

Clysis of Burn Donor Sites Causes Physiologically Significant Hypertension in Pediatric Patients

**Saturday, November 10, 2018
11:00 – 11:15 am**

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Objective:

Upon completion of the lecture, attendees should be better prepared to:

- Describe the physiologic effect tumescence administration has on pediatric burn patients
- Discuss the differences between children who became hypertensive after tumescence administration and those who did not

Abstract:

Introduction: Tumescence is commonly administered to burn patients intra-operatively to reduce blood loss and increase available surface area for harvesting donor skin. At our institution, standard practice is to inject tumescence which contains saline and phenylephrine. The hemodynamic effects of this practice have been evaluated in adults; however, the physiologic effects in pediatric burn patients are unknown. Operating room providers at our institution have anecdotally noted significant hypertensive episodes in this population, and they hypothesize that this hypertension is related to redistribution of tumescent solution from the subcutaneous space to the systemic circulation. For this reason, the current study aimed to determine the incidence of hypertension in this population at our institution.

Methods: This was a retrospective, cohort study of pediatric burn patients (age <18 years) who underwent tangential excision with split thickness autografting with tumescence administration for burn injury between January 2012 and August 2017 at a single, Level 1 burn center. Anesthesia records were reviewed for episodes of hypertension which was defined as at least 2 consecutive hypertensive blood pressure (BP) readings over the course of 3 minutes or more. Systolic and diastolic pressures as well as mean arterial pressures were evaluated, and patients were considered hypertensive if a hypertensive episode occurred in one or more of these measures. Published, intra-operative BP standards which account for gender and age were used to determine hypertension cut offs.

Results: In total, 173 operative trips where patients received tumescence were evaluated. Mean patient age was 6.8 years +/- 5.0 years, and 36.6% of patients were female. Patients were predominately white (67.4%). There was a 72.1% incidence of hypertension in any measure (95% CI 64.8-78.7). When comparing those patients who became hypertensive with those who did not, the hypertensive group was younger (6.2 +/- 4.9 years vs 8.1 5.0 years; p = 0.026), had higher total body surface area of

burn (TBSA) (17% vs 12.3%; $p = 0.023$), and had higher volume of tumescence injected (56.9 mL/kg vs 26.8 mL/kg; $p = 0.0013$). Gender, race, weight, BMI, use of tourniquet, and resuscitation volume was similar between groups ($p > 0.05$). Estimated blood loss was similar between hypertensive and non-hypertensive groups ($p = 0.054$).

Conclusions: In our pediatric burn population, there is a high incidence of significant intra-operative hypertension in patients undergoing subcutaneous injection of tumescence containing phenylephrine. Importantly, the presence of hypertension was associated with younger age and an increased volume of tumescence (mL/kg). Future studies comparing the incidence of hypertension between groups that received tumescent solution and those that did not are warranted.

References and Resources:

1. Gomez, M., S. Logsetty, and J.S. Fish, Reduced blood loss during burn surgery. *J Burn Care Rehabil*, 2001. 22(2): p. 111-7.
2. Cartotto, R., et al., What are the acute cardiovascular effects of subcutaneous and topical epinephrine for hemostasis during burn surgery? *J Burn Care Rehabil*, 2003. 24(5): p. 297-305.
3. Sheridan, R.L. and S.K. Szyfelbein, Staged high-dose epinephrine clysis is safe and effective in extensive tangential burn excisions in children. *Burns*, 1999. 25(8): p. 745-8.
4. Barret, J.P., et al., Effect of topical and subcutaneous epinephrine in combination with topical thrombin in blood loss during immediate near-total burn wound excision in pediatric burned patients. *Burns*, 1999. 25(6): p. 509-13.
5. Allorto, N.L., D.G. Bishop, and R.N. Rodseth, Vasoconstrictor clysis in burn surgery and its impact on outcomes: systematic review and meta-analysis. *Burns*, 2015. 41(6): p. 1140-6.

Disclosure:

Holly B. Cunningham– No Relevant Financial Relationships to Disclose
Kyle E. Meinhardt– No Relevant Financial Relationships to Disclose
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