Audit of Burns Patients in the Intensive Care Setting

H. Douglas, C. Gilhooly, S. Watson.
Intensive Care Unit, Glasgow Royal Infirmary, 84 Castle Street, Glasgow, G4 0SF

Aim

The audit aim was to identify the workload from patients admitted with burns to Glasgow Royal Infirmary intensive care unit (ICU), scrutinise the outcomes of these patients and identify the fluid management received in the first 48 hours of their ICU admission.

Methods

A retrospective analysis of Electronic Patient Record (CareVue) and Wardwatcher data between May 2006 and August 2008. All patients admitted to ICU with a burns diagnosis were included. Weight was estimated at 70kg and the Parkland formula (See Appendix 1) used to calculate initial fluid requirements for those with a resuscitation burn (>15% BSA) whom were admitted within 24 hours of their burn. Fluid received in the first and second 24 hour periods of admission in mls/% burn/kg was calculated for all patients with a resuscitation burn. Patients with a burn of <15% BSA had the fluid received in the first and second 24h period calculated in mls/hr and compared with maintenance fluid requirements (2500ml/day).

Results

52 burns patients were admitted to Glasgow Royal Infirmary ICU between May 2006 and August 2008. Ages ranged from 14 – 84 years (mean 45 years). 69% had significant smoke inhalation and the percentage body surface area burn ranged from 0-95% (mean 29%). Fluid resuscitation data was retrieved for 49 patients, summarised below of which 40 were admitted to our ICU within 24 hours of their burn.

Patients with resuscitation burn >15% BSA

	Parkland recommended fluid amount in first 24h (mls/% burn/kg)	Average Fluid received in first 24h period of admission (mls/% burn/kg)	Average Fluid received in second 24h period of admission (mls/% burn/kg)
Patients with burn BSA>15%admitted after 24h of burn (n=32)	N/A	4.3	2.7
Patients with burn BSA>15% admitted within 24h of burn (n=24)	4	5.0	3.1

Patients with resuscitation burn >15% BSA

	Maintenance fluid requirements (mls/hr)	Average Fluid received in first 24h period of admission (mls/hr)	Average Fluid received in second 24h period of admission (mls/% burn/kg)
Patients with burn BSA<15% (n=17)	104	186	131

Excess Fluid Administration

Of the patients admitted with a resuscitation burn, 3 patients received over 8mls/% burn/kg in the first 24 hour period ; 5 patients received over 6mls//% burn/kg in the first 24 hour period. 2 patients received over 8mls/% burn/kg in the second 24 hour period ; 1 patient received over 6mls/% burn/kg in the second 24 hour period

Of the patients with non-resuscitation burns (<15% BSA) 6 patients received more than double the required maintenance fluids in the first 24h period; 2 patients received more than 1.5 times the required maintenance fluids in the first 24h period. 3 patients received more than double the required maintenance fluids in the second 24h period; 1 patient received more than 1.5 times the required maintenance fluids in the second 24h period.

Fluid Excess Patients in Detail – with resuscitation burn >15% BSA

Patient	Admitted within 24hrs of burn (Y/N)	Fluid received in 1st 24 hour period (mls/% burn/kg)	Fluid received in 2nd 24 hour period (mls/% burn/kg)	Burn and Patient Details
587	Y	10.9	4.5	50% burn, severe smoke inhalation, 108kg, significant PMH
482	Y	7.4	3.8	36% burn, severe smoke inhalation, COPD, Asthma
650	Y	6.3	5.5	55% burn, self-immolation, severe smoke inhalation, drug overdose and alcohol excess
483	Y	37.1	17.1	1% flame burn, ignited home oxygen, severe smoke inhalation,COPD
774	Y	6.7	1.8	50% burn severe smoke inhalation, alcohol excess
833	Y	13.1	8.9	20% burn, severe smoke inhalation, alcohol excess
932	Y	9.8	9.0	38% burn, severe smoke inhalation, acute renal failure, alcohol excess

Fluid Excess Patients in Detail – without resuscitation burn <15% BSA

Patient	Admitted within 24hrs of burn (Y/N)	Fluid received in 1st 24 hour period (mls/hr)	Fluid received in 2nd 24 hour period (mls/hr)	Burn and Patient Details
515	Y	196	25	7% burn, thrown by explosion, severe smoke inhalation
696	Y	227	0	6% burn, severe smoke inhalation, GCS 3 from scene, meningioma
788	Y	212	203	10% burn, severe smoke inhalation
961	Y	316	262	0% burn, severe smoke inhalation
1265	Y	352	154	9% burn, severe smoke inhalation and lung injury
227	Y	313	260	0% burn, severe scald to oropharynx and oesophagus, alcohol excess
892	Y	196	150	9% burn, severe smoke inhalation
948	Y	338	385	0% burn, severe smoke inhalation, GCS 3 at scene, alcohol excess, hepatitis

PMH = Past Medical History; COPD = Chronic Obstructive Pulmonary Disease; GCS = Glasgow Coma Scale

Conclusion

This audit identified that some ICU burns patients are receiving more fluid than may be anticipated by the extent of their burn injury, especially in the period following the initial 24 resuscitation period. This may be partly explained by additional trauma sustained at time of burn injury, co-morbidities and smoke inhalational injury. It is not clear from the current literature what the optimal fluid management of burns patients should be in the period following their initial resuscitation, and in GRI ICU we will be revising and clarifying our protocol to ensure that these patients are managed optimally.

References

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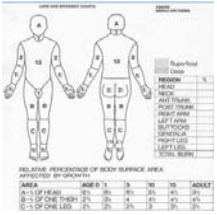

Appendix 1

Parkland Fluid Resuscitation Formula
Calculate % Body Surface Area burn using Lund and Browder chart as shown in diagram.
Fluid Requirements = TBSA burned(%) x Wt (kg) x 4mL
Give first half of total requirements in 1st 8 hours, then give second half over next 16 hours.