Perioperative fasting in burn patients: Are we doing it right?

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Background. Burn patients have high metabolic demands requiring aggressive nutritional supplementation. Multiple operations necessitate a period of starvation. This audit was undertaken to review the total duration of starvation experienced by burn patients in a regional hospital.
Methods. This study reviewed the nutritional intake/output data for 3 months of admitted patients using standard formulas to calculate the average energy deficit.
Results. Nine adult patients with an average burn of 21% total body surface area (TBSA) were included, with an average starvation period of 21 hours. There were 10 paediatric patients with an average burn of 18% TBSA and average starvation period of 18 hours. There was an average 12% deficit in weekly energy requirements.
Conclusion. Burn patients are starved for periods longer than necessary, which may have implications for recovery. Shortened fasting is preferable and safe. Perioperative starvation protocols specific for burn patients in this hospital need to be developed and enforced.

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Burn patients have high nutritional needs and a hypercatabolic state is one of the hallmarks of thermal injury. The pronounced metabolic response to burn injury results in increased systemic levels of stress hormones, which promote gluconeogenesis proteolysis, sequestration of micronutrients and altered lipid metabolism.[1] Strategies to provide nutritional support and alimentation are vital in burn patients if we hope to decrease the stress response, prevent bacterial translocation and encourage wound healing. Underfeeding a burn patient may lead to delayed wound healing, loss of body protein mass, decreased resistance to infection, impaired organ function, increase in length of hospital stay and increased mortality.[2,3]

Management of burn injury may include multiple operative interventions, each of which requires a period of pre-operative fasting. This tends to undermine strategies to provide ongoing alimentation of the burn patient. Modern fasting guidelines allow clear fluids orally up to 2 hours and solids 6 hours pre-operatively.[4] We audited the pre-operative feeding schedules of patients in our burn high care unit over a 3-month period to establish whether our patients are getting adequate nutrition for healing.

Pre-operative fasting was proposed in the 1800s to minimise the risk of aspiration after fatal anaesthesia due to aspiration. Traditionally, patients have been starved from midnight prior to elective surgery although evidence for such practice was lacking. The incidence of aspiration is 1 in 10 000 and the practice of prolonged starvation has since been discredited. There has subsequently been no evidence to show that a shortened fasting time increases the risk of aspiration and there are a number of reviews that show shortened fasting is preferable and safe.[4] Still, the practice of prolonged fasting exists and is slow to change.[5]

Method

In order to establish the pre-operative starvation practices and nutritional deficit in a seven-bedded burn unit, we retrospectively reviewed the intake output data from July to September 2011 of the burn patients admitted to the Edendale Hospital Burns Unit. The burn service at Edendale Hospital is part of a regional surgical service for a 3 million peri-urban population. The nutritional deficit incurred was calculated using standard energy expenditure equations. For adults an average of the Currerri *et al.* equation, Xie *et al.* equation and Harris-Benedict equation with Activity and Stress factors was calculated. For paediatric patients, an average of the WHOx2 and the Mayes equation was calculated. These formulae are seen in Table 1.

Results

The audit included 9 adult patients with an average age of 35 years and average total body surface area burn of 21%, and 10 paediatric patients with an average age of 2 years and total body surface area of 21%. Table 2 illustrates the details of the fasting period and the caloric deficit.

Discussion

Our audit demonstrates that burn patients experience prolonged periods of starvation in our unit. This has potential recovery implications. We did not record any outcome measures, which is

Table 1. Energy requirement formulae

Curreri *et al.*	
(25 × body weight (kg))+40 × %BSA	
Harris Benedict	
Men	66.5 + 13.75 (weight in kg) + 5.0 (height in cm) – 6.78 (age)
Women	655 + 9.56 (weight in kg) + 1.85 (height in cm) – 4.86 (age)
Xie *et al.*	
(1 000 × $BSAm^2$) + (25 × %BSA)	
WHO	
Male <3 years	(60.9 × weight in kg) – 54
Male 3 - 10 years	(22.7 × weight in kg) + 495
Female <3 years	(61 × weight in kg) – 51
Female 3 - 10 years	(22.5 × weight in kg) + 499
Mayes	
Male and female <3 years	108 + (68 × weight in kg) + (3.9 × %TBSA)
Male and female 3 - 10 years	818 + (37.4 × weight in kg) + (9.3 × %TBSA)

$BSAm^2$ = Body surface area in m^2; TBSA = Total body surface area.

Table 2. Details of the fasting period

	Children	Adults
Number of patients	10	9
Total number of fasted episodes	20	23
Average number of fasted periods per patient	2	2.5
Average duration of fasted period (hours)	18	21
Range of duration of fasted episode (hours)	8 - 51	7 - 42
Average caloric deficit (% of weekly energy requirements)	11%	13%

a limitation of this study and subject for further study. The burns managed in our unit are of moderate severity and an average 12% deficit in nutritional requirements probably does not result in a measurable negative outcome in such a group. However, in patients with bigger burns such a deficit may well impact negatively.

There are a number of factors influencing the prolonged fasting periods in Edendale Hospital. Doctor and nurses are slow to change traditional practices of fasting from midnight. Hospitals run on scheduled mealtimes and often the last tea is served at 8 pm. Patients are either too ill or immobilised with dressings and splints to feed themselves in the night. There is no accommodation of pre-operative patient feeding needs compared with non-operative patients. The late cancellation of operations without timeous recommencement of feeding is also common. Reducing the pre-operative starvation times in our burns patients will require innovative approaches that involve both nursing and medical staff and that seek to both educate staff and change their behaviour.

Conclusion

This audit highlights the prolonged fasting periods experienced by burn patients in a busy regional hospital and we expect other hospitals experience similar problems. As our burn service develops to manage larger body surface area burns, long periods of imposed fasting will result in significant nutritional deficits and have a major impact on recovery. We will need to develop a separate, flexible feeding schedule in collaboration with the dietician, nurses and anaesthetists. It should be practical and appropriate for our environment but must address the nutritional needs of the burn patient.

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