

Evaluation of Newborns by Normal Deliveries and Cesarean Sections under General Anesthesia by Application of Scanlon's Scoring System

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Abstract

Background: In the present scenario there is an increased demand by the mothers for painless deliveries. Therefore the number of babies delivered by C Sections has increased. However it also necessitates one to study the effects of various agents and anesthetics used during such operations that may have immediate or long-term undesirable effects on physiological processes of newborns. With this background we tried to evaluate the newborns delivered by C section under general anesthesia using Scanlon's scoring system. **Methods:** A total of 66 females were selected for the study based on including and excluding criteria. They were divided into two groups Group I (n=35) included females evaluated to have normal vaginal deliveries. Group II (n=31) included females for Caesarean section both elective and emergency. They were pre-anesthetically evaluated thoroughly. Both the groups were comparable in respect of maternal age, parity, birth weight, gestational age and duration of labor of each other. **Results:** Various assessments and scorings of Scanlon's neurobiological behavioral scoring system collectively assessed as one more response called overall response. It signifies the integrity and commencement with response of central nervous system as, muscle tone, pinprick, sound, placing, alertness and decrement. Up to 24 hours of delivery overall response with low scores was noted in maximum no. of neonates in Group II as compared to Group I. Lastly, even at 48 hours of life, Group II with low scores was noted in more number of neonates as compared to neonates of Group I who has reached better scores. **Conclusion:** Assessment by Apgar scoring and application of Scanlon's scoring system is different as far as clinical importance. Scanlon's scoring system is highly recommended and sensitive evaluation of overall newborns when central nervous system functioning is concerned.

Keywords: Evaluation of Newborns; Scanlon's Scoring System.

Introduction

Sufficient intra-disciplinary co-ordination between Obstetrician, Anesthesiologist and Neonatologist is necessary to evaluate perinatal phenomenon of foetal delivery. A first wave of uncritical acceptance has receded leaving an undercurrent of concern, that the neonate might be affected unfavorably by the procedures or the drugs. Since the starting of the operative to the delivery of the baby or a normal vaginal delivery, the baby delivered were usually assessed by the doctor or by the dais. It was only

cleaning the baby or to observe the baby's cry. Dr. Virginia Apgar [1] was first to develop the scoring system for a newborn which is the most widely used measure of the neonate's condition at birth. Here, the only quantitative measure of neonatal welfare consists of timing interval from delivery to first breath or cry. In this method, it compels the attending physician to judge those functions necessary to sustain life and forces him to pay attention to the newborn. It also provides yard stick to establish the need for resuscitation. It was useful for baby with birth asphyxia or severely depressed neonate to respond to immediate resuscitation.

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However, Apgar scoring system has its own limitations as it consisted of five variables of five vital signs, limiting the observations to first 10-15 minutes after birth, neglects a critical time of 24 hours of post natal life. Scanlon J.W. suggested various tests for evaluating the newborn for 24-48 hours with an assessment of overall central nervous system with special attention to overall central nervous system functioning, reflexes, sensory system, motor system, respiratory system and cardiovascular systems. So we proposed to evaluate the newborn delivered after normal delivery and after cesarean section under general anesthesia [2].

Materials and Methods

This study was undertaken in Department of Anesthesia, Government Medical College and Hospital, Latur, Maharashtra State. Institutional Ethical committee permission was obtained prior to the study. Scanlon's early neonatal neurobehavioral scale was applied to 66 babies, divided in two equal groups. Group I (n=35) included Neonates delivered by normal vaginal deliveries. Group II (n=31) Neonates delivered by caesarean section whose mothers received general anesthesia. In the first group mothers did not receive any narcotic analgesics or sedative prior to delivery.

In the second group mothers were posted for either elective or emergency caesarean section. The mothers posted for caesarean section were preanaesthetically thoroughly evaluated and informed consent was obtained from each. No mother received any type of premedication prior

to induction of anesthesia. In general anesthesia group intravenous drip of Ringer lactate was set up and induction was done after 5 minutes of preoxygenation. Induction was done with thiopentone sodium 2.5%, 5 mg/kg body weight followed by suxamethonium chloride 2 mg/kg body weight intravenously. Endotracheal intubation was carried out with cuffed endotracheal tube and patient was ventilated artificially using closed circuit with circle absorber. Anesthesia was maintained with nitrous oxide-oxygen 50:50 percent with intermittent doses of suxamethonium as required. After the delivery of fetus, halothane was supplemented along with narcotic analgesics when required. Intravenous fluids were given as needed. Patient's blood pressure and pulse rate were monitored throughout the operative procedure.

Results

In normal vaginal delivery Group I, maximum no. of neonates having the score of 9 as compared to very high or very low Apgar scores. In Group II maximum No. of neonates about 68% were having Apgar score 8-9 as compared to 7 scores in 20% and 10 scores in 11.4%. Apgar score at five minute, it was noted that in Group I, 14.2% of neonates had the score of 8, 42.8% each had the score of 9 and 10. In Group II, 28.5% of neonates had the score of 8 and 10. And 42.8% had a score of 9. It was observed that maximum Apgar score of 9-10 was noted in almost in 85% of neonates after normal delivery as compared to 70% in Group II and 85%.

Table 1: Showing age range in various groups

Age Range (Years)	Group I	Group II	Total
16-20	02	04	06
21-25	22	19	41
26-30	11	05	16
31-35 & Above	-	03	3
Total	35	31	66

Table 2: Showing APGAR scoring

Groups	No. of Neonates with Apgar Scores at 1 minute			
	7	8	9	10
Group I	0	02 (5.7%)	30 (85.7%)	03 (8.7%)
Group II	07 (20%)	12 (34.2%)	12 (34.2%)	04 (11.4%)
No. of Neonates with Apgar Score at 5 minutes				
Group I	0	05 (14.2%)	15 (42.8%)	15 (42.8%)
Group II	0	10 (28.5%)	15 (42.8%)	10 (28.5%)

Scanlon's neurobiological behavioral scoring system was undertaken in neonates of all the groups. The two groups were assessed at time intervals of 2, 6, 24 and 48 hours after delivery. They have been assessed for pinprick response, muscle tone, rooting reflex, sucking reflex, Moro's reflex, sound response, placing reflex, alertness

and decrement response. At the end, altogether above parameters are also assessed as overall responses. Pinprick sensations at time intervals of 2, 6, 24, 48 hours were observed and scores are labeled as very low, low, good and better response as 1, 2, 3, 4 respectively shown in Table 3.

Table 3: Showing Scanlon's scoring system

Groups	2 hours				6 hours				24 hours				48 hours			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Scores of Pinprick Response																
Group I	-	94.2%	5.7%	-	-	-	100%	-	-	-	-	100%	-	-	-	100%
Group II	-	100%	-	-	-	85.7%	14.2%	-	-	-	94.2%	5.7%	-	-	-	100%
Scores Muscle Tone																
Group I	-	97.1%	2.8%	-	-	-	100%	-	-	-	-	100%	-	-	-	100%
Group II	88.5%	11.4%	-	-	48.5%	48.5%	2.8%	-	-	94.2%	5.7%	-	-	-	68.5%	31.4%
Scores of Rooting Reflex																
Group I	-	48.5%	28.5%	22.8%	-	-	94.2%	5.7%	-	-	-	100%	-	-	-	100%
Group II	11.4%	88.5%	-	-	-	11.4%	80%	5.7%	-	-	8.5%	91.4%	-	-	2.8%	97.1%
Scores of Sucking Reflex																
Group I	-	48.5%	28.5%	22.8%	-	-	94.2%	5.7%	-	-	-	100%	-	-	-	100%
Group II	11.4%	88.5%	-	-	-	11.4%	80%	5.7%	-	-	8.5%	91.4%	-	-	2.8%	97.1%
Scores of Moro's Reflex																
Group I	-	57.1%	42.8%	-	-	-	85.7%	14.2%	-	-	71.4%	28.5%	-	-	-	100%
Group II	97.1%	2.8%	-	-	5.7%	94.2%	-	-	14.2%	85.7%	-	-	-	-	65.7%	34.4%
Scores of Sound Response																
Group I	-	28.5%	48.5%	22.8%	-	-	97.1%	2.8%	-	-	-	100%	-	-	-	100%
Group II	11.4%	88.5%	-	-	-	11.4%	80%	5.7%	-	-	8.5%	91.4%	-	-	2.8%	97.1%
Scores for Placing Reflex																
Group I	-	97.1%	2.85%	-	-	-	100%	-	-	-	-	100%	-	-	-	100%
Group II	88.5%	11.4%	-	-	-	48.5%	48.5%	2.85%	-	94.2%	5.7%	-	-	-	68.5%	31.4%
Scores for Alertness																
Group I	-	-	85.7%	14.2%	-	-	100%	-	-	-	-	100%	-	-	-	100%
Group II	100%	-	-	-	14.2%	85.7%	-	-	2.85%	54.2%	42.8%	-	-	14.2%	28.5%	42.8%
Scores of Decrement Response																
Group I	-	-	85.7%	14.2%	-	-	85.7%	14.2%	-	-	-	100%	-	-	-	100%
Group II	100%	-	-	-	14.2%	85.7%	-	-	2.85%	54.2%	42.8%	-	-	14.2%	28.5%	57.1%
Scores of Overall Response																
Group I	-	100%	-	-	-	34.2%	65.7%	-	-	-	48.5%	51.4%	-	-	-	100%
Group II	94.2%	5.7%	-	-	-	97.1%	2.85%	-	-	8.5%	91.2%	-	-	-	25.7%	74.2%

Various assessments and scorings of Scanlon's neurobiological behavioral scoring system collectively assessed as one more response called overall response. It signifies the integrity and commencement with the response of the central nervous system as, muscle tone, pinprick, sound, placing, alertness, and decrement. At 2 hours, overall response with the very low score (1) was noted in 94.2% of neonates and low score (2) was noted in 5.7% of neonates in Group II where as in Group I all neonates had low score (2) response.

At 6 hours, in Group I, low score (2) was noted in 34.2% of neonates and 65.7% had good score (3) response. In Group II, 97.2% had a low score (2) and 2.85% had a good score (3). At 24 hours, in Group I, 48.5% of neonates had a good score (3) and 51.4% had the better score (4). In Group II, 91.2% of neonates had a good score (3) and 8.5% had a low score (2). At 48 hours 100% in group I had a

good score and 74.2% in group II had good scores Table 3. Thus it was observed that, up to 24 hours of delivery overall response with low scores was noted in maximum no. of neonates in Group II as compared to Group I. Lastly, even at 48 hours of life, Group II with low scores was noted in more number of neonates as compared to neonates of Group I who has reached better scores.

Discussion

Obstetricians are taking due care for healthy newborn, right from prenatal to postnatal period. They are providing adequate measures to the mother as well as the baby during the course of pregnancy and they are taking guidance from other specialties. At present, Anesthesiologists are providing labor analgesia to decrease stress and

strain of labor pain, psychological counseling of mothers, and timely intervention for operative deliveries and resuscitative measures for the newborn.

Scanlon's neurobiological behavioral response scoring was also evaluated by many authors [3-6] and have worked on the neonatal neurobehavioral scoring system and evaluated the effects of various inducing agents, sedatives, hypnotics and local anesthetics, anesthesia techniques affecting the net result of the scoring system. The present was in accordance with one or all above authors when various clinical criteria were concerned.

According to many authors [7-9] maternal health during the prenatal period, progress, and course of labor, placental transfer of drugs, condition of the newborn after delivery all these play an important role during assessment for Scanlon's scoring system. In Scanlon's scoring system, most of the scores except a response to sound and pinprick at 12 to 24 hours were significantly lower in babies delivered by cesarean section under general anesthesia as compared to spinal anesthesia [3]. The rooting and sucking reflex being segmental medullary reflexes were affected the most. Muscle tone, overall assessment, alertness, Moro's response were also affected more under general anesthesia as compared to spinal anesthesia. The delayed negligible response of local anesthetics agents in spinal anesthesia has the little alteration in neurobehavioral reflexes [10]. The drugs used for general anesthesia like sedatives, intravenous inducing agents, readily crosses the placental barrier and has direct effects on the central nervous system of newborn more than 24 to 48 hours.

We have observed that, a pinprick of the high score was noted in more no. of neonates after normal delivery, and is more affected in general anesthesia group. Same observations were there for muscle tone, rooting reflex, Moro's response placing etc. sound response, alertness and decrement scores were decreased in more no. of neonates with low scores up to 2-6 hours in general anesthesia to Group I. Over all response was with high scores after 6 hours of life in normal delivery and it was more with low scores even up to 24 hours in general anesthesia group. Thus, it was observed that, over all Scanlon's scoring system was of concern in general anesthesia group as, high scores are easily observed in the normal delivery group. These observations are in accordance Heidelise et al. [5]; had also coated that social, environmental, high-risk newborn capacity for attention and interaction, premature training for assessment, inter raters reliability, significance and meaning of scoring system all these play important role in assessment.

Conclusion

It is of vital importance to assess the newborns with traditional Apgar scoring system at one and five minutes. This technique assesses the need for active resuscitation to be undertaken immediately in newborn to save the life. Assessment by Apgar scoring and application of Scanlon's scoring system is different as far as clinical importance. Scanlon's scoring system is highly recommended and sensitive evaluation of overall newborns when central nervous system functioning is concerned.

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