

A Clinical Application of Brazelton's Neonatal Behavior Assessment Scale.

Shohei OGI¹, Tomitaro AKIYAMA², Masafumi FUKUDA³,
Yoshiko GOTO⁴ and Mineko KUSANO²

Abstract We have applied the Brazelton's Neonatal Behaviour Assessment Scale (NBAS) for the evaluation of early development stages in both premature infants, and mature risk infants, as well as for the clinical application of early intervention method. This paper reports the neonatal behaviour peculiarities of premature infants forecast by NBAS to have mental-motor delays. This paper also report on our practical application of the early intervention program. Finally, we conclude with the progress made in these infant's developments.

Bull. Sch. Allied Med. Sci., Nagasaki Univ. 7 : 11-20, 1993

Key words : Neonatal Behavior Assessment Scale (NBAS), Premature Infants, Early Intervention Program

Introduction

We have applied the Brazelton's Neonatal Behavior Assessment Scale (NBAS) both to the clinical evaluation of neonatal development and as a method of intervention in both premature and mature risk infants. This is because the fundamental principle of the NBAS, to assess the individual characteristics and best performance of each neonatal infants, are useful for the early assessment and intervention of risk infants. This study reports on the differences in the neonatal behavior of premature infants with development difficulties, and a discussion of practical early intervention programs using the NBAS. We conclude this with a report the ongoing progress of these infants' development.

1 Dept. of Rehabilitation, Nagasaki University Hospital

2 The School of Allied Medical Sciences, Nagasaki University

3 Dept. of Pediatrics, Nagasaki University

4 Faculty of Education, Nagasaki University

Cases	16
Gestational Age	28w5d ± 3w5d (24w6d~34w6d)
Birth Weight(g)	976.5 ± 401.2 (565~2010)
A P sc. 1 min	5.9 ± 2.1 (2~9)
A P sc. 5 min	7.7 ± 1.5 (6~9)
Intubation Cases	11
Period of Intubation(day)	35.3 ± 23.9 (3~65)
Period of Incubate(day)	121.5 ± 45.6 (20~182)

A F D infants	9
S F D infants	7
L B W < 1000g	12
R D S	11
W - M synd.	3
B P D	5
A p n e a	8
T T N B	1
P D A	5
S e p s i s	12
A n e m i a	7
Hyperbilirubinemia	14

Fig. 1 Subject

Gestational Age	40W	44W	48W	52W
Habituation	7.69±0.61	7.80±0.54 6.80±0.64	8.12±0.63 7.01±0.71	6.82±0.75
Orientation	5.33±0.89	5.97±0.98 4.79±1.07	6.79±0.72 5.06±0.97	5.31±1.18
Motor	5.45±0.60	5.75±0.67 4.59±0.67	6.01±0.57 4.80±0.84	4.81±0.60
State Range	3.74±0.56	3.93±0.56 3.12±0.86	4.29±0.73 3.51±0.93	3.34±0.92
State Regulation	5.13±0.64	5.17±1.15 3.65±0.95	5.59±0.92 4.06±0.93	3.89±0.80
Autonomic Stability	6.27±0.92	6.97±0.76 6.39±1.12	7.84±0.71 7.00±0.77	7.16±0.90
Supplement Items	6.64±0.99	7.30±1.06 5.83±0.89	7.71±0.80 5.84±0.80	5.89±0.86
Reflexes	0.63±0.90	0.73±0.81 3.61±1.40	0.64±0.72 3.23±1.37	3.17±0.89

Fig. 2 Result of NBAS Examinations. The upper line showed controlled subjects.
The second line showed the risk infants.

Subjects

We used the NBAS to evaluate 111 premature infants. We examined our findings on predictions made of development difficulties in 16 cases of these premature infants and implemented the early intervention program as on the basis of these findings. Delays in mental-motor progress were predicated for 14 of the infants, and disorders in the central nervous system were predicated for 2 infants.

While the former were extremely premature and had respiratory disease, the latter did not indicate any significant pediatric problems (Fig. 1). (Another 2 infants were found to have disorders in the CNS, however as these displayed sufficient progress after being transferred to another site, they have been omitted from this report.)

Result of the NBAS examinations

The score of each NBAS cluster (by Lester, 1982) is seen in Fig. 2. In comparison with controlled subjects who developed normally, at risk infants showed a low score for a long period. It was shown that in such cases, neonatal behavior was very fragile, and progressive adaptation to the environment did not come about successfully.

Results of the NBAS examinations showed that at risk infants displayed neonatal behavioural differences according to the following classifications (Fig. 3);

① Physiological System :

Eleven cases of the subjects with predicted delays displayed RDS, out of which six cases showed chronic respiratory disorders, BPD, Wilson Mikity Syndrome. In these at risk infants stress behavior was observed in the physiological system. During rest, paradoxical or irregular breathing was observed. Crying capacity was weak, breathing was gasped and exerted and cyanosis was detected. The ability to maintain a constant physiological standard was poor, impairing the organization of other neonatal behavioral systems.

② State Control System :

Sleep and waking rhythms were prone to change, and problems such as the presence of only brief woken states during the day were also noticed. Sleeping ability was slight and easily disturbed by numerous distractions. Waking episodes were a very brief with brief periods of alert response and displays of drowsiness frequent.

These infants were easily irritated by external stimulation and were prone to sudden crying. Their self-quieting ability was poor so they lapsed into panic easily.

③ Motor System :

In these at risk infants abnormal posture occurred frequently due to problems in the central nervous system and from the long period of intubation. Asymmetrical posture, shoulder retraction and opisthotonic posture were

1. Physiological System:

- paradoxical, irregular, forced respiration
- gasping, grunting, stridor
- skin color changes to cyanosis
- weak crying capacity
- tremoring, startling
- yawning
- etc

2. State Control System:

- unstable sleep-awake rhythm
- light sleep, excess response to stimulation in sleeping
- short awake state, short period of alertness
- panicked, worried, drowsy alertness
- rapid state change to crying
- irritability, prolonged crying (fussy state)
- unconsolability, poor self-quieting activity
- etc

3. Motor system:

- abnormal muscle tonus (hypotonus, hypertonus)
- abnormal posture (flaccid, opisthotonic, high-gird posture)
- abnormal response to primitive reflexes
(hypo-, hyper-, asymmetrical)
- overshooting, jerky movement
- poor postural righting reaction
- poor anti-gravitic activity
- etc

4. Interaction system:

- over-sensitive response
 - inattention
 - roving, averting, staring eye movement
 - panicked, blankly glassy expression
 - stiffen, passively cuddling
 - weak sucking capacity
 - etc
-

Fig. 3 Characteristics of Neonatal Behavior at Risk infants using NBAS

observed, as well as underdeveloped anti-gravitational activity in head, body and limbs. Furthermore, limbs movements were uncoordinated, it showed overshooting and/or jerky movement. The infants with symptoms of impaired CNS showed abnormal response in primitive reflex items, predominantly so in the total movement patterns of lower limbs.

④ Interaction System :

The stress shown in the physiological control and state regulatory system made the obstruction of the social interaction process likely. An excessively agitated facial expression and staring eyes, change of state to crying or drowsiness, the excessive uncoordinated movement of limbs and total extension of body, all demonstrated signs of stress.

Early Intervention Programs

Next, we express on our practical early intervention programs for at risk infants who shows the above peculiarities of newborn behavior.

The premature infants with developmental difficulties had not matured sufficiently in utero. These infants easily contracted infectious or respiratory distress and had central nervous system disorders. Therefore, the organization of their neonatal behavioral processes obstructed. Further, long-term medical supervision and separation from the mother were all reflected in their developmental processes. Due to these peculiarities of behavior, progress in adaptation to the environment did not progress well, and the course of learning was delayed as well.

A fundamental principle of the early intervention program is to assist development of neonatal behavior system by encouraging mother-infant interaction. Therefore, we attach importance to the daily transactions between mother and infants (Fig. 4).

Program 1: Assisting development of mother-infant interaction

The infant's early separation from the mother, the fragility of the infant's behavior and the difficulties in socialisation of premature risk infants make it difficult for the mother to deal with the infant. We recommend that early steps are taken to assist development of a normal and healthy mother-infant relationship. In the intervention method, it is important that the mother appreciates the infant's behavior abilities and the infant's signs of stress.

Program 2: Assisting the development of sleep-wake rhythm

Sleep and wake rhythms should be in accord with the natural cycle of the day so that a pattern of sleep at night and waking during daytime

isensured.

Sleep should be in a dark room to prevent disturbance by sudden or strong light or noises. Stable sleep is an essential behavior pattern which helps regulate neonatal behavior.

Thirty minutes to an hour after midday feeding can be employed as a time for gentle play activities that stimulate senses of touch, sight and hearing and so to help control regulate the waking state. Extending a stable waking condition during the day helps increase the infants interaction abilities.

Program 3: Assisting development of state control

Appropriate forms of stimulation from the external environment are recommended in order to improve neonatal behavior system. In using appropriate treatment it is vital to deal carefully with the infants, without eliciting any stress behaviour. In infants that easily display stress behavior, signs of

-
- ① **Assisting the development of infant and mother interaction**
 - appreciation of infant's behavioral ability
 - appreciation of stress behavior

 - ② **Assisting the development of awake-sleep rhythm**
 - rhythm adaptable a day cycle(light and darkness)
 - stable sleep : life environment care
 - stable awake : treatment in awake state

 - ③ **Assisting the development of state control**
 - staring (visual)
 - talking (auditory)
 - touch, massage (tactile)
 - swinging, rocking (vestiblar)
 - hand to mouth, hand to eyes coordination
 - physical exercise
 - opportunity to self-quiet from crying

 - ④ **Promoting motor development (Physical Exercise)**
 - positioning in lying, holding
 - facility of head, body righting reaction
 - breathing assist techniques

 - ⑤ **Promoting feeding abilities**
 - mouth, tongue, passive stimulation
 - positioning in feeding
-

Fig. 4 Early interventional Program

stress may be prevented by gentle rocking and holding so that the state of alertness is also promoted.

To encourage the sense of touch, begin by using hands gently. To foster the audio-visual sense, eye contact and familiarity with the mother's voice as well as other sounds, will enable gradual progressive steps in recognition.

In play between mother and infant, playing with the hands, hand to eye-contact and encouraging hand to mouth behavior is recommended to improve coordination in these regions. In the crying state, it is important to allow the infant to self-quiet and then to use consoling techniques.

Program 4: Promoting motor development (Physical Therapy)

Abnormal posture in the neonatal period obstructs the process of acquiring normal motor development. An early correction of posture is necessary in order to acquire normal motoric development.

In the lying and holding posture, it is important to inhibit abnormal-posture, as well as a development of anti-gravitic activities is attended.

Physical Therapy will promote behavioral development, if the stress that accompanies physiology can gradually be alleviated. The approach put into practice is the facilitation of the head and body's righting reaction, and anti-gravitic activities.

When an infant has a severe respiratory disease, enforce chest physical therapy. The postural drainage and thoracic mobilization which assists the infant's breathing movement will improve respirational efficiency, and regulate neonatal behavior.

Program 5: Promoting feeding abilities

Disorders of feeding in a premature infant originate from respiratory distress.

However, one group of infants may have a neurological disorder and oversensitivity in their oral regions.

In this type of infants, fingers should be used to practice stimulation of the internal-external oral region.

Attention should also be paid to the posture during feeding.

Development Progress

In one year's treatment up to the present, 11 cases out of the 16 at risk infants viewed in the Fig. 5 indicated a developmental level of 12 months on the Bayley Scales. In 9 infants with predicted difficulties in mental-motor development, both MDI and PDI scores showed comparatively smooth progress. However it did not develop to a standard value yet. In 2 cerebral palsy

infants, with 80.5 average points MDI scores indicated comparatively smooth progress. However in 61.0 average points PDI scores reflected delayed acquisition of walking.

This Fig. 6 shows progress of the former cases' motor development. In comparison with the standard values, smooth progress in development lagged by two or three months later. In cerebral palsy infants the progress from sitting and sanding, to acquiring walking, tended to be markedly slow.

Conclusion

The above has been a report of the effects of intervention based on the NBAS on the early development of at risk infants, and our application of the early intervention program. The NBAS was extremely useful for the assessment and intervention planning of development difficulties, as well as assisting at their development. We strongly recommend a clinical application of NBAS for at risk infants.

	MDI	PDI
Control Subjects	102.4± 7.7	97.9± 8.2
Risk Infants	80.1±10.6	77.3± 9.7

Fig. 5 Development level of 12 months (Corrected Age) on the Bayley Scales.

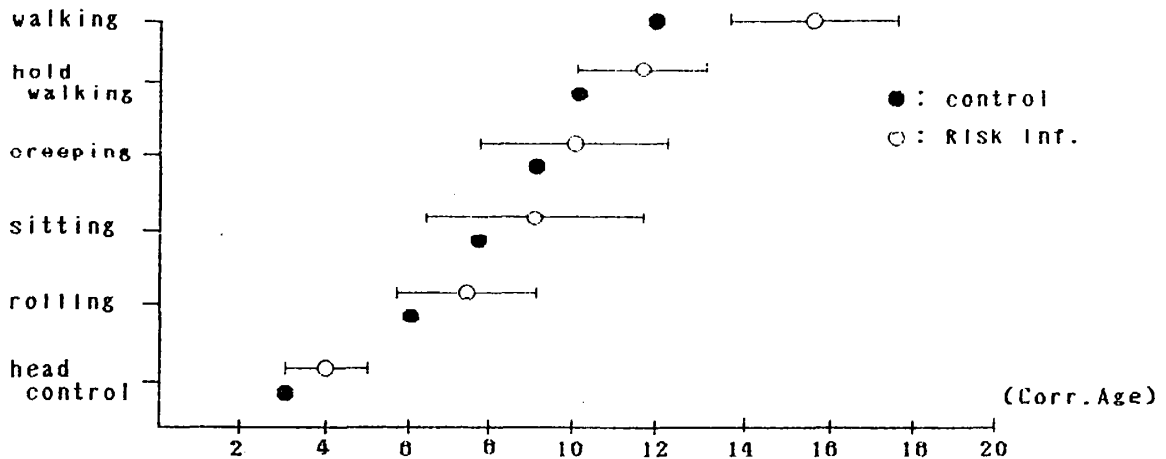


Fig. 6 Motor Development Progress

Reference

1. Akiyama T, et al: Neonatal behavior of healthy matured infants and development through 5 year old. Bull Sch Allied Med Sci Nagasaki Univ, 4: 19–27. 1990.
2. Akiyama T, et al: Neonatal behavioral assessment of SFD infants and longitudinal study of their development-During the first postnatal year-. Bull Sch Allied Med Sciences Nagasaki Univ, 5: 41–50. 1991.
3. Brazelton T. B.: Neonatal behavioral assessment scale. Clinics in Developmental Medicine No. 88, Blackwell Scientific Publication Ltd., London, 1–104, 1984.
4. Joy Donigor Osofsky (Edited): Handbook of Infants Development, Second Edition. A Wiley-Interscience Publication, New York, 1987, 788–817.
5. Ogi S, et al: Early Assessment and Intervention for Premature Infants with respiratory distress. Bull Sch Allied Med Sci Nagasaki Univ, 6: 25–30. 1992.
6. Ezure K, et al: Physiotherapy for the premature and mature newborn infants. Rigakuryohogaku, 14: 357–364, 1987.

ブラゼルトン新生児行動評価の臨床活用

大城 昌平¹ 穠山富太郎² 福田 雅文³
後藤ヨシ子⁴ 草野美根子²

- 1 長崎大学医学部付属病院理学療法部
- 2 長崎大学医療技術短期大学部
- 3 長崎大学小児科
- 4 長崎大学教育学部

要 旨 我々はこれまでブラゼルトン新生児行動評価法(NBAS)を未熟児やリスクを有する成熟児の早期発達評価と介入手段として応用してきた。今回は未熟児を対象にNBASの評価結果から発達障害を予測された児の新生児行動上の特性を4つの行動系に分けて整理し、我々の実施している早期療育プログラムについて報告した。また、これまでフォローした児について発達経過を加えた。

長崎大医療技短大紀7:11-20, 1993