formation on nursing books, visit our website www.jaypeebrothers.com, for detailed information on nursing books, visit our website www.jaypeebrothers.com

Indian Academy of Pediatrics
NEONATOLOGY Chapter

Manual of Newborn Nursing



2nd Edition

An Official Publication of IAP Neonatology Chapter

Naveen Bajaj
Rajesh Kumar

Forewords
Armida Fernandez
Ruchi Nanavati
Upendra S Kinjawadekar

JAYPEE

Contents

Section 1: Fundamentals of Newborn Care

1. **Classification of Newborn Babies** 3
   Shoham Majumder, Ashish Jain
2. **Basics of Neonatal Resuscitation** 8
   Poonam Joshi
3. **Developmental Peculiarities of the Newborn** 14
   Neeraj Gupta
4. **Identification of Sick Newborns: Triaging** 22
   Rajiv Sharan
5. **Hypothermia** 27
   Simin Irani
6. **Fluids, Electrolytes, and Dextrose** 32
   Sreeram S
7. **Basics of Respiratory Distress in Neonates and Oxygen Therapy** 35
   Sanjay Wazir
8. **Shock** 40
   Vishal Vishnu Tewari
9. **Neonatal Transport** 46
   Bhargavi Gohil, Nandkishor Kabra
10. **Examination of the Newborn** 50
    Kishorekumar P Sanghvi
11. **Essentials of Breastfeeding** 55
    Mallikarjuna, Nancy Jeniffer V

Section 2: Essential Nursing Skills

12. **Hand Washing** 65
    Rahul Bhamkar, Anjali Kulkarni
13. **Baby Hygiene Cleaning, Bath, Skin Care, and Bed Keeping** 71
    Manisha Bhandankar

14. Assessing Body Temperature 74
Indu S Nair

15. Assessment of Heart Rate 77
Sumitha Nayak

16. Assessing Respiration of a Neonate 83
Maneesha PH

17. Assessing Blood Pressure 87
Rajesh Kumar

18. Using the Weighing Machine (Electronic) 91
LS Deshmukh

19. Anthropometry and Growth Monitoring 93
Susan Mary Jacob, Bhargavi Gohil

20. Nasogastric Tube Feeding 97
Jaikrishan Mittal, Sunil Gothwal

21. Securing and Maintaining Intravenous Lines 100
Pradeep Sharma

22. Urine Collection and Measurement 103
VC Manoj

23. Hemoglucostix Testing 106
Vinay H Joshi

24. Endotracheal Suctioning in Ventilated Neonates 110
K Sankaranarayanan

25. Administering Medications 113
LS Deshmukh, Rhishikesh Thakre

26. Patient Counseling 124
Ranjan Kumar Pejaver, Sumitha Nayak

27. Neonatal Intensive Care Unit Housekeeping Practices 127
Sashikala, Srinivas Murki

28. Breast Milk Expression and Storage 131
Sailesh Gupta, Sahil Bansal

29. Kangaroo Mother Care 140
Ruchi N Nanavati

30. Neonatal Pain 145
Somashekhar Nimbalkar

31. Using a Pulse Oximeter 148
Jayashree Mondkar

32. Oxygen Administration in Newborns 152
SR Daga, BR Chiluvery

33. Bag and Mask Ventilation 156
Rhishikesh Thakre

34. Nursing Etiquettes 165
Hebsiba LD, Ankita Raj

35. Neonatal Metabolic Screening 168
Rajath Pejaver

36. Coping with Death 171
Rhishikesh Thakre

Section 3: Nursing Care of Newborn

37. Care of the Normal Newborn Infant 177
Ashwani K Sood

38. Care of the Baby Under Radiant Warmer 187
Sreeram S

39. Monitoring of Sick Neonates 193
Rekha Samant

40. Feeding of Low Birth Weight Infants 198
Shradha Palekar

41. Care of the Hypoglycemic Infant 203
Arjit Mohapatra, Vidya Patwari

42. Care of the Baby under Phototherapy 207
Rimple Sharma

43. Care of Newborn on Continuous Positive Airway Pressure 215
Naveen Bajaj

44. Care of a Ventilated Baby and Prevention of Ventilator-associated Pneumonia 224
Ashish Jain

45. Care of a Baby with Sudden Deterioration 235
Suman Rao, Vimala Peter

46. Developmentally Supportive Care 240
Suman Rao, Sunita Namdev

47. Chest Physiotherapy 246
Sandeep Kadam

48. Management of Pain in Neonates 249
Nida Siddique, Tushar B Parikh

49. Preparation and Administration of Total Parenteral Nutrition 257
Tushar B Parikh

50. Nursing Care of a Surgical Neonate 263
Sandeep Kadam

SECTION 4: Nursing Protocols/Checklist

51. Admission Procedure for Newborns 271
Leslie Lewis

52. Basic Documentation and Handover Procedures for Newborns 273
Anju Thomas, Bhargavi Gohil

53. Organization of Discharge from Neonatal Intensive Care Unit 277
Shamim Akhtar, Reeta Bora

54. Care of the Neonatal Intensive Care Unit Equipment 280
Pradeep Suryawanshi

55. Disinfection and Sterilization 291
Deepak Chawla

56. Blood Transfusion 295
Neeraj Gupta

SECTION 5: Assisting Procedures

57. Peripheral Venous Cannulation 303
Naveen Bajaj

58. Arterial Sampling 307
Swarup Kumar Dash

59. Capillary Heel Sampling 311
Bonny Jasani

60. Fixation and Care of Endotracheal Tube 315
Hemant Parakh

61. Surfactant Administration 321
Srinivas Murki, Tejo Pratap Oleti

62. Blood Culture Sampling 325
Raktima Chakrabarti

63. Intercostal Drainage 327
Ashish Mehta

64. Peripherally Inserted Central Catheter Insertion 330
Jyothi Prabhakar, Naveen Jain

65. Lumbar Puncture 340
Sanjay Aher

66. Umbilical Artery and Venous Catheterization 344
Sachin Shah, Amita Kaul

67. Exchange Transfusion 352
Asim Kumar Mallick

68. Partial Exchange Transfusion 357
Piyush Jain

69. Retinopathy of Prematurity Examination 360
Nandkishor Kabra

70. Nebulization 364
Jaikrishan Mittal, Sunil Gothwal

SECTION 6: Common Newborn Disorders

71. Respiratory Distress Syndrome 369
Ashish Mehta

72. Patent Ductus Arteriosus 372
Bhawandeep Garg, Naveen Bajaj

73. Intraventricular Hemorrhage 375
Sachin Shah, Amita Kaul

74. Necrotizing Enterocolitis 380
Vinay H Joshi

75. Perinatal Asphyxia 384
Preetha Joshi

76. Sepsis 389
Somashekhar Nimbalkar

77. Jaundice in Newborn 392
Nandkishor Kabra

78. Hypoglycemia 397
Leslie Lewis

79. Neonatal Seizures 401
K Sankaranarayanan

80. Polycythemia 405
Sanjay Aher

81. Inborn Errors of Metabolism 408
Naveen Jain, Femitha P

82. Persistent Pulmonary Hypertension 411
Pradeep Suryawanshi

83. Congenital Heart Disease 414
Arjit Mohapatra, Vidya Patwari

84. Common Surgical Anomalies 417
Kumar Ankur

85. Bronchopulmonary Dysplasia 421
Jaikrishan Mittal, Sunil Gothwal

86. Transient Tachypnea of the Newborn 424
VC Manoj

87. Meconium Aspiration Syndrome 427
Rajesh Kumar

88. Intrauterine Growth Restriction 430
Rohit Arora

89 Apnea in Newborn 432
Sanjay Wazir

90 Congestive Heart Failure 436
Rohit Arora

91 Retinopathy of Prematurity 439
Snehal Thakre

92. Large for Gestational Age 443
Dinesh Chirla

93. Multiple Gestation 446
Anu Thukral

SECTION 7: Miscellaneous Topics

94. Follow-up of High-risk Newborn 451
Archana Kadam

95. Evidence-based Medicine 455
Deepak Chawla

96. Medical Ethics 460
Nandkishor Kabra

97. Human Milk Banking 464
Sahil Bansal

Appendices 469
Index 475

CHAPTER 4

Identification of Sick Newborns: Triaging

Rajiv Sharan

LEARNING OBJECTIVES

- Understand how to triage all sick newborns into following categories:
  - Those with emergency signs
  - Those with priority signs
  - Those with nonurgent signs
- Assess the newborn's temperature and give emergency treatment
- Assess the newborn's airways and breathing and give emergency treatment
- Assess the newborn's state of circulation and give emergency treatment
- Manage shock, coma, and convulsion.

INTRODUCTION

Four million newborn babies die each year, 75% of them within the first week of life. Identifying those babies who are sick and need immediate care is important to reduce the morbidity and mortality. A proportion of these neonates may die in hospital due to delay in starting a procedure or initiating a specific management. Triaging these newborns goes a long way in improving the outcome of these babies. In this chapter, we will learn how to identify sick newborn and triage them into emergency, priority, and nonurgent cases and to facilitate appropriate timely management.

DEFINITION

Triage

Triage is sorting of the patients into priority groups according to their needs, within the available resources.

ETAT

The ETAT stands for *Emergency Triage Assessment and Treatment*. This signifies that the triaging and treatment start together and go hand in hand, the moment emergency signs are seen or evident and treatment starts immediately.

JAYPEE BROTHERS

TABCCC Concept

Triage of newborn involves looking for signs of serious illness. Each letter stands for an emergency sign. T stands for temperature, whereas ABCCC stands for airways, breathing, circulation, consciousness, coma, or convulsion.

TRIAGING PROCESS

Triage is a process of rapidly examining all sick newborns when they arrive at the hospital in order to place them in one of the following categories:

- *Emergency:* Require immediate treatment
- *Priority:* Should be rapidly assessed and treated without delay
- *Nonurgent:* Can wait for their turn.

The process of triage should not take much time. The clinical staff should complete the triage at the earliest and they should learn to look for several signs at the same time.

When and Where to Triage

As soon as the newborn arrives at the facility or hospital, near the emergency room, or outpatient department of the hospital.

Who Should Triage

Triage should be done by the most experienced clinical staff present on the arrival of the baby.

How to Triage

Keep in mind the concept of TABCCC. Emergency signs should be looked in the same order. First assess temperature, then airways, breathing, circulation, consciousness, coma, and convulsion (TABCCC).

The details of the process are mentioned in **Table 1**.

TABLE 1: The triaging process.

Objective	*Method*	*Action*
	Temperature (T)	
Determine if the baby is hypothermic	• Feel the soles and abdomen. If palm and soles both are warm, the newborn has normal temperature • If soles are cold and abdomen warm, the newborn is suffering from cold stress • If the soles and abdomen are cold, the newborn has severe hypothermia	• Manage hypothermia • Keep the baby under a radiant warmer

Contd...

JAYPEE BROTHERS

Contd...

Objective	***Method***	***Action***
	Airway (A)	
• Are the airways obstructed? • Is the newborn breathing?	• Look at the newborn's mouth for the secretions and the position of the head • Look for apnea especially in preterms	• Clear secretions, reposition head to open the airway • If apnea, stimulate the baby
	Breathing (B)	
• Does the newborn have severe respiratory distress? • Cyanosis is based on examination of lips and mouth	• Severe respiratory distress is based on qualitative observation of labored breathing accompanied by distress • In this condition, there could be tachypnea, subcostal retraction, nasal flaring, and grunting	• Give oxygen • Administer positive pressure ventilation if apneic
	Circulation (C)	
• Look for cold and clammy skin • Look for CRT >3 seconds • Look for weak and fast pulse rate	• Rapidly feel if the palms and soles are warm, if so no need to evaluate for shock but if they are cold look for CRT. If it is >3 seconds and the pulse is rapid, the child should be diagnosed as shock and managed accordingly • Shock is defined as a clinical condition where circulation is not able to meet the metabolic demand of the newborn baby. In newborns, this is usually because of hypovolemic or cardiogenic shock	Insert IV line, Bolus 20 mL/kg NS/RL.
	Coma (C)	
Asses the consciousness of the baby	For the assessment of level of consciousness, AVPU scale can be used to rapidly assess the newborn *A:* Is the newborn alert? *V:* Is the newborn responds to voice? *P:* Is the newborn responding to pain? *U:* Is the newborn not responding?	• Insert the IV line, check RBS • Nurse the baby in the lateral position
	Convulsion (C)	
Identify the convulsion	Tonic-clonic movement of limbs, or posturing of the baby	Injection phenobarbitone 20 mg/kg slowly over 20 minutes

JAYPEE BROTHERS

EMERGENCY TREATMENT IS ETAT

The emergency management in a sick baby consists of:

- Manage airways including bag and mask ventilation.
- Give oxygen by nasal prongs or nasal catheter.
- Position the child and open airways.
- Insert an intravenous line and administer fluid rapidly.

ETAT assumes there is no need of cardiorespiratory resuscitation and intubation at the triage center.

PRIORITY AND NONURGENT CASES

Priority Signs

Besides emergency signs, there are priority signs. When any of these signs present, they should be addressed on priority. The *priority signs* in case of a newborn are low birth weight (weight <1,800 g), mild hypothermia (temperature 36.4–36°C), tachypnea, respiratory rate (RR) > 60/min, irritable, restless, jittery, refusal to feed, abdominal distension, severe jaundice, severe pallor, bleeding from any sites, major congenital anomaly, and large baby.

Nonurgent

Nonurgent cases can wait for their turn. These newborns present with physiological jaundice, transitional stools, development peculiarity, minor malformations, and superficial illness.

DANGER SIGNS

There are seven cardinal signs, which have very high sensitivity and specificity toward identifying sick newborns. These newborn signs are for the staff assessing the newborn at the institution level.

These signs are: *(1) Feeding less or not feeding at all, (2) convulsions, (3) high or very low temperature, (4) local infection, (5) no movement or less movement, (6) fast or difficult breathing, and (7) yellow skin.* Let us understand these signs in details and look for them in sick newborn babies.

- *Feeding less or not feeding at all:* This includes those babies who are not able to suck at the breast when the mother tries to put the baby to the breast several times a day over few hours as well as those babies who were feeding well previously but have stopped feeding well now.
- *Convulsions:* These include babies whose arms and legs become stiff or stops breathing and becomes blue or have recurring movement of a part of the body like twitching of the mouth.
- *High or very low temperature:* This includes babies with temperature that is below 36°C as well as temperature that is above 37.5°C.

JAYPEE BROTHERS

- *Local infection:* This includes babies with evidence of infection in the umbilicus, skin and eyes, pus coming out from umbilicus and the eyes and skin boils with pus, or having redness of the skin where the stump is attached.
- *No movement or less movement:* These babies move their bodies only on stimulation otherwise the body does not move at all.
- *Fast and difficult breathing:* Babies having fast breathing, i.e., breathing rate >60/min or difficult breathing in the form of chest indrawing (the lower chest goes in when the newborn is breathing in and upper chest and abdomen moves out).
- *Yellow skin:* A baby who shows yellow skin or face within 24 hours of delivery or develops yellow palms and soles >24 hours of delivery.

CONCLUSION

Triage is an important process to look for danger signs, categorize the newborn baby into one of the three groups, i.e., emergency, priority, and nonurgent, and manage the newborn accordingly. By undertaking this process, early initiation of treatment can be started to those who need early treatment and it will help unusual procedural delays.

SUGGESTED READING

1. Millar KR, Gloor JE, Wellington N, Joubert GI. Early neonatal presentations to the pediatric emergency department. Paediatr Emerg Care. 2000;16(3):145-50.
2. The Standard Treatment Protocol for management of common newborn conditions in small hospitals(adapted from WHO Guidelines).
3. Zupancic JA, Richardson DK. Characterisation of the triage process in neonatal intensive care. Pediatrics. 1998;102(6):1432-6.

JAYPEE BROTHERS

detailed information on nursing books, visit our website www.jaypeebrothers.com, for detailed information on nursing books, visit our website www.jaypee



Manual of Newborn Nursing

Salient Features

- Covers nearly 100 topics
- Contributed by over 80 experts in field of neonatology
- Chapters by Senior and experienced nurses alco covering nursing aspects
- Practical useful tips for examination, common illness, and procedures
- A handy guide for Pediatricians, Neonatal Fellows, Pediatric Residents, Medical Officers, nurses, and Nursing students involved in newborn care of Level I, Level II and Level III
- Latest and updated information.



Naveen Bajaj MD (Ped) DM (Neonatology) is working as Director Neonatology and senior Consultant Neonatologist in Sapling Hospital Ludhiana Punjab. He is currently Chairperson of IAP Neonatology Chapter. He has obtained his neonatology speciality training from Seth GS Medical College and KEM Hospital Mumbai. He is exquisite clinician, good academician, and excellent teacher. He is well known for his involvement in neonatology training program including workshops. He has been a regular invite as faculty in national conferences and workshops. He has been a member of editorial board of many books in the field of neonatology. This book is continuation of his commitment to teaching and training of neonatology students, practicing paediatricians and neonatal nurses.



Rajesh Kumar Senior Consultant Neonatologist, Director, Rani Hospital and Rani Children Hospital, Ranchi. He has graduated MBBS from JIPMER, Pondicherry, completed his MD Pediatrics and DM Neonatology from PGIMER, Chandigarh. He is the recipient of gold medal during in MBBS and best student in MD Pediatrics. He is also the recipient of NNF gold medal (year 2000). He is from the first batch of 3 yrs course of DM Neonatology. After his studies, went back to his home state (Jharkhand) and established the largest tertiary care pediatric hospital in India with largest neonatal unit (in private sector). Over more than 2 decades, Dr Rajesh is extensively involved in knowledge dissemination, advocacy, capacity building, teaching, training, mentoring in one or more ways through CMEs, workshops, and conferences. His passion of neonatology is evident through his publications, paper presentations and chapters in books. He is known for his practical approach for neonatal care and making the neonatal care cost effective.

Printed in India

Available at all medical bookstores
or buy online at www.jaypeebrothers.com

JAYPEE BROTHERS
Medical Publishers (P) Ltd.
EMCA House, 23/23-B, Ansari Road,
Daryaganj, New Delhi - 110 002, INDIA
www.jaypeebrothers.com

Join us on facebook.com/JaypeeMedicalPublishers

ISBN 978-93-5465-929-4