Transport Risk Assessment in Pediatrics (TRAP) Score Predicts the Clinical Course of Critically Ill Children

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Introduction

TRAP score provides a way of determining the proper disposition regarding the need of care in an Intensive Care Unit and higher scores have been associated with Pediatric Intensive Care Unit (PICU) admission longer than 24 hours.

Few evidence is available showing the relationship between time of transportation to a PICU from other hospitals or the emergency department (ED) and patient's outcome.

To our knowledge, there is no evidence in the literature showing an association between TRAP score and PRISM score or mortality in children admitted to PICU.

Objectives

Evaluate the relationship between time of transportation and outcome (length of stay and mortality) of patients to a single-center PICU.

Determine whether there is an association between TRAP score and PRISM score and PICU patients' clinical outcome.

Methods & Materials

Study Design: Prospective Observational Cohort Study from August 2014 to August 2015 held at a single tertiary referral center.

Subjects: Patients referred from community hospitals, the Trauma Center, and the ED at the University Pediatric Hospital (where study is held) were included. Patients transferred from OR, another PICU or NICU, or those admitted to a ward (general pediatrics or surgical subspecialty) were excluded.

Variables: Demographics (sex, age), TRAP Score, PRISM Score, PICU Length of Stay (LOS) and Mortality Rate.

		2	1	0		2	1	0
< 12 mos		< 90 or > 180	90-109 or 151- 180	110- 150		< 60 or > 110	60 - 69 or 90-110	70 - 89
1-12 yrs	HR	< 65 or >140	65-79 or 116-140	80-115	SBP	< 75 or >130	75-89 or 116 - 130	90 - 115
≥ 12 yrs		< 50 or >120	50-59 or 101 - 120	60-100		<85 or >150	85 - 101 or 131 - 150	100 - 130
	RESP	Apnea, gasping, intubated	RR ≥ 50, Sat <90	RR < 50, Sat ≥ 90	FIO2	≥ 50% or ≥4 liters	< 50% or <4 liters	Room air
	Cap refill	> 3 secs	2 - 3 secs or bolus	< 2 secs	Pulses	Absent	Faint or bounding	Normal
	GCS	< 7	7-11	12-15	Temp (˚C)	< 35 or >40	35 - 35.9 or 38.1 - 40	36-38

Figure 1: TRAP score

Statistical Analysis: Data was expressed as means ± SEM and interquartile ranges. A Mann-Whitney test was used to evaluate the effect of TRAP Score and PRISM Score in PICU Length of Stay. A logistic regression was used to evaluate an association between mortality rate and TRAP Score, Time of Referral and PRISM Score.

Results

Table 1. Patients' Characteristics

Variables	All Patients n(%) or Mean ± SEM (IQR)
Male: Female n (%)	56 (62%) : 35 (38%)
Age (months)	94 ± 7.3 (32, 156)
Mortality Rate (%)	5.7 %
PRISM Score	5.6 ± 0.7 (0, 9)
Length of PICU Stay (days)	4.9 ± 0.5 (1, 6)
TRAP Score	3.2 ± 0.2 (3, 4)
Referral to Arrival Time (minutes)	293.3 ± 24 (150, 345) ~ 5 hours

Table 2. Characteristics of Deceased Patients

Variables	Deceased Patients n(%) or Mean ± SEM (IQR)
Male: Female n (%)	5 (100%):0 (0%)
Age (months)	52.1 ± 36.7 (0.7, 126)
PRISM Score	23 ± 5.1 (12, 34)
Length of PICU Stay (days)	7.4 ± 1.8 (4, 11)
TRAP Score	8.4 ± 1.8 (7.5, 9)
Referral to Arrival Time (minutes)	340 ± 75 (185, 497) ~ 6 hours

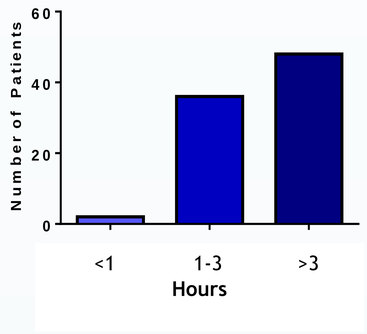

Figure 4. Total Time Spent to be Admitted to PICU since Referral Time

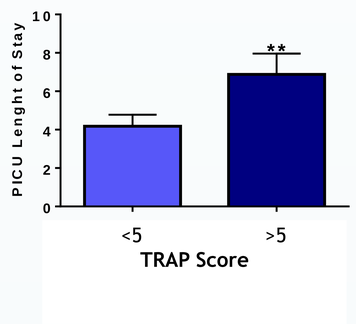

Figure 5. Effect of TRAP Score on PICU length of stay. Patients with TRAP Score higher than 5 spent more days at the PICU. (Mann-Whitney Test, p =0.003).**

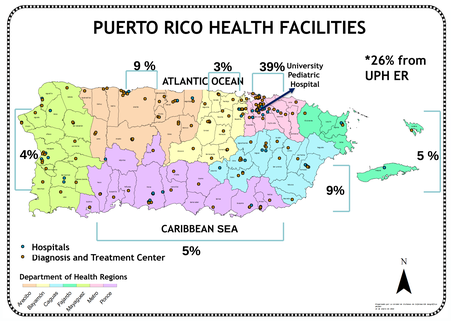

Figure 2. Percentage of referrals to PICU by Puerto Rico Health Regions

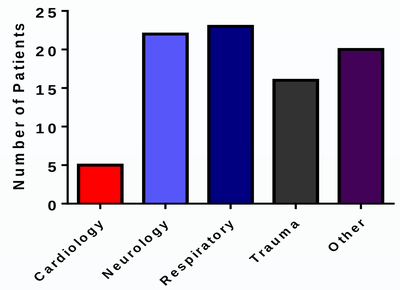

Figure 3. Diagnostic Criteria for admission to PICU

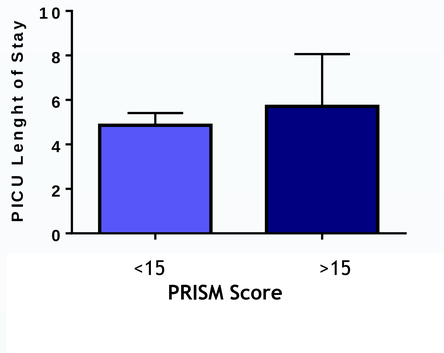

Figure 6. Effect of PRISM Score on PICU length of stay. (Mann-Whitney Test, p = 0.9)

- ✓A univariate logistic regression showed that there was an association between PRISM Score and mortality (OR 1.4 [95% CI 1.1 - 1.7], p = 0.007).
- ✓We observed a strong association between a high TRAP score (>5) and mortality (OR 4.0 [95% CI 1.5 - 10.7], p = 0.005).
- ✓No association was observed between mortality to total transportation time to PICU arrival (OR 1.0 [95% CI 0.99 - 1.0], p = 0.6) or patient's age (OR 1.0, 95% CI 0.98-1.01, p = 0.40).

Conclusions

TRAP score predicted mortality and morbidity among this sample of patients which suggests that it may help to predict patients at risk of deterioration and therefore triage patients adequately prior to transportation.

Time of transportation did not predict patients' outcome in this study. However, it should be noted that prolonged transportation (>3 hours) occurred frequently in spite of the small geographical area. This highlights the need to re-evaluate the pediatric pre-hospital care and transport for the safety and well-being of children.

Additional studies are needed to further assess and improve the safety of pediatric patients at high risk of clinical deterioration during transportation.

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