

CASE 4.3

Respiratory Distress Syndrome and
Bronchopulmonary Dysplasia | Level 3

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LEARNING OBJECTIVES

1. Identify the presenting signs and symptoms of respiratory distress syndrome (RDS) and bronchopulmonary dysplasia (BPD) in a premature neonate.
2. Determine risk factors and approaches to prevent RDS and BPD in premature neonates.
3. Recommend treatment regimens for RDS and BPD in a premature neonate.
4. Develop a discharge plan for a patient with BPD including caregiver education.
5. Identify a medication-related problem and develop a plan for resolution of the problem.

CHIEF COMPLAINT: Failed attempts to wean ventilator settings and increased respiratory symptoms

HISTORY OF PRESENT ILLNESS: Patient is a 5-week-old premature male in the NICU with continued respiratory distress. The patient has required mechanical ventilation since birth due to RDS secondary to prematurity. He has failed attempts to wean the ventilator to lower FiO_2 settings and continues to have episodes of increased work of breathing, tachypnea, and retractions despite the use of albuterol. The team would like to transition the patient to continuous positive airway pressure (CPAP) for supplemental oxygen support. The patient recently had increased respiratory secretions for which glycopyrrolate was started 3 days ago. The patient appears to be increasingly edematous over the past week and has decreased urine output.

BIRTH HISTORY: Born at 26 weeks gestation to a G2P2 mother, RDS at birth, and received three doses of poractant alfa 2 mL intratracheal for one dose, then 1 mL for two doses; mother was GBS (-) and did not receive antenatal steroids prior to delivery (vaginal delivery); birth weight 800 g; APGAR at 1, 5, 10, and 15 minutes were 3, 5, 6, and 7

PAST MEDICAL HISTORY: Neonatal RDS at birth treated with surfactant, mechanical ventilation since birth, history of PDA treated with ibuprofen, resolved; completed 4-week course of vitamin A therapy for BPD prevention

PAST SURGICAL HISTORY: None

DEVELOPMENT HISTORY: Patient is premature, reflexes normal for age

SOCIAL HISTORY: Mother—history of illicit drug abuse but was undergoing rehabilitation prior to pregnancy, no noted drug use during this pregnancy; father—unknown

FAMILY HISTORY: Maternal side of family affected by asthma and depression (MGM); unknown history from paternal side

DIET: Similac NeoSure® 22 kcal/30 mL, receiving full enteral feeds at 270 mL (15 mL/hr) as continuous feeds (132 kcal/kg/day)

IMMUNIZATIONS: Awaiting weight to be 2 kg before administering first dose of hepatitis B vaccine

ALLERGIES: NKDA

MEDICATION HISTORY

Medication	Sig	Start Date	End Date	Taking	Authorizing Provider
Poly-Vi-Sol®	1 mL po daily	2 wk ago		Currently taking	Dr. Smith
Glycopyrrolate solution (0.2 mg/mL)	0.15 mg po 4 times daily	3 days ago		Currently taking	Dr. Newbie
Albuterol sulfate 0.083%	1.25 mg nebulized q 6 hr	3 wk ago		Currently taking	Dr. Smith
Dexamethasone	0.38 mg po bid	1 day ago		Currently taking	Dr. Newbie

PHYSICAL EXAM

BP 55/28 mm Hg | Pulse 125 beats per min
Temp 37°C | 35 breaths per min | Wt 1.5 kg
Ht 42 cm | SpO₂ 83%

Ventilator settings: SIMV-PC, PEEP 7 cm
H₂O, PS 10 cm H₂O, PC 17, inspiratory time
0.5 sec, RR 20 breaths per min, FiO₂ 50%

GENERAL APPEARANCE: Alert, increased work of
breathing despite ventilator, appears edema-
tous

EYES: PERRLA, clear

EARS: TM clear, no issues

THROAT: Defer, intubated

NECK: No issues

LUNGS: Course rhonchi noted, diffuse rales and
wheeze on auscultation

HEART: History of PDA, now resolved; most
recent ECHO without evidence of cardiac
hypertrophy or pulmonary HTN; murmur has
been heard intermittently on exam

ABDOMEN: Soft, nontender, nondistended; no
masses felt; no hepatosplenomegaly; positive
bowel sounds

MUSCULOSKELETAL: Warm and well-perfused; no
cyanosis; capillary refill less than 2 seconds;
edema noted in upper and lower extremities

SKIN: No rashes, no petechiae, no purpura

NEUROLOGICAL: Alert, good tone; reflexes appro-
priate for age

LABORATORY DATA

BASIC METABOLIC PANEL		
Component	Value	Range
Glucose	70	60–110 mg/dL
BUN	5	7–17 mg/dL
Sodium	138	137–145 mmol/L
Potassium	3.8	3.6–5.0 mmol/L
Chloride	102	98–107 mmol/L
CO ₂	23	22–30 mmol/L
Anion gap	13	6–16 mmol/L
Creatinine	0.4	0.60–1.00 mg/dL
Calcium	8.6	8.4–10.2 mg/dL
CBC		
WBC count	8.0	5.0–19.0 x 10 ³ /μL
RBC count	3.5	3–5.4 million/μL
Hemoglobin	11	10–18 g/dL
Hematocrit	31	31% to 55%
MCV	90	85–123 fL
MCH	30	28–40 pg
MCHC	32	29–37 g/dL
Platelets	200	150–450 x 10 ³ /μL
CAPILLARY BLOOD GAS		
pO ₂	35	70–95 mm Hg
pCO ₂	42	35–45 mm Hg
pH	7.35	7.35–7.45
Calculated bicarbonate	23.2	16–23 mmol/L
Base deficit	2.4	0–2 mmol/L

BUN = blood urea nitrogen; CBC = complete blood count;
CO₂ = carbon dioxide; MCH = mean corpuscular hemoglobin; MCHC
= mean corpuscular hemoglobin concentration; MCV = mean corpus-
cular volume; pO₂ = partial pressure of oxygen; pCO₂ = partial pres-
sure of carbon dioxide; RBC = red blood cell; WBC = white blood cell.