperative care
- the combination of chlorhexidine and 0.9% saline can be used for open wound care in newborns



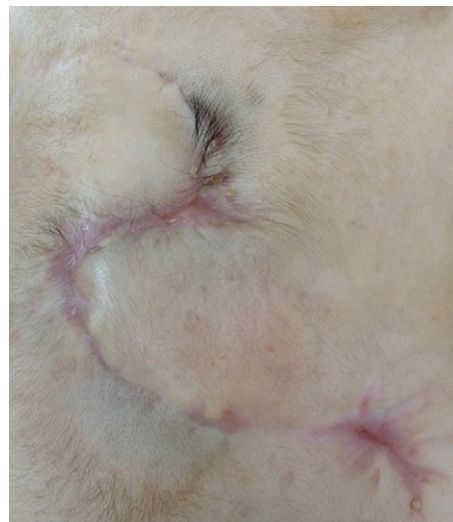
**Figure 1** Surgical suture line dehiscence on the eighth postoperative day.



**Figure 2** On the 16th postoperative day, tissue healing started at the edge of the wound area.

## Discussion

Povidone-iodine is a commonly used antiseptic for postoperative surgical site care. However, many studies in the literature have reported that CHG is more effective for reducing skin and blood culture contamination rates (5–7). Moreover, it has been used in large, well-designed clinical trials on tens of thousands of neonates without any severe complications (8,9). In this case, we observed wound infection in spite of the use of povidone-iodine, but the infection disappeared after treatment with the combination of CHG and saline. Ramirez-Arcos and Goldman (10) reported that the efficacy of skin disinfection depends on multiple factors such as the chemical disinfectant used, its concentration, the duration of exposure, the use of a one- or two-step process, the training for the staff performing the process and the method of application. In this case, wound disinfection occurred with twice a day application of CHG.



**Figure 3** Completely healed wound area at 2 months.

Little data exist concerning the use of saline in neonates with an open wound, but studies have focused on saline irrigation intervention for the management of extravasation injuries in neonates (11). In addition, we found only a few available studies with evidence pertaining to cleaning wound with saline for pressure ulcers in adults (12), and the study by Ho *et al.* (13) presented information regarding one randomised controlled trial that used daily low-pressure pulsatile lavage with saline in conjunction with standard wound care to achieve an enhanced healing rate for pressure ulcers. In our patient, we used 0.9% saline to wash the open wound area and cleaned the intact skin with 2.0% CHG.

In conclusion, combined wound care using saline and CHG proved to be effective in this patient. However, randomised controlled trials are needed to further examine the effects of CHG treatment with saline irrigation in neonatal wound care.

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