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 Title : PEDIATRIC INTENSIVE CARE: FACTORS THAT INFLUENCE OUTCOME
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Introduction. Studies of critically ill adults in intensive care units have examined factors associated with survival and the efforts required to care for these patients.^{1,2} Similar data is needed to evaluate the effectiveness of pediatric intensive care units. The present study was undertaken to define the relationship of severity of disease to survival, and the factors that may influence outcome in a pediatric population.

Methods. During a one year period, 461 consecutive admissions to the Pediatric Intensive Care Unit (PICU), a combined medical-surgical unit, were evaluated using the Therapeutic Intervention Scoring System (TISS).³ The TISS allows assessment of severity of illness based on quantitation of therapeutic interventions. For each 24 hour period that a child was in the PICU, TISS points were determined by the nursing staff. The maximum number of TISS points on any day during the PICU stay was used to divide patients into groups. For the purpose of this study a death was defined as any death occurring in the PICU or within one month of discharge from the PICU. Information concerning survival after discharge was obtained from the hospital chart and from referring physicians. Survival was examined in relation to the presence of congenital malformations, chromosome abnormalities, malignancies, the occurrence of a cardiac arrest immediately prior to or during the child's stay in the PICU, and the development of acute renal failure in the PICU.

Results. There were 283 patients with TISS points < 10 and 178 patients with TISS points ≥ 10. Patients with less than 10 points had a total of 450 hospital days (mean=1.59 days) and those with 10 or more points had a total of 1351 hospital days (mean=7.59 days). All deaths occurred in the group with 10 or more points. For purposes of analysis only those patients with TISS points greater than or equal to 10 were considered. The mean age of the patients was 4.94±.87 years. The major diagnoses leading to admission to the PICU were congenital heart disease (34%), trauma (17%), malignancy (10%) and primary respiratory failure (9%). Overall mortality was 18%. Survival was inversely related to TISS points as shown in Table 1. Survivors accounted for 80% and nonsurvivors for 20% of total hospital days in the PICU. Children with congenital malformations (primarily cardiac and gastrointestinal) accounted for 43% of all admissions and 67% of all deaths. Those with chromosome abnormalities made up 5% of the admissions and 21% of the deaths. Children with malignancies accounted for 13% of all admissions and 21% of the deaths. Nine per cent of children sustained a cardiac arrest immediately prior to or during hospitalization in the PICU yet were 33% of those that died. Acute renal failure developed in 5% of all admissions and accounted for 21% of all deaths. (A number of children were in more than one category and therefore the sum is greater than 100%). The mor-

tality rate for children with congenital malformations, cardiac arrest and acute renal failure was highly significant as shown in Table 2.

Discussion. Mortality in critically ill children is related to the severity of their disease. The presence of congenital malformations tends to increase the mortality. Children with malformations made up the largest group of admissions and the largest group of non-survivors. Future developments in surgical correction of these defects may reduce the mortality that was seen in this group. The second most common cause of admission to the PICU, trauma, is theoretically capable of being reduced. Most of these admissions were due to motor vehicle accidents. The very high mortality rates in children who sustained a cardiac arrest or developed renal failure, 65% and 78% respectively, are indicative of the severity of the insult they suffered. Reduction of these mortality figures will ultimately depend on reducing the incidence of the primary insult and this will most likely take place outside of the PICU.

References.

1. Cullen DJ, Ferrara LC, Briggs BA, Walker PF, Gilbert J. Survival, hospitalization charges and follow-up results in critically ill patients. *N Engl J Med.* 1976; 294: 982-987.
2. Thibault GE, Mulley AG, Barnett GO, et al. Medical intensive care: indications, interventions, and outcomes. *N Engl J Med.* 1980; 302:938-942.
3. Cullen DJ, Civetta JM, Briggs BA, Ferrara LC. Therapeutic intervention scoring system: a method for quantitative comparison of patient care. *Crit Care Med.* 1974; 2:57-60.

Table 1

TISS Points	Lived	Died	Mortality Rate
≥ 50	3	9	75%
40-49	13	7	35
30-39	23	6	20
20-29	41	6	13
10-19	66	4	6
Total	146	32	18

Table 2

Factor	% Admissions	Mortality Rate
Cong. Malform.	43	28%*
Chromosome Abn.	5	44
Malignancy	13	30
Cardiac Arrest	9	65 **
Acute Renal Fail.	5	78 **

*P < .01
 **P < .001