UC DAVIS HEALTH | CHILDREN'S HOSPITAL

Systemic corticosteroids for prevention and treatment of BPD

Background: Corticosteroids may be used for prevention or treatment of bronchopulmonary dysplasia (BPD) in neonates. Age of the patient and treatment goal(s) should be considered when choosing a regimen.

STEROID	DOSING	CUMULATIVE STEROID DOSE (mg/kg)	WHEN TO USE	REFERENCE	CAUTIONS/ RECOMMENDATIONS
Prophylaxis ("Early"; < 7 days)					
Hydrocortisone	10 day course: 1 mg/kg/day div BID x 7 days, 0.5 mg/kg/day QD x 3 days	8.50	Consider for infants 24-27 6/7 weeks who are at high risk for BPD	Baud, O, et al. 2016. *The Lancet* 387 (10030): 1827-1836.	Do not use with NSAIDs
Early evolving BPD (7-28 days)					
Dexamethasone (low cumulative dose, medium course)	10 day course: 0.15 mg/kg/day x 3 days, 0.10 mg/kg/day x 3 days, 0.05 mg/kg/day x 2 days, 0.02 mg/kg/day x 2 days	0.89	To facilitate extubation in infants < 28 weeks GA	DART	DART protocol facilitated extubation but did not improve survival or oxygen dependence at 36 weeks; sample was not large enough to assess ND outcomes
Dexamethasone (medium cumulative dose, short course)	7 day course: 0.5 mg/kg/day x 3 days, 0.25 mg/kg/day x 3 days, 0.10 mg/kg/day x 1 day	2.35	Infants 24-32 weeks GA who are still intubated DOL 7-14 (for prevention of BPD)	Durand, M. et al. 1995. *Pediatrics* 95 (4): 584–90.	
Dexamethasone (high cumulative dose, medium course)	14 day course: 0.5 mg/kg/day x 6 days, 0.25 mg/kg/day x 6 days, 0.125 mg/kg/day x 2 days	4.75	Preterm infants who are at high risk for BPD and still intubated on DOL 10 (for prevention of BPD)	Romagnoli, C, et al. 1997. Rivista italiana di pediatria (The Italian journal of pediatrics), no. 24: 283–88; Romagnoli, C, et al. 2002. Archives of Disease in Childhood. Fetal and Neonatal Edition 87 (1): F55–58.	Original paper is in Italian
Dexamethasone (high cumulative dose, long course)	42 day course: 0.5 mg/kg/day x 3 days, 0.3 mg/kg/day x 3 days, reduce dose by 10% every 3 days until day 34 (0.1 mg/kg/day), 0.1 mg/kg/day x 3 days, 0.1 mg/kg on alternate days for 1 week	7.98	Infants < 30 weeks GA who are still intubated DOL 12-21 (for prevention of BPD)	Kothadia, JM, et al. 1999. *Pediatrics* 104 (1 Pt 1): 22–27; Marr, BL, et al. 2019. The Journal of Pediatrics 211 (August): 20–26.e1.	

STEROID	DOSING	CUMULATIVE STEROID DOSE (mg/kg)	WHEN TO USE	REFERENCE	CAUTIONS/ RECOMMENDATIONS
Late evolving BPD (> 28 days to 36 weeks PMA)					
Dexamethasone	9 day course: 0.2 mg/kg/day div q12h x 3 days, 0.1 mg/kg/day div q12h x 3 days, 0.05 mg/kg/day div q12h x 3 days	1.05	To facilitate extubation in infants < 28 weeks GA	Alan Jobe; Nath, S, et al. 2020. American Journal of Perinatology 37 (14): 1425–31.	Limited data for dosing in this age group
Established BPD (> 36 weeks PMA)					
Prednisolone (short course)	5-11 days: 2 mg/kg/day div BID x 5-7 days (up to 11 days may be considered)	10-14 (possibly up to 22)	NICU babies still requiring HFNC or greater		More likely to be helpful in patients with PSS* < 0.5, pCO_2 < 48 mmHg
Prednisolone (medium course)	14 day course: 2 mg/kg/day div BID x 5 days, 1 mg/kg/day QD x 3 days, 1 mg/kg/day QoD x 3 doses	16	NICU babies still requiring HFNC or greater	Bhandari, A, et al. 2008. *Pediatrics* 121 (2): e344–49.	
Prednisolone (long course)	28+ day course: 2 mg/kg/day x 7 days, 1 mg/kg/day QD x 7 days, 0.5 mg/kg/day QD x 7 days, 0.5 mg/kg/day 3x/week x 7 days (can go back to previous dose ONCE, then continue wean)	Variable	NICU babies still requiring HFNC or greater and require escalation of respiratory support	Linafelter, A, et al. 2019. *Early Human Development* 136 (September): 1–6.	

***Pulmonary Severity Score (PSS) = [FiO_2 (or "effective" FiO_2, if on nasal cannula) x Support score] + Medication score**

Support score
2.5 for ventilator
1.5 for CPAP/BiPAP
1.0 for nasal cannula or none

Medication score (sum)
0.2 for systemic steroids given for treatment of BPD
0.10 each for regular diuretics or inhaled steroids
0.05 each for methylxanthines or intermittent diuretics

References

Table adapted from:

Htun, ZT, et al. 2021. "Postnatal Steroid Management in Preterm Infants with Evolving Bronchopulmonary Dysplasia." *Journal of Perinatology* 41 (8): 1783–96.

Other references:

Baud, O, et al. 2016. “Effect of early low-dose hydrocortisone on survival without bronchopulmonary dysplasia in extremely preterm infants (PREMILOC): a double-blind, placebo-controlled, multicentre, randomised trial.” *The Lancet* 387 (10030): 1827-1836.

Doyle, LW, et al. 2005. “Impact of Postnatal Systemic Corticosteroids on Mortality and Cerebral Palsy in Preterm Infants: Effect Modification by Risk for Chronic Lung Disease.” *Pediatrics* 115 (3): 655–61.

Doyle, LW, et al. 2021. “Early (< 7 Days) Systemic Postnatal Corticosteroids for Prevention of Bronchopulmonary Dysplasia in Preterm Infants.” *Cochrane Database of Systematic Reviews* 10 (10): CD001146.

Doyle, LW, et al. 2021. “Late (≥ 7 Days) Systemic Postnatal Corticosteroids for Prevention of Bronchopulmonary Dysplasia in Preterm Infants.” *Cochrane Database of Systematic Reviews* 11 (11): CD001145.

Madan, A, et al. 2005. “A pulmonary score for assessing the severity of neonatal chronic lung disease.” *Pediatrics* 115 (4): e450-e457.

Onland, W, et al. 2023. “Systemic Corticosteroid Regimens for Prevention of Bronchopulmonary Dysplasia in Preterm Infants.” *Cochrane Database of Systematic Reviews* 3 (3): CD010941.

Ramaswamy, VV, et al. 2021. “Assessment of Postnatal Corticosteroids for the Prevention of Bronchopulmonary Dysplasia in Preterm Neonates: A Systematic Review and Network Meta-Analysis.” *JAMA Pediatrics* 175 (6): e206826.

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