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Role of Ryan Score in Predicting Mortality in Thermal Burns

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Abstract

Burn injuries can present in a myriad of ways and in a diverse patient population. Its severity is not only determined by the nature of burn injury or the extent of the injury but also by several patient factors. Mortality in burn injury used to be very unpredictable but now there are various means of predicting morbidity and mortality in a burns patient. The scoring system developed by Ryan Score was one such tool formulated to aid in outcome prediction in burns patient. In this case study we evaluate the accuracy of the Ryan score in predicting mortality outcome in a patient with thermal burns.

Keywords: Ryan score; Thermal burns; Mortality.

INTRODUCTION

Burns is a very serious issue that is prevalent in many low income and developing countries. As many as 200,000 deaths occur due to burns worldwide per year.[1-3] Burns mortality depends on type of burns injury, total body surface area involved (TBSA) as well as patient demographic factors like age, gender, comorbidities. Predicting burns mortality helps in planning patient care and counselling the patient and his/her family. It also helps in allocating resources efficiently and making a decision on early escalation of resuscitative efforts. Additionally, it also helps in assessing the performance of a burns centre, which aids in auditing and improvement. Several indices have been formulated over the years including the scoring system by Ryan in 1998.[4-5] In this case study we evaluate the role of the scoring system by Ryan in predicting mortality outcome in a patient with thermal burns.

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METHODS AND MATERIALS

This study was conducted in tertiary care centre in department of plastic surgery after getting the department ethical committee approval. Informed consent was obtained. The subject was a 1 year old male child who had accidental scald thermal burns after hot water fell on him. He was initially taken to

a nearby hospital where he was resuscitated with intravenous fluids (IV) and antacids, analgesics. He was then referred to JIPMER for further treatment. On examination he had 2nd degree burns over the chest, abdomen and right upper limb. There was a total of 20% surface area involvement (Fig. 1).

Fig. 1: 20% mixed (superficial & deep second degree) scald thermal burns over chest, abdomen and right arm

His Ryan score was calculated as the sum of 3 parameters (Age, TBSA, Presence of inhalational injury). In this case the score was 0.

Hydro jet debridement was done along with Autologous Platelet Rich Plasma (APRP) application as regenerative technology for 2nd degree superficial burn areas for aiding healing by secondary intention. Tangential excision with split thickness skin grafting was done for 2nd degree deep burns. To promote take of the graft Autologous platelet rich plasma (APRP) was applied on the dermal side of the graft.

RESULTS

Ryan score of our patient came to a total of 0 points. When there is no risk factor, mortality rate is 0.3%, one risk factor 3%, two risk factors 33% and 3 risk factors give a probability of death of 90%, so in this case the predicted mortality rate was 0.3%[6]. Intra-operative and post-operative periods were uneventful for the patient. Uptake of the graft was good (Fig. 2).

Fig. 2: Healed second degree superficial burn wounds and complete take of split thickness skin graft over second degree deep burn wounds.

Ryan Score in Burns				
Age	>60 Years	1	0	0.3
TBSA	>40%	1	1	3
Inhalational Injury	Yes	1	2	33
	No	0	3	90

There were no complications noted in the post-operative period. Patient was discharged successfully.

DISCUSSION

Several prognostic indices for burn injuries have been created over time. The earliest prediction model was based only on total body surface area (TBSA) involved and age.[4] However, this was highly limited in application as several factors modify survival probability. Other indices formulated include the Baux index which was modified by Osler et.al and additionally included inhalational injury. Other indices include the modified Bull grid which involves age and TBSA, and the ABSI score which includes 5 parameters - female gender, age, TBSA, inhalation injury, and full thickness burn. Ryan score consists of three parameters – Age, TBSA, Inhalational injury. In our study, the patient's Ryan score was 0 with a mortality probability of 0.3%. This corresponds to the actual outcome in the child who was healthy on discharge. However, this is a single case study and is not sufficient to extrapolate onto the general population. Hence, Ryan score was an accurate predictor of mortality outcome in this case study but more cases have to be reviewed to come to an absolute conclusion.

CONCLUSION

Ryan et al score is a good predictor of mortality in

thermal burns with three simple parameters. Due to its simplicity in predicting mortality it can be employed in all centers with ease.

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