

Clinical Pearl:

Topical Therapy May Have Systemic Effects: Povidone-Iodine (Betadine®) in Ioban® Dressing

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I was talking with Emily Campbell, who is a NICU nurse and one of QI champions a couple of months ago. At that time, she was caring for a 5-month-old male infant with giant omphalocele, pulmonary hypoplasia, and chronic lung disease who had episodes of hypothermia and had an elevated TSH, low T4 and elevated urine iodine. He had multiple dehiscences of the omphalocele membrane and was being managed with a negative pressure wound therapy dressing consisting of gauze and secured with Ioban (a film dressing impregnated with Iodine). Dressing changes were completed 2x/wk by Catherine Kennedy from Physical Therapy and ongoing management help from pediatric surgery and plastics services. The Pediatric endocrinology service made the association between the systemic absorption of the topical iodine and the elevated Thyroid Stimulating Hormone, low T4, and elevated urinary iodine, consistent with hypothyroidism (1-3). This clinical story brought back a memory from 45 years ago as a medical student during my senior rotation I learned about this form of hypothyroidism in caring for an infant with giant omphalocele who had topical povidone-iodine applied to the membrane to stimulate granulation and some shrinkage of the membrane.

Here is a summary of his current wound management for your review: The omphalocele wound was initially being treated with twice-daily silvadene dressing changes. The omphalocele dehiscd and required intervention, and at this time, the NPWTR dressing was introduced to minimize trauma to the tissue and maintain a healthy wound environment.

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At this time, plastic surgery placed a negative pressure dressing with two drains, one in which an antibiotic solution was instilled into the gauze covering the omphalocele and wound, and the other connected to continuous negative pressure via wall suction (we used a pleur evac® to wall suction). The wound was dressed with Mepitel® (a silicone dressing to protect the fragile tissue), Acticoat® for antimicrobial protection, and gauze. Two drains were placed atop the wound, and a seal was attained using Ioban® to secure the dressing to the patient’s skin. The use of the of negative pressure dressing decreased the need for twice-daily dressing changes and facilitated a healthy wound bed to promote granulation and wound closure.

At this time, the bedside RN, along with the pediatric endocrinology service, noted the recent introduction and continued use of Ioban covering several skin surfaces as the only recent change in Nathan’s care that would have changed his lab results. Ioban®, as the name states, is impregnated with iodine and layered on the skin for containment of the negative pressure dressing and prevention of infection. The exposure to iodine caused transient hyperthyroidism that resulted in reflex hypothyroidism, as evidenced by the increased TSH and low T4 levels. Despite the recent development of hypothyroidism, endocrinology recommended the continued use of both Ioban® and levothyroxine.

Nathan was transferred to the Pediatric Intensive Care Unit for further management, where his omphalocele has decreased in size, and he is beginning the use of an abdominal binder for reduction at a later date.

The major lesson from this presentation is to be aware of what is being applied topically to wounds, membranes, and congenital and acquired defects and how these topicals may impact other systems. I was also able to find a case series of 4 infants with myelomeningocele who had iodine-containing ointment (Betadine®) (10%) applied to the membrane covering the defect, also developed increases in urinary iodine (4). Two of the four developed laboratory evidence of hypothyroidism necessitating levothyroxine therapy (4). Once the applications and levothyroxine were simultaneously stopped at age nine months, laboratory values normalized, and the 2 infants remained euthyroid (4).

References:

1. Malhotra S, Kumta S, Bhutada A, Jacobson-Dickman E. Topical iodine-induced thyrotoxicosis in a newborn with giant omphalocele. *Am J Perinatol Rep* 2016; 6:e243-245.
2. Cosman BC, Schullinger JN, Bell JC, Regan JA. Hypothyroidism caused by topical povidone-iodine in a newborn with omphalocele. *J Pediatr Surg* 1988;23(4): 356-358.
3. Whitehouse JS, Gourlay DM, Masonbrink AR et al. Conservative management of giant omphalocele with topical povidone-iodine and its effect on thyroid function. *J Pediatr Surg* 2010; 45: 1192-1197.
4. Barakat M, Carson D, Hetherington AM, et al. Hypothyroidism secondary to topical iodine treatment in infants with spina bifida. *Acta Pediatr* 1994; 83:741-743.

The authors have identified no conflicts of interest.

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