Neutral and straight positioning of joints or limbs, especially the wrist and elbow instead of full flexion or extension will prevent kinking of injured arteries in early stages after injury until collaterals form or acute injury subsidies. Harsh handling during dressing change compromises venous drainage or arterial flow to the distal limb. Venous congestion due to venous thrombosis or total loss will decrease arterial blood flow and limb loss. Another point is gentle dressing change. Due to vascular compromise and unsupported and unstable joints, inappropriate and careless joint and limb handling can lead to more injury. Unsupported joints by muscles and ligaments and subsequently more than normal range extension or flexion or rotation can kink the supplying artery and limb ischemia. Tight dressings also aggravate limb ischemia. Very good hemostasis during operation is recommended as pressure dressing for bleeding prevention in the operating room or in the ward after bleeding can compromise blood flow to the injured limb. The third is gentle dissection. Aggressive debridement, especially near the major vessels can compromise the limb blood flow and more tissue or limb loss. Aggressive and unnecessary dissection with resultant inadvertent tissue and vessel (both artery and vein) injury and more cautery use all compromise inflow and outflow perfusion of limb.

In conclusion, high voltage electrical injury is very similar to an iceberg. In the early stage, extent of injury is obscure. Due to low resistance of electrical current through the vessels, small vessel thrombosis is common. In early stages anticoagulant prescription is recommended to prevent more thrombosis or thrombosis progression. Gentle dissection during operation and gentle handling before, during and after operation and dressing changes in ward is highly recommended. Also the injured limb must be dressed carefully without any tension. Due to compromised inflow and outflow, any pressure can lead to frank ischemia. Venous drainage is also compromised and congestion will decrease arterial inflows to the limb.

REFERENCES

[1] Tarim A, Ezer A. Electrical burn is still a major risk factor for amputations. Burns 2013, doi:http://dx.doi.org/10.1016/j.burns.2012.06.012.
[2] Ayaz M. Why aren't our work results in burn care excellent? Burns 2017;43:681, doi:http://dx.doi.org/10.1016/j.burns.2016.08.041.
[3] Li Q, Wang LF, Chen Q, Wang SJ, Li F, Ba T. Amputations in the burn unit: a retrospective analysis of 82 patients across 12 years. Burns 2017, doi:http://dx.doi.org/10.1016/j. burns.2017.04.005.
[4] Ayaz M. High voltage electrical injury, early vs. Late wound excision, and coverage. Burns 2020;46(6)1476–7, doi:http://dx.doi.org/10.1016/j.burns.2020.04.043 Epub 2020 Jun 3. PMID: 32591196.

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The impact of burn wound cooling on chosen parameters of burns in children

We would like to compliment Varun Harish and colleagues on their inspirational article titled "First aid is associated with improved outcomes in large body surface area burns" and reemphasize the significance of adequate first aid also in burned children [1].

We conducted the study to characterize the first aid received after burn injury in Polish children and identify the common mistakes made by people involved in prehospital care of children after burn injury. The anonymous survey was conducted among caregivers of 200 children under 18 years old hospitalized due to burn injuries in 5 Polish hospitals in Wroclaw, Szczecin, Polanica Zdrój and Opole from 05.03.2014 to 05.03.2016. Statistical analysis of the obtained data was performed using Excel and Statistica v. 12. Ethics approval was obtained from the Bioethical Committee of Wroclaw Medical University (opinions Nr KB – 109/2014, Nr KB – 305/2015, Nr KB – 493/2015, Nr KB – 518/2015, Nr KB – 141/2016).

In our study correctly given first aid in case of thermal burn included cooling of the burned area and analgesia. The assessment of correctness was performed by the doctor individually in each case. The reaction was assessed as incorrect when the above-mentioned activities have not been carried out, the inappropriate method (for example cooling the wound with the bottled water) or too short time of cooling of the wound or another activity has been performed that should not have been performed (for example applying different substances to the wound).

Even though the ambulance was called to 61.5% of burned children, only 19.5% of burned children received analgesics before arrival to the hospital. The results revealed that the burn wound was not cooled 13,5%. The most common mistake made by person who was present at the moment of injury (most frequently – by the mother (67%)) was applying different substances to the burn wound (vodka, milk, eggs) (17 cases).

The results presented in the article of Varun Harish et al. inspired us to conduct additional analysis – to compare the group of children that was cooled correctly with the group that was not cooled after burn injury (or cooled incorrectly). We compared the depth of injury (assessed clinically into 4 degrees), burned surface (expressed as %TBSA; assessed according to Lund Bowder charts), type of treatment (conservative vs. surgical), length of hospitalization (in days).

The obtained results indicated that children who did not receive correct burn wound cooling more often suffered from full-thickness (III and IV degree) burns than children who received correct burn wound cooling (52% vs. 32%). But there was no statistically significant difference when compared the depth of injury expressed as I–IV degree (the chi-squared test p-value = 0.112477; $p > 0.05$). The surface of burns did not differ significantly among analysed groups (8.51 ± 8.13 %TBSA for group of children that received correct burn wound cooling vs. 6.06 ± 4.62 %TBSA for children that did not receive the appropriate burn wound cooling; Student's t-test $p = 0.2113$; $p > 0.05$). We observed that children who did not receive correct cooling more often required surgical treatment (36% vs. 25,8%), but the differences were not statistically significant (the chi-squared test p-value = 0.2839; $p > 0.05$). The statistically significant differenced were observed in the duration of stay in the hospital that was longer for children that did not receive the appropriate burn wound cooling (11.23 ± 11.68 %TBSA for group of children that did not received correct burn wound cooling vs. 7.56 ± 5.08 %TBSA for children that received the appropriate burn wound cooling; Student's t-test $p = 0.0133$; $p < 0.05$).

In closing, we wanted to express that also in Poland the recommendations support burn wound cooling in children (at least for 15 min) and underline the importance its analgesic and thermodynamic effect [2]. However, our and other Polish authors' observations indicate that there is insufficient knowledge about first aid in burns both in parents and in medical staff [3,4]. That is why we think that such works that confirms the association of the correctly given first aid with improved outcomes can increase the awareness of the problem.

Conflict of interest

The authors declare that they have no conflict of interest.

REFERENCES

[1] Harish , Li Z, Maitz PKM. First aid is associated with improved outcomes in large body surface area burns. Burns 2019;45 (8):1743–8, doi:http://dx.doi.org/10.1016/j.burns.2019.05.006.
[2] Traczyk M. Stany nagłe. Pediatria. 2nd ed. Warszawa: Medical Tribune Polska; 2018.
[3] Kawalec , Godziński J, Paradowski S, Noparlik R, Patkowski D, Koźlik M, et al. Pierwsza pomoc udzielana dzieciom oparzonym - wyniki wieloośrodkowego badania. Stand Med Probl Chir Dziec 2019;1(10):28–34.
[4] Nessler , Nessler M, Krztoń-Krolewiecka A, Chrapusta , Windak A. The knowledge about burn first aid among young physicians in Malopolska region — a pilot study. Chirurgia plastyczna i oparzenia 2014;2(1):7–13.

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