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LETTER TO EDITOR / EDİTÖRE MEKTUP

# SNAPPE II score for predicting mortality in a level II neonatal intensive care unit

## *İkinci basamak yenidoğan yoğun bakım ünitesinde mortaliteyi öngörmede SNAPPE II skorlaması*

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**Dear Editor,**

Severity of illness in neonates and mortality has various scoring system, which have been validated in different neonatal set-ups. The Score for Neonatal Acute Physiology (SNAP) was developed in 1993 for babies of all birth weights and validated as a predictor of mortality[1]. It is a physiology-based score that uses 34 routinely available vital signs and laboratory test results. It's perinatal extension, Score of Neonatal Acute Physiology Perinatal Extension (SNAPPE) was validated in US set up[2]. The Clinical Risk for Babies score (CRIB) was developed for babies <1500 g, consists of 3 physiologic variables plus birth weight, gestational age, and congenital anomalies[3]. CRIB-II is calculated from five items: sex, birth weight, gestation age, worst base excess and temperature at admission[4]. SNAP was cumbersome to use because of the number and complexity of items[1].

The Score for Neonatal Acute Physiology Perinatal Extension, SNAPPE-II is a scoring system developed and validated by Richardson et al in 2001 for illness severity and mortality risk scores for newborn intensive care[5]. It is simple, accurate and robust across populations. This system includes 9 physiological and laboratory evaluations regarding the vital functions collected during the first 12 h after delivery. The SNAPPE-II values range from 0 to 162 and are proportional to the illness severity, with higher scores indicating higher mortality or morbidity risks. The SNAPPE-II can be used in patients with all birth weight and gestation age[5].

CRIB, SNAP, CRIB II and SNAPPE-II score has been validated[6-9], CRIB II and SNAP II has been validated in Indian set up also[10,11]. But there is no study on validation of SNAPPE II in neonatal intensive care unit in Indian setup.

We collected data prospectively on all sequential inborn admissions to our neonatal intensive care unit, of all birth weights over 10 weeks after excluding: babies transferred out to the step down care area in <24 hours, babies admitted to the neonatal intensive care unit at >48 hours of age or after having been discharged home, moribund infants when an explicit physician decision not to provide life support was made at the time of neonatal intensive care unit admission and babies who left the unit against medical advice. SNAPPE-II was calculated from nine items: birth weight; being small for gestation age (SGA); APGAR at five minutes; urine output; lowest mean blood pressure; worst $PaO_2/FIO_2$ ratio; lowest pH; occurrence of seizures; lowest temperature. Although antenatal steroid prophylaxis, caesarean section, and not having any congenital anomaly are tended to be of significance with a better survival in very low birth weight were not included for analysis.

The data collection window was the first 12 hours after admission to the NICU. A total of 66 babies were admitted in neonatal intensive care unit, NICU during this period and 63 met the inclusion criteria. Mean birth weight was 1382.7± 581.3 grams and gestation age was 31.1±2.9 weeks. Mortality rate was 11.1%. As the score increased to 40 and above chances of mortality increased and it was maximum with score of 80 and

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above. Mean score in those who survived and in neonates with mortality was calculated for each group. Data are shown in Table 1.

**Table I.** SNAPPE II scores in infants those who survived or died.

| SNAPPE II score | No. of babies n=63 | Died n=7 (11.1%) | Mean (SD) score/survived | Mean score (SD)/died |
|---|---|---|---|---|
| 0-9 | 14 | 0 | 2.1 (2.6) | - |
| 10-19 | 7 | 0 | 15.1 (2.9) | - |
| 20-29 | 17 | 1 (5.8%) | 24.6 (2.5) | 24 |
| 30-39 | 15 | 1 (6.6%) | 33.9 (2.8) | 37 |
| 40-49 | 8 | 3 (37.5%) | 44.3 (3.6) | 47 (2) |
| 50-59 | 0 | 0 | - | - |
| 60-69 | 0 | 0 | - | - |
| 70-79 | 0 | 0 | - | - |
| ≥ 80 | 2 | 2 (100%) | - | 94 (1) |

SD: standard deviation

Score of illness severity varies according to birth weight, gestation age and as per the level of care inform of antenatal corticosteroids use and surfactant use[5]. CRIB (clinical risk index for babies) and SNAPPE (score for neonatal acute physiology-perinatal extension) are the most commonly used scores, and their performance has been extensively validated. However, both scores have some limitations and were developed almost a decade ago[1-3], before widespread use of surfactant and antenatal steroids, when mortality was higher. SNAPPE (developed and mainly used in the United States and Canada) can be applied to neonates of all BW and all GA[2], whereas CRIB (developed in the United Kingdom and mainly used in Europe) can only be applied to VLBWI[3]. These score needs validation in different NICU set up. SNAP score as severity illness and mortality predictor[9], SNAP II score as mortality and end organ dysfunction predictor and CRIB score as mortality predictor in very low birth weight babies less than 32 weeks of gestation has been validated in neonatal intensive care set up in India[9-11], SNAPPE II score has not been validated in intensive care units in India. SNAPPE II score, which was validated for neonatal severity of illness and mortality in 2001 in Canada has an advantage that it has excellent discrimination and goodness of fit in neonates of all the birth weights[5]. Although, in another study CRIB and CRIB-II was found to have greater discriminatory ability than SNAPPE-II in very low birth weight infants[8]. In our study we did a piloting to see that whether the SNAPPE II score can be used in NICU set up in India and similar to the study by Richardson[5] in our study also those with the score >40 had a mortality in 37.5% and those with score >80 had 100% mortality.

This was a pilot study to assess the prediction of mortality using SNAPPE II score in level II NICU in Indian setup. Study with large sample size can be done to predict mortality for each range of score.

## REFERENCES

1. Richardson DK, Gray JE, McGomick MC, Workman K, Goldman DA. Score for neonatal acute physiology: a physiologic severity index for neonatal intensive care. Pediatrics 1993; 91: 617-623.
2. Richardson DK, Phibbs CS, Gray JE, et al. Birth weight and illness severity: independent predictors of neonatal mortality. Pediatrics 1993;91:969-975.
3. The international Neonatal Network. The CRIB (Clinical Risk Index for Babies) score: a tool for assessing initial neonatal risk and comparing performance of neonatal intensive care units. Lancet 1993;342:193-198.
4. Parry G, Tucker J, Tarnow-Mordi W; UK Neonatal Staffing Study Collaborative Group. CRIB II: an update of the clinical risk index for babies score. Lancet 2003;361:1789-1791.
5. Richardson DK, Corcoran JD, Escobar GJ and Lee M SK. SNAP-II and SNAPPE-II: Simplified newborn illness severity and mortality risk scores. J Pediatr 2001; 138:92-100.
6. Rautonen J, Makela A, Boyd H, et al. CRIB and SNAP: assessing the risk of death for preterm neonates. Lancet 1994;343:1272–1273.

7. Pollack MM, Koch MA, Bartel DA, et al. A comparison of neonatal mortality risk prediction models in very low birth weight infants. Pediatrics 2000; 105:1051-1057.
8. Gagliardi L, Cavazza A, Brunelli A, et al. Assessing mortality risk in very low birthweight infants: a comparison of CRIB, CRIB-II, and SNAPPE-II. Arch Dis Child Fetal Neonatal Ed 2004; 89:F419–F22.
9. Vasudevan A, Malhotra A, Lodha R, Kabra SK. Profile of neonates admitted in pediatric ICU and validation of Score for Neonatal Acute Physiology (SNAP). Indian Pediatr 2006 ;43:344-348
10. Sundaram V, Dutta S, Ahluwalia J and Narang A. Score for neonatal acute physiology II predicts mortality and persistent organ dysfunction in neonates with severe sSepticemia. Indian Pediatr 2009 :46; 775-778.
11. Rastogi PK, Sreenivas V, Kumar N. Validation of CRIB II for Prediction of Mortality in Premature Babies. Indian Pediatr In press 2009: