

Complications in Burn Patients Following Fluid Over-Resuscitation

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Background/Objective: Over-resuscitation of burn patients leads to dangerous edema-related sequelae. The Parkland formula is commonly used to predict fluid requirements in the 24 hours following burn injury, yet studies report widely varying resuscitation rates. This study aims to assess fluid resuscitation practices at Lutheran Hospital and evaluate correlations between resuscitation rates and fluid-overload complications.

Methods: A retrospective chart review assessed fluid resuscitation of 36 adult patients with burns affecting at least 15% total surface body area (TBSA) between May 2020-May 2022 at Lutheran Hospital. Intravenous fluid rates and urine output (UO) were recorded for the first 24 hours of each patient's hospital stay. Complications and mortality were recorded for the entirety of a patient's hospital stay. Patients who received volumes exceeding those recommended by the Parkland formula were placed in the high-volume group whereas patients who received a lesser volume were placed in the low-volume group. Statistical analyses were performed using Microsoft Excel ($\alpha = 0.05$).

Results: The study included 36 patients with an average fluid resuscitation of 4.13 ± 2.14 mL/kg/%TBSA in the first 24 hours following hospital admission. Average UO in the high-volume group (n=14) was 1.33 ± 0.76 mL/kg/hr compared to 0.75 ± 0.47 mL/kg/hr in the low-volume group (n=22). Fluid complications were more common in the high-volume group (41.7%) compared to the low-volume group (19.0%), but this difference was not statistically significant ($p=0.230$). No difference in mortality was observed ($p=1.000$).

Conclusion: The high-volume group had an average UO exceeding the recommended range (0.5-1.0 mL/kg/hr) and experienced greater rates of fluid-overload complications (pulmonary edema, compartment syndromes, etc.). Due to the small sample size and limited power of this study, the difference in fluid-related complications was not statistically significant.

Clinical Impact and Implications: Physicians should limit fluid volumes exceeding the Parkland formula when resuscitating burn patients to avoid fluid overload sequelae.