

**49** PEDIATRIC MECHANICAL VENTILATION: A BASIS FOR PROJECTING ICU BED NEEDS. Terry L. Furgiuele, John J. Mickell, Jack Mulroy, Timothy Tong, (Spon. by F. Stanley Porter) Department of Pediatrics, Eastern Virginia Medical School, Norfolk, Va., and Medical College of Virginia, Richmond, Va.

Mechanical ventilation (MV) can be considered to be an absolute indication for ICU admission. By retrospective analysis of those patients mechanically ventilated at two tertiary care centers, we attempted to identify factors that could be applied in projecting future ICU bed utilization. Pediatric MV data was compared to total admissions, general population base, patient age, and indication for MV.

Out of a total of 3,654 admissions, 1,010 were mechanically ventilated (27.6%). Based upon our population base, this represented 14.2 admission/yr/10<sup>5</sup> population which required MV. The mean age of all patients requiring MV was 4.22 yr. but 49.8% were <age 2yr. The mean duration of intensive care for all MV patients was 7.81 days but patients ventilated postoperatively required only 4.93 days (p<.01). Only 2.9% required >1 mo. of ventilation but of that chronic group 71.4% were <2yr. old. MV patients accounted for 53.1% of total ICU patient days.

Based upon an analysis of this data the following conclusions can be made: 1) a minimum of .30 ICU beds/10<sup>5</sup> population are needed for MV patients, 2) the percent of patients requiring MV is the most important factor in determining the need for ICU beds, 3) at least twice the number of beds allocated for MV patients should be available to accommodate other critically ill patients, 4) ICU's with <39.9% post-operative MV may need additional beds above the minimum.

**50** THE HIGH INCIDENCE OF ABNORMAL SHOULDER GIRDLE MUSCLE TONE IN PREMATURE INFANTS DURING THE FIRST YEAR OF LIFE. MK Georgieff and JC Bernbaum (Spon. by WW Fox), University of PA School of Medicine, Dept. of Pediatrics, Children's Hosp of Philadelphia, Philadelphia, PA.

Abnormal muscle tone during the first year of a premature's life is an early indicator of delayed motor development. Increased shoulder girdle muscle tone (ISGT) can delay the onset of sitting, crawling, and object transfer. We studied the incidence of, and factors associated with, ISGT in 125 prematures. All were former NICU patients with BW less than 1750 grams. All were followed as outpatients up to 18 months corrected age. Fifty-seven infants (46%) had ISGT associated with either truncal hypotonia or generalized hypertonia. Mean age of onset was 5 ± 2 months. Mean age of resolution was 10 ± 3 months. Compared to 68 infants without ISGT, these patients had lower mean BW (1130 vs 1320 gms., P<0.001), lower gestational age (29 vs 31 wks, P<0.001), higher incidence of RDS (92% vs 72%, P<0.001) & BPD (52% vs 17%, P<0.001), and neonatal CNS insults (42% vs 10%, P<0.05). Of the 57 infants with ISGT, 15 (26%) had associated truncal hypotonia. Here ISGT appeared to compensate for poor neck and trunk tone while sitting. Compared to 42 infants with ISGT and generalized hypertonia, those with ISGT and truncal hypotonia had more CNS insults (80% vs 22%, P<0.001), more seizures (46% vs 11%, P<0.01), and more birth asphyxia (42% vs 11%, P<0.01). Conclusions: 1) ISGT associated with abnormal truncal tone is common during the first year of a premature's life and appears in the smaller, sicker infants. 2) Infants with ISGT and truncal hypotonia have more likely sustained severe CNS insults. 3) Risk factors predisposing a premature to ISGT can be identified early so that intervention can be initiated to promote the normal acquisition of developmental milestones.

**51** EVALUATION OF PEDIATRIC INTERMEDIATE CARE, Nancy L. Glass, Murray M Pollack, Urs E Ruttimann, Children's Hosp. Nat. Med. Cntr., GWU Sch. of Med., Washington.

There have been no studies examining the utilization and function of pediatric Intermediate Care Units (PIMU). This study quantitates services using the Therapeutic Intervention Scoring System (TISS) and PIMU days, and examines severity of illness (Physiologic Stability Index: PSI), disease acuity and chronicity in the patient population. 123 consecutive admissions to a 12 bed PIMU were prospectively evaluated, representing 808 days and 8109 TISS points. The average TISS per patient was 10.0, and the average PSI was only 2.5. 40% were transferred from the Intensive Care Units (ICU), and 39% were admitted through the Emergency Room. 9% demonstrated increasing care needs and were transferred to the ICU or Operating Room, while 91% improved. 53% were < one year of age and received 59% TISS and 55% PIMU days. 74% stayed between 1 and 3 days, but 7 patients stayed a mean of 61 days (53% of the total days). Analysis of disease acuity and chronicity with anticipated outcome revealed that the majority of PIMU resources (61% TISS, 53% PIMU days) were consumed by a minority of patients (6%) with stable physiology but overwhelming chronic conditions requiring longterm mechanical ventilation. The majority of patients (94%), however, required little therapy for minimal or potential physiologic instability. Both groups of patients required ICU admission before the PIMU became available.

**52** RESOURCE CONSUMPTION IN A PEDIATRIC ICU, Nancy L. Glass, Murray M Pollack, Urs E Ruttimann, Children's Hosp. Nat. Med. Cntr., GWU Sch. of Med., Washington.

Using the Therapeutic Intervention Scoring System (TISS) and ICU days to measure resource consumption in a PICU, we prospectively examined care distribution to patients by age, goals of therapy, acute and chronic disease status. Methods: Resource utilization was assessed for each patient group as total TISS per patient, % total TISS per group, and total ICU days. TISS per patient was adjusted for severity of illness using analysis of covariance. Results: Data was collected on 396 admissions (2,202 days, 54,018 TISS points). Children under one month of age received significantly more therapy than those >one month (405 vs 114 TISS per patient, p<.0001). Of the total, 65% were admitted for definitive therapy, 13% for observation, and 22% for palliative therapy. TISS per patient was higher in the palliative therapy group than in other groups. 32% of the patients had significant chronic disease expected to alter life expectancy and had higher TISS per patient per day scores than others (24 vs 20 TISS/pt./day, p<.001). Infants with acute congenital disease received more therapy than other children with acute onset disease, 532 vs 120 TISS/pt., p<.0001. Those admitted to the PICU following surgery received less therapy and had shorter stays. Discussion: Even after adjusting resource consumption for severity of illness, this study shows the disproportionate consumption of PICU resources by those under one month of age, those with congenital disease, and those with significant chronic disease. Less care was consumed by older children, postoperative patients, and those admitted for observation.

**53** SUCROSE INGESTION, ACTIVITY AND TASK ORIENTATION. Jane A. Goldman, Robert H. Lerman, John H. Contois, John N. Udall. Univ. of Conn., Human Development

Center, Storrs, CT., Boston Univ. Medical Center, Clinical Nutrition Unit, Boston; M.I.T., Clinical Research Center, Cambridge, MA

It has been speculated that sucrose consumption affects the behavior of young children. However, little empirical information is available. Accordingly, we investigated the effects of sucrose on the behavior of 8 normal children aged 3 to 5 yrs, who were tested individually using a double-blind, crossover design. On separate mornings each child received 6 ounces of orange juice, sweetened one morning with sucrose (2 gm/kg body weight), and the other morning with aspartame (11.6 mg/kg), a dipeptide artificial sweetener. Three parameters tested included, vigilance measured with a computerized version of the Continuous Performance Task (CPT); and activity level and focus both assessed during free-play. Total number of errors during the CPT were determined before and 30, 60 and 90 minutes after the drink. Free-play was videotaped for three 15 minute sessions beginning 15, 45, and 75 minutes after the drink. The sessions, segmented into 10 second intervals, were coded for occurrence of movement across a floor grid, and for focus on the available toys. Coding was done by two "blind" observers (observers agreement >90%). Compared to aspartame, sucrose ingestion was associated with increased errors during the CPT (p<.003), increased activity during play sessions (p=.05), and decreased focus (p=.04). These differences occurred 45 to 60 minutes following the drinks. This study provides objective evidence in children of a significant time dependent, behavioral effect of sucrose ingestion.

**54** HEART RATE, TcPO2 AND TACTILE STIMULI PRECEDING BRADYCARDIA IN PRETERM INFANTS. Peter A. Gorski, Carol H. Leonard, John A. Martin, David Sweet, Sally A.

Sehring, Pamela C. High and Robert Piecuch (Spon. by Roberta A. Ballard). Mount Zion Hospital and Medical Center, Department of Pediatrics, San Francisco, California.

Attempting to identify predictive antecedents to bradycardia in preterm infants, we analyzed 6500 minutes of heart rate and transcutaneous oxygen patterns of 9 infants who had bradycardic episodes during continuous computerized observations. Sixteen measures of heart rate and TcPO<sub>2</sub> recorded 5 minutes before a bradycardic episode were compared with baseline values of these variables for the day when each bradycardia occurred. There were 50 episodes of bradycardia isolated by more than 5 minutes from any prior episode. Infants were handled 5 minutes before bradycardia in 29 of the 50 instances. Over the 5 minutes before bradycardia, the mean of the minimum TcPO<sub>2</sub>'s, the absolute minimum TcPO<sub>2</sub> and the mean of the TcPO<sub>2</sub>'s were all lower than baseline 24 of 29 times when touch preceded bradycardia (p<.01). However, when no caregiver touch occurred prior to bradycardia, these same 3 TcPO<sub>2</sub> variables were recorded higher than baseline for the 5-minute pre-bradycardic period. In the absence of touch, the mean heart rate as well as the maximum variability in high - low heart rates were lower than baseline 14 of 21 times during the pre-bradycardic period. These results generate the hypothesis that preterm infants who are handled when TcPO<sub>2</sub> is low are very prone to subsequent bradycardia. Bradycardia following handling appears to have a different and potentially more preventable causative mechanism from spontaneously occurring episodes.