One Hundred Useful References in Pediatric Cardiac Intensive Care

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(in alphabetical order)

1. Adatia I.
Recent advances in pulmonary vascular disease.
Curr Opin Pediatr. 2002 Jun; 14(3): 292-7.
A review of recent advances in pulmonary vascular disease covering the genetics of primary pulmonary hypertension, histology of familial, sporadic, and Eisenmenger vasculopathy, and vasoactive mediators and pharmacologic treatments such as prostacyclin, nitric oxide, sildenafil and endothelin receptor blockade.

2. Akhtar N, Ni J, Stromberg D, Rosenthal GL, Bowles NE, Towbin JA.
Tracheal aspirate as a substrate for polymerase chain reaction detection of viral genome in childhood pneumonia and myocarditis.
Circulation. 1999 Apr 20; 99(15): 2011-8.
This study demonstrated the use of polymerase chain reaction on tracheal aspirates from 32 patients to be a rapid and sensitive diagnostic tool in cases of viral pneumonia with or without myocarditis in both DNA viruses (such as adenovirus, cytomegalovirus, herpes simple virus, and EBV) as well as RNA viruses (enterovirus, influenza A and B, and RSV).

3. Anand KJS, Hickey PR.
Pain and its effects in the human neonate and fetus.
New Engl J Med 1987 Nov; 317(21):1321-9.
This review provides background information on the developmental aspects of pain perception and the physiologic (cardiorespiratory, hormonal, and metabolic) and behavioral changes associated with pain in neonates.

4. Andropoulos DB, Stayer SA, Diaz LK, Ramamoorthy C.
Neurological monitoring for congenital heart surgery.
Anesth Analg 2004 Nov; 99(5): 1365-75.
A review of causes of neurological complications after cardiac surgery as well as neurological monitoring devices such as near-infrared cerebral oximetry and transcranial Doppler ultrasound.

5. Atz AM, Adatia I, Wessel DL.
Rebound pulmonary hypertension after inhalation of nitric oxide.
Ann Thorac Surg. 1996 Dec; 62(6):1759-64.
This study described the hemodynamic response to initiation and withdrawal of inhaled nitric oxide in 9 infants after total anomalous pulmonary venous connection repair and showed a decrease in mean pulmonary artery pressure (from 35.6 to 23.7 mmHg), but all infants had a rebound pulmonary hypertension upon cessation of therapy that dissipated within 60 minutes.

6. Barnea O, Austin EH, Richman B, Santamore WP.
Balancing the circulation: theoretic optimization of pulmonary/systemic flow ratio in hypoplastic left heart syndrome.
J Am Coll Cardiol 1994 Nov; 24(5):1376-81.
This study uses mathematical models to study the effects of varying the systemic and pulmonary blood flows and Qp/Qs ratio with several key findings that are useful for clinical practice in the cardiac intensive care setting.

7. Bayer AS, Bolger AF, Taubert KA, Wilson W, Steckelberg J, Karchmer AW, Levison M, Chambers HF, Dajani AS, Gewitz MH, Newburger JW, Gerber MA, Shulman ST, Pallasch TJ, Gage TW, Ferrieri P.
Diagnosis and management of infective endocarditis and its complications.
Circulation. 1998 Dec 22-29; 98(25): 2936-48.
A review of infective endocarditis covers aspects of diagnosis (Duke criteria and echocardiography) as well as management issues such as unusually encountered organisms, congestive heart failure, risk of embolization, periannular extension of infection, splenic abscess, and mycotic aneurysms.

8. Bellinger DC, Jonas RA, Rappaport LA, Wypij D, Wernovsky G, Kuban KC, Barnes PD, Holmes GL, Hickey PR, Strand RD.
Developmental and neurologic status of children after heart surgery with hypothermic circulatory arrest or low-flow cardiopulmonary bypass.
N Engl J Med. 1995 Mar 2; 332(9): 549-55.
This study of 155 neonates randomized to either circulatory arrest of low flow bypass showed that those assigned to circulatory arrest had a lower mean score on the Psychomotor Development Index of the Bayley Scales of Infant Development (a 6.4 point deficit) and that perioperative EEG seizure activity was also associated with a lower score.

9. Booker PD.
Pharmacological support for children with myocardial dysfunction. Paediatr Anaesth. 2002 Jan; 12(1): 5-25.
This reviews emphasizes the developmental aspects of adrenergic receptor physiology and catecholamine response in myocardial dysfunction, and also discusses the prevention and treatment of catecholamine desensitization.

10. Bradley SM, Simsic JM, Mulvihill DM.
Hypoventilation improves oxygenation after bidirectional superior cavopulmonary connection.
J Thorac Cardiovasc Surg. 2003 Oct; 126(4): 1033-9.
This study in 15 infants who underwent bidirectional cavopulmonary anastomosis showed that hypoventilation (mean PCO2 of 58 mmHg) increased both arterial PO2 (from 50 to 61 mmHg) as well as systemic oxygen saturation (from 86 to 90%) and also increased cerebral blood flow (increased blood flow velocity and decreased arteriovenous oxygen saturation difference across the upper body); this maneuver led to only a small increase in transpulmonary gradient (from 6 to 8 mmHg).

11. Bridges ND, Mayer JE Jr, Lock JE, Jonas RA, Hanley FL, Keane JF, Perry SB, Castaneda AR.
Effect of baffle fenestration on outcome of the modified Fontan operation.
Circulation. 1992 Dec; 86(6): 1762-9.
This study assessed the effect of baffle fenestration on outcome in 91 patients (vs 56 who did not have fenestrations) and showed that durations of pleural effusions and hospitalization were shorter and systemic venous pressures were lower (12.6 vs 14.3 mmHg) with the fenestration group despite having significantly higher preoperative risks.

12. Brown KL, Ridout DA, Goldman AP, Hoskote A, Penny DJ.
Risk factors for long intensive care unit stay after cardiopulmonary bypass in children.
Crit Care Med. 2003 Jan; 31(1): 28-33.
This study of 355 patients after cardiac surgery showed that a model combining all factors identified preoperative mechanical ventilation, neonatal status, major medical problems, operative complexity, cardiopulmonary bypass time, and a postoperative complication score as independently associated with a longer length of stay in the intensive care unit.

13. Burns JP.
Research in children.
Crit Care Med. 2003 Mar; 31(3 Suppl): S131-6.
This is a review of pertinent issues in pediatric research include research protection, current code of federal regulations, parental permission and assent, and the recent initiative such as the best pharmaceuticals for children act and the PALISI (pediatric acute lung injury and sepsis investigators) network.

14. Carabello BA, Crawford FA Jr.
Valvular heart disease.
N Engl J Med. 1997 Jul 3; 337(1): 32-41.
This review elucidates the pathophysiology of common valvular heart diseases (aortic and mitral stenosis and aortic and mitral regurgitation) that emphasizes the stages of disease and timing of intervention.

15. Chang AC.
How to start and sustain a successful pediatric cardiac intensive care program: A combined clinical and administrative strategy.
Pediatr Crit Care Med. 2002 Apr; 3(2): 107-111.
This guideline reviews the key clinical and administrative factors (such as philosophy and strategy, leadership and personnel, facility and equipment, operations and management, patients and families, and education and research) that provide the underpinnings of a successful cardiac intensive care program.

16. Chang AC, Zucker HA, Hickey PR, Wessel DL.
Pulmonary vascular resistance in infants after cardiac surgery: role of carbon dioxide and hydrogen ion.
Crit Care Med. 1995 Mar; 23(3): 568-74.
This is a clinical investigation to define the roles of carbon dioxide and hydrogen ion in pulmonary vascular resistance and demonstrated that increasing arterial pH with administration of sodium bicarbonate lowered pulmonary arterial pressure and increased cardiac output, thus lowering pulmonary vascular resistance (from 6.0 to 3.1 U·M2).

17. Chang AC, McKenzie ED.
Mechanical cardiopulmonary support in children and young adults: extracorporeal membrane oxygenation, ventricular assist devices, and long term support devices.
Pediatric Cardiology (in press).
This review covers medical and surgical principles of mechanical support in children and young adults, including acute devices such as extracorporeal membrane oxygenation and ventricular assist devices as well as long term support devices (such as the pulsatile ventricular assist devices and the new generation of axial type ventricular assist devices).

18. Charpie JR, Dekeon MK, Goldberg CS, Mosca RS, Bove EL, Kulik TJ.
Serial blood lactate measurements predict early outcome after neonatal repair or palliation for complex congenital heart disease.
J Thorac Cardiovasc Surg. 2000 Jul; 120(1): 73-80.
This prospective study of 46 neonates who had complex cardiac surgery showed that patients with poor outcome had a greater initial mean lactate level (9.4 vs 5.6 mmol/L) and a rise in serum lactate level of $\geq$ 0.75 mmol/L per hour was associated with a poor outcome.

19. Chaturvedi RR, Lincoln C, Gothard JW, Scallan MH, White PA, Redington AN, Shore DF.
Left ventricular dysfunction after open repair of simple congenital heart defects in infants and children: quantitation with the use of a conductance catheter immediately after bypass.
J Thorac Cardiovasc Surg. 1998 Jan; 115(1): 77-83.
This clinical study of load-independent indices of left ventricular function (using conductance catheters) in 16 children after simple cardiac surgery showed a 40.7% decrease in end-systolic elastances, thus demonstrating a deterioration in systolic function.

20. Cheung YF, Penny DJ, Redington AN.
Serial assessment of left ventricular diastolic function after Fontan procedure.
Heart. 2000 Apr; 83(4): 420-4.
This prospective Doppler study in 13 patients early and late after Fontan procedure showed reduction of left ventricular compliance and persisting abnormalities of relaxation.

21. Cullen S, Shore D, Redington A.
Characterization of right ventricular diastolic performance after complete repair of tetralogy of Fallot. Restrictive physiology predicts slow postoperative recovery.
Circulation. 1995 Mar 15; 91(6): 1782-9.
This prospective Doppler study in 35 patients after repair for tetralogy of Fallot showed that 17/35 patients demonstrated restrictive RV physiology characterized by pulmonary arterial antegrade flow during diastole, and this flow was abolished or greatly diminished during the inspiratory phase.

22. de Leeuw M, Williams JM, Freedom RM, Williams WG, Shemie SD, McCrindle BW.
Impact of diaphragmatic paralysis after cardiothoracic surgery in children.
J Thorac Cardiovasc Surg. 1999 Sep; 118(3): 510-7.
This retrospective study of 160 children who had diaphragmatic paralysis after cardiac surgery (incidence of 1.6%) showed smaller patients with bilateral hemidiaphragmatic paralysis requiring mechanical ventilation may represent a higher risk subgroup.

23. Duncan BW, Bohn DJ, Atz AM, French JW, Laussen PC, Wessel DL.
Mechanical circulatory support for the treatment of children with acute fulminant myocarditis.
J Thorac Cardiovasc Surg. 2001 Sep; 122(3): 440-8.
This is a retrospective review of 15 patients with viral myocarditis who were supported with ECMO or VAD revealed 12/15 patients (80%) survived (including 5/6 who were bridged to transplantation).

24. Fleming F, Bohn D, Edwards H, Cox P, Geary D, McCrindle BW, Williams WG.
Renal replacement therapy after repair of congenital heart disease in children. A comparison of hemofiltration and peritoneal dialysis.
J Thorac Cardiovasc Surg. 1995 Feb; 109(2): 322-31.
This is a retrospective review of renal replacement strategy and results in 34 children after cardiac surgery that showed that both arteriovenous and venovenous hemofiltration was more advantageous than peritoneal dialysis in achieving negative fluid balance, increasing nutritional support, or lowering serum urea or creatinine.

25. Flori HR, Johnson LD, Hanley FL, Fineman JR.
Transthoracic intracardiac catheters in pediatric patients recovering from congenital heart defect surgery: associated complications and outcomes.
Crit Care Med 2000 Aug; 28(8): 2997-3001.
This is a descriptive study of 523 intracardiac catheters that revealed younger age (< 3 months), catheter location (left atrial and pulmonary artery), and platelet count of < 50,000 were identified as risk factors after multivariate logistic regression analysis.

26. Fogel MA, Durning S, Wernovsky G, Pollock AN, Gaynor JW, Nicolson S.
Brain versus lung: hierarchy of feedback loops in single-ventricle patients with superior cavopulmonary connection.
Circulation. 2004 Sep 14; 110(11 Suppl 1): II147-52.
This MRI velocity mapping study of 12 infants after bidirectional cavopulmonary anastomosis showed that with hypercarbia, flow to the brain and lungs increased (from 1.5 to 2.7 L/min/M2), PO2 improved (from 48 to 60 mmHg), and cardiac index increased (from 4.3 to 5.4 L/min/M2), all indicating that cerebral feedback loop overrides the pulmonary control system.

27. Goldman AP, Delius RE, Deanfield JE, Miller OI, de Leval MR, Sigston PE, Macrae DJ.
Pharmacological control of pulmonary blood flow with inhaled nitric oxide after the fenestrated Fontan operation.
Circulation. 1996 Nov 1; 94(9 Suppl): II44-8.
This is a clinical study of 10 consecutive children who had SaO2 ≤ 85% after the Fontan operation showed an increase in SaO2 (from 64 to 82%) and a concomitant decrease in transpulmonary gradient (from 12.2 to 9.6 mmHg) after 15 minutes of inhaled nitric oxide at 20 ppm.

28. Goldman AP, Tasker RC, Hosiasson S, Henrichsen T, Macrae DJ.
Early response to inhaled nitric oxide and its relationship to outcome in children with severe hypoxemic respiratory failure.
Chest. 1997 Sep; 112(3): 752-8.
A retrospective study of 30 children with severe acute hypoxemic respiratory failure (mean alveolar arterial oxygen gradient of 568 mmHg with an oxygenation index of 41) that showed a significant association between early response to inhaled nitric oxide and patient outcome (while all 6 patients who had < 15% improvement in oxygen index died, 8/13 who had a > 30% improvement in oxygen index survived).

29. Goldstein DJ.
Worldwide experience with the MicroMed DeBakey Ventricular Assist Device as a bridge to transplantation.
Circulation. 2003 Sep 9; 108 Suppl 1: II272-7.
This is the international experience of the implantable MicroMed DeBakey ventricular assist device in 150 patients (mean support time of 75 days) with linearized rates of events/patient-year of 2.03 for reoperation, 0.61 for thromboembolic event, and 0.62 for pump thrombosis but only 0.16 for infection and 0.13 for pump failure.

30. Harrison AM, Davis S, Eggleston S, Cunningham R, Mee RB, Bokesch PM.
Serum creatinine and estimated creatinine clearance do not predict perioperatively measured creatinine clearance in neonates undergoing congenital heart surgery.
Pediatr Crit Care Med. 2003 Jan; 4(1): 55-9.
This is a prospective trial of 24 neonates demonstrated that serum creatinine, urine output, and the Schwartz formula are not predictive of creatinine clearance and that this needs to be considered when potentially nephrotoxic agents are administered.

31. Hoffman TM, Wernovsky G, Atz AM, Kulik TJ, Nelson DP, Chang AC, Bailey JM, Akbary A, Kocsis JF, Kaczmarek R, Spray TL, Wessel DL.
Efficacy and safety of milrinone in preventing low cardiac output syndrome in infants and children after corrective surgery for congenital heart disease.
Circulation. 2003 Feb 25; 107(7): 996-1002.
This double blind, placebo-controlled, multicenter study of 227 children after cardiac surgery demonstrated a 64% risk reduction of low cardiac output syndrome with prophylactic use of high dose milrinone (0.75 ug/kg/minute)(11.7 vs 25.9% in the placebo group).

32. Hoskote A, Li J, Hickey C, Erickson S, Van Arsdell G, Stephens D, Holtby H, Bohn D, Adatia I.
The effects of carbon dioxide on oxygenation and systemic, cerebral, and pulmonary vascular hemodynamics after the bidirectional superior cavopulmonary anastomosis.
J Am Coll Cardiol. 2004 Oct 6; 44(7): 1501-9.
This study of 9 infants after bidirectional cavopulmonary anastomosis using inspired CO2 showed that arterial oxygen tension increased (from 36 to 44 and 50 mmHg) at PaCO2 of 35, 45, and 55 mmHg, and this increased oxygenation was accompanied by increased Qp and cerebral blood flow.

33. Hovels-Gurich HH, Vazquez-Jiminez JF, Silvestri A, Schumacher K, Minkenberg R, Duchateau J, Messmer BJ, von Bernuth G, Seghaye MC.
Production of proinflammatory cytokines and myocardial dysfunction after arterial switch operation in neonates with transposition of the great arteries.
J Thorac Cardiovasc Surg 2002; 124:811-20.
This is a study of 63 neonates with transposition of the great arteries who had the arterial switch operation with patients who died had significantly higher cardiac troponin T blood levels as well as higher interleukin 6 and 8 levels.

34. Humbert M, Sitbon O, Simonneau G.
Treatment of pulmonary arterial hypertension.
N Engl J Med. 2004 Sep 30;351(14):1425-36.
This is a review of the state of the art in pulmonary hypertension, with an emphasis on therapeutic strategies, such as calcium channel blockers, prostacyclin therapy (intravenous prostacyclin, subcutaneous treprostinil, oral beraprost, and inhaled iloprost), and endothelin receptor antagonists, and future therapies.

35. Khambadkone S, Li J, de Leval MR, Cullen S, Deanfield JE, Redington AN.
Basal pulmonary vascular resistance and nitric oxide responsiveness late after Fontan-type operation.
Circulation. 2003 Jul 1; 107(25): 3204-8.
This is a study of 15 Fontan patients (at a median of 9 years after the Fontan operation) showed a fall in PVRI (from 2.2 to 1.6 $WU \cdot M^2$) in response to 20 ppm of inhaled nitric oxide for 10 minutes, thus suggesting endothelial dysfunction secondary to altered flow characteristics.

36. Khongphatthanayothin A, Wong PC, Samara Y, Newth CJ, Wells WJ, Starnes VA, Chang AC.
Impact of respiratory syncytial virus infection on surgery for congenital heart disease: postoperative course and outcome.
Crit Care Med. 1999 Sep; 27(9): 1974-81.
This retrospective study of 25 children with congenital heart disease who had cardiac surgery within 6 months of RSV infection showed higher morbidity and mortality and longer postoperative ventilatory support (10.5 vs 1.2 days) in patients who had cardiac surgery during the same admission as the RSV infection (vs those who had surgery electively after RSV infection).

37. Krauss B, Green SM.
Sedation and analgesia for procedures in children.
N Engl J Med. 2000 Mar 30; 342(13): 938-45.
This is a review of terminology and guidelines of sedation and issues of patient care before and after the procedure with a pharmacopeia that includes sedative-hypnotic agents, analgesic agents, and reversal agents.

38. Landzberg MJ, Murphy DJ Jr, Davidson WR Jr, Jarcho JA, Krumholz HM, Mayer JE Jr, Mee RB, Sahn DJ, Van Hare GF, Webb GD, Williams RG.
Task force 4: organization of delivery systems for adults with congenital heart disease.
J Am Coll Cardiol. 2001 Apr; 37(5): 1187-93.
This is a review of a proposed structure of the health care delivery system for adults with congenital heart disease with a set of recommendations.

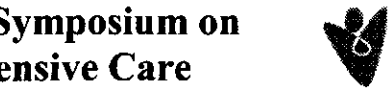
39. Laussen PC.
Neonates with congenital heart disease.
Curr Opin Pediatr. 2001 Jun; 13(3): 220-6.
A review of pertinent issues of the neonate with congenital heart disease covering topics such as prematurity and low birth weight, hypoplastic left heart syndrome, necrotizing enterocolitis, cardiopulmonary bypass inflammatory response, systemic perfusion, hypomagnesemia, neurologic injury, myocardial injury, and mechanical support after cardiotomy.

40. Li J, Bush A, Schulze-Neick I, Penny DJ, Redington AN, Shekerdemian LS.
Measured versus estimated oxygen consumption in ventilated patients with congenital heart disease: the validity of predictive equations.
Crit Care Med. 2003 Apr; 31(4): 1235-40.
This is a prospective study of 126 patients with congenital heart disease in both the catheterization laboratory and the intensive care unit using respiratory mass spectrometry that concluded poor agreement between measure values and accepted four predictive equations published.

41. Liu PP, Mason JW.
Advances in the understanding of myocarditis.
Circulation. 2001 Aug 28; 104(9): 1076-82.
A review of myocarditis with emphasis of this disease as a three phase process: viral infection, autoimmunity, and dilated cardiomyopathy and with treatment strategies directed at each of the three phases.

42. Luciani GB, Nichani S, Chang AC, Wells WJ, Newth CJ, Starnes VA.
Continuous versus intermittent furosemide infusion in critically ill infants after open-heart operations.
Ann Thorac Surg. 1997 Oct; 64(4): 1133-9.
This prospective, randomized study in 26 infants comparing continuous vs intermittent furosemide infusion demonstrated that continuous infusion of furosemide resulted in higher urinary output per dose of drug (1.0 vs 0.5 mL/kg/hour per mg) and lower fluid replacement needs.

43. Mahle WT, Spray TL, Wernovsky G, Gaynor JW, Clark BJ 3rd.
Survival after reconstructive surgery for hypoplastic left heart syndrome: A 15-year experience from a single institution.
Circulation. 2000 Nov 7; 102(19 Suppl 3): III136-41.
This is a retrospective review of the 15-year experience that involved follow-up of 840 patients and that showed a 39% survival of this cohort at 15 years with improved early and intermediate term survival in the recent era (66% three-year survival).



44. Mahle WT, Tavani F, Zimmerman RA, Nicolson SC, Galli KK, Gaynor JW, Clancy RR, Montenegro LM, Spray TL, Chiavacci RM, Wernovsky G, Kurth CD.
An MRI study of neurological injury before and after congenital heart surgery.
Circulation. 2002 Sep 24; 106(12 Suppl 1): I109-14.
This is a prospective study of a cohort of neonates undergoing open-heart surgery that revealed mild ischemic lesions (primarily in the form of periventricular leukomalacia) in > 50% of neonates postoperatively, but that these lesions resolved commonly 4 to 6 months after surgery.

45. Main E, Elliott MJ, Schindler M, Stocks J.
Effect of delayed sternal closure after cardiac surgery on respiratory function in ventilated infants.
Crit Care Med. 2001 Sep; 29(9): 1798-802.
This clinical investigation demonstrated that respiratory compliance decreased by a mean of 19% after delayed sternal closure in infants after cardiac surgery.

46. Macrae DJ, Field D, Mercier JC, Moller J, Stiris T, Biban P, Cornick P, Goldman A, Gothberg S, Gustafsson LE, Hammer J, Lonnqvist PA, Sanchez-Luna M, Sedin G, Subhedar N.
Inhaled nitric oxide therapy in neonates and children: reaching a European consensus.
Intensive Care Med. 2004 Mar; 30(3): 372-80.
This guideline formulated by a panel of European experts in the use of inhaled nitric oxide noted that few randomized control trials in children with congenital heart disease have been performed but hopefully will be pursued to encourage evidence-based practice.

47. McCarthy RE 3rd, Boehmer JP, Hruban RH, Hutchins GM, Kasper EK, Hare JM, Baughman KL.
Long-term outcome of fulminant myocarditis as compared with acute (nonfulminant) myocarditis.
N Engl J Med. 2000 Mar 9; 342(10): 690-5.
This adult study demonstrated excellent long-term prognosis in patients with fulminant myocarditis (93% 11-year survival compared to 45% in acute myocarditis) and therefore provided the basis for the notion of aggressive hemodynamic support in these critically ill patients.

48. McElhinney DB, Hedrick HL, Bush DM, Pereira GR, Stafford PW, Gaynor JW, Spray TL, Wernovsky G.
Necrotizing enterocolitis in neonates with congenital heart disease: risk factors and outcomes.
Pediatrics. 2000 Nov; 106(5): 1080-7.
This study revealed an overall necrotizing enterocolitis incidence of 3.3% in neonates with congenital heart disease, with elevated risk in hypoplastic left heart syndrome and truncus arteriosus (odd ratios of 3.8 and 6.3, respectively) as well as factors such as prematurity, and low cardiac output or clinical shock.

49. McElhinney DB, Reddy VM, Hanley FL, Moore P.
Systemic venous collateral channels causing desaturation after bidirectional cavopulmonary anastomosis: evaluation and management. J Am Coll Cardiol. 1997 Sep; 30(3): 817-24.
The authors concluded from postoperative angiography in patients after bidirectional cavopulmonary anastomosis that 33% of the study patients had systemic venous collateral channels with majority (80%) of these originating from the brachiocephalic vein or its junction with the superior vena cava and over half of these collaterals draining below the diaphragm (interestingly, the patients with collaterals had higher transpulmonary gradients immediately after surgery).

50. Meyer FJ, Schoene AM, Borst MM.
Pathophysiological aspects of cardiopulmonary interaction.
Clin Nephrol. 2003 Jul; 60 Suppl 1: S75-80.
A review of the pathophysiological aspects of cardiopulmonary interaction in adults but its topics (pulmonary circulation and right ventricular function in left heart failure, pulmonary mechanics in left heart failure, and left ventricular function in cor pulmonale) are useful for pediatric patients as well.

51. Michelakis ED, Reeve HL, Huang JM, Tolarova S, Nelson DP, Weir EK, Archer SL.
Potassium channel diversity in vascular smooth muscle cells.
Can J Physiol Pharmacol. 1997 Jul; 75(7): 889-97.
This molecular biology-based paper elegantly elucidates the mechanisms of vascular tone regulation based on differential expression of cell phenotype of cytoskeletal and contractile proteins as well as heterogeneity of number and activity of key potassium channel subtypes (K_{Ca}, K_{ATP}, etc).

52. Migliavacca F, Pennati G, Dubini G, Fumero R, Pietrabissa R, Urcelay G, Bove EL, Hsia TY, de Leval MR.
Modeling of the Norwood circulation: effects of shunt size, vascular resistances, and heart rate.
Am J Physiol Heart Circ Physiol. 2001 May; 280(5): H2076-86.
This study uses a computational model of the Norwood circulation (constructed on the basis of compartmental analysis) and showed: larger shunts decreased oxygen delivery, systemic (rather than pulmonary) vascular resistance exerted more effect on hemodynamics, systemic arterial oxygenation was minimally influenced by heart rate, better correlation was found between venous (rather than arterial) O2 saturation and oxygen delivery, and pulmonary-to-systemic shunt of 1.0 resulted in optimal oxygen delivery.

53. Miller OI, Tang SF, Keech A, Pigott NB, Beller E, Celermajer DS.
Inhaled nitric oxide and prevention of pulmonary hypertension after congenital heart surgery: a randomized double-blind study.
Lancet. 2000 Oct 28; 356(9240): 1464-9.
This study randomized 124 infants with high shunt flow lesions (median age of 3 months) to either low dose nitric oxide or placebo and demonstrated that routine use of nitric oxide resulted in fewer pulmonary hypertensive crises and shortened postoperative course (time to extubation 87 vs 117 hours) without incurring toxicity.

54. Morris MC, Ittenbach RF, Godinez RI, Portnoy JD, Tabbutt S, Hanna BD, Hoffman TM, Gaynor JW, Connelly JT, Helfaer MA, Spray TL, Wernovsky G.
Risk factors for mortality in 137 pediatric cardiac intensive care unit patients managed with extracorporeal membrane oxygenation.
Crit Care Med. 2004 Apr; 32(4): 1091-2.
This recent large retrospective review of 137 patients managed with ECMO in the pediatric cardiac intensive care unit showed a survival to discharge of 39% with risk factors in postoperative patients include male gender, patients < 1 month of age, patients with a longer duration of mechanical ventilation before initiation of ECMO, and patients who developed renal or hepatic failure while on ECMO (but not single ventricle physiology).

55. Mou SS, Giroir BP, Molitor-Kirsch EA, Leonard SR, Nikaidoh H, Nizzi F, Town DA, Roy LC, Scott W, Stromberg D.
Fresh whole blood versus reconstituted blood for pump priming in heart surgery in infants.
N Engl J Med. 2004 Oct 14; 351(16): 1635-44.
This single center, randomized, double-blind, controlled trial in infants undergoing cardiac surgery showed that the use of whole blood (vs reconstituted blood) for bypass circuit priming not only conferred no advantages (chest tube output, blood product transfusion requirements, levels of serum mediators of inflammation such as IL-6 and C3a, and cardiac troponin I) but was associated with an increased length of ICU stay (97 vs 70.5 hours) and increased perioperative fluid overload (28.8 vs -6.9 mL/kg).

56. Mou SS, Haudek SB, Lequier L, Pena O, Leonard S, Nikaidoh H, Giroir BP, Stromberg D.
Myocardial inflammatory activation in children with congenital heart disease.
Crit Care Med. 2002 Apr; 30(4): 827-32.
This prospective observational study in children with congenital heart disease with examination of myocardial samples obtained intraoperatively demonstrated nuclear translocation of nuclear factor-κB activation in 60% of study patients, thus suggesting myocardial inflammatory cascade contributing to the pathophysiology of congenital heart disease.

57. Nelson DP, Schwartz SM, Chang AC.
Neonatal physiology of the functionally univentricular heart.
Cardiol Young. 2004 Feb; 14 Supl 1: 52-60.
This is a review of preoperative and postoperative anatomy and physiology of the neonate with functional single ventricle with emphasis on ICU management to maximize systemic oxygen delivery.

58. Penny DJ.
The basics of ventricular function.
Cardiol Young. 1999 Mar; 9(2): 210-23.
This is a review of ventricular function as well as systolic and diastolic performance that highlights the role of the ventricle in overall cardiovascular and metabolic homeostasis.

59. Penny DJ, Rigby ML, Redington AN.
Abnormal patterns of intraventricular flow and diastolic filling after the Fontan operation: evidence for incoordinate ventricular wall motion.
Br Heart J. 1991 Nov; 66(5): 375-8.
This is a prospective Doppler echocardiographic study that showed significantly longer isovolumic relaxation times in patients after the Fontan operation (93.8 vs 55.2 msec in control patients) with 80% of these patients also having intraventricular flow during Isovolumic relaxation, thus indicating an incoordinate ventricular relaxation that may have implications for ventricular diastolic filling, pulmonary blood flow, and cardiac output.

60. Perry JC, Fenrich AL, Hulse JE, Triedman JK, Friedman RA, Lamberti J.
Pediatric use of intravenous amiodarone: efficacy and safety in critically ill patients from a multicenter protocol.
J Am Coll Cardiol 1996; 27:1246-50.
This is a multicenter study of 40 patients with various tachyarrhythmias who failed standard therapy and with majority who responded to therapy with intravenous amiodarone (mean loading dose of 6.3 mg/kg and a continuous infusion if necessary).

61. Penny DJ, Sano T, Smolich JJ.
Increased systemic oxygen consumption offsets improved oxygen delivery during dobutamine infusion in newborn lambs.
Intensive Care Med. 2001 Sep; 27(9): 1518-25.
This animal study examined the systemic oxygen consumption and delivery interrelationship of dobutamine and concluded that the thermogenic effect of dobutamine exhibited via a substantial rise in oxygen consumption utilized most of the associated increase in oxygen delivery and was 7-12 fold greater in younger animals.

62. Ramamoorthy C, Tabbutt S, Kurth CD, Steven JM, Montenegro LM, Durning S, Wernovsky G, Gaynor JW, Spray TL, Nicolson SC.
Effects of inspired hypoxic and hypercapnic gas mixtures on cerebral oxygen saturation in neonates with univentricular heart defects. Anesthesiology. 2002 Feb; 96(2): 283-8.
This randomized crossover trial study of neonates with single ventricle physiology examined the effects of 17% inspired oxygen vs 3% inspired carbon dioxide and demonstrated that while 3% inspired carbon dioxide improved cerebral oxygenation (from 56 to 68%) and raised mean arterial pressure (from 45 to 50 mmHg), 17% inspired oxygen had no effects.

63. Ravishankar C, Tabbutt S, Wernovsky G.
Critical care in cardiovascular medicine.
Curr Opin Pediatr. 2003 Oct; 15(5): 443-53.
This review article covers topics such as advances in intraoperative care, assessment of cardiac output via direct and indirect measurement techniques, strategies for low cardiac output syndrome, and neurologic surveillance after cardiac surgery.

64. Reddy VM, Liddicoat JR, McElhinney DB, Fineman JR, Klein JR, Chang R, Hanley FL.
Hemodynamic effects of epinephrine, bicarbonate and calcium in the early postnatal period in a lamb model of single-ventricle physiology created in utero.
J Am Coll Cardiol. 1996 Dec; 28(7): 1877-83.
This is a fetal animal model of single ventricle physiology created to examine the effects of resuscitative agents and concluded that while epinephrine infusion and calcium and bicarbonate boluses increased total cardiac output without affecting Qp/Qs, epinephrine boluses were detrimental (by increasing Qp/Qs 584% as a result of increased SVR).

65. Riordan CJ, Randsbaek F, Storey JH, Montgomery WD, Santamore WP, Austin EH 3rd.
Inotropes in the hypoplastic left heart syndrome: effects in an animal model.
Ann Thorac Surg. 1996 Jul; 62(1): 83-90.
This animal single ventricle study showed that while dopamine, dobutamine, and epinephrine all increased total cardiac output, only epinephrine (at 0.1 ug/kg/minute) decreased the Qp/Qs ratio (1.23 to 0.8) and increased oxygen delivery (from 40 to 56 mL/minute).

66. Rosales AM, Walsh EP, Wessel DL, Triedman JK.
Postoperative ectopic atrial tachycardia in children with congenital heart disease.
Am J Cardiol 2001 Nov 15; 88(10): 1169-72.
This retrospective study examined the course of 17 children who had postoperative ectopic tachycardia and identified risk factors such as younger age (6 months), lower preoperative saturation, and also atrial septostomy, longer pump times, need for inotropic support, and potassium depletion.

67. Rosenberg DI, Moss MM, American College of Critical Care Medicine of the Society of Critical Care Medicine.
Guidelines and levels of care for pediatric intensive care units.
Crit Care Med. 2004 Oct; 32(10): 2117-27.
These current guidelines discussed the scope of pediatric critical care services including the organization and administrative structures, hospital facilities and services, personnel, drugs and equipment, quality monitoring, and training and continuing education.

68. Rosenzweig EB, Starc TJ, Chen JM, Cullinane S, Timchak DM, Gersony WM, Landry DW, Galantowicz ME.
Intravenous arginine-vasopressin in children with vasodilatory shock after cardiac surgery.
Circulation. 1999 Nov 9; 100(19 Suppl): II182-6.
This study showed that children who have catecholamine resistant hypotension after cardiac surgery responded to arginine vasopressin (dosing range of 0.0003 to 0.002 Units/kg/minute) with an improvement in systolic blood pressure (from 65 to 87 mmHg), but should probably be avoided in the presence of severe left ventricular dysfunction.

69. Rossi AF, Sommer RJ, Lotvin A, Gross RP, Steinberg LG, Kipel G, Goli RJ, Griepp RB.
Usefulness of intermittent monitoring of mixed venous oxygen saturation after stage I palliation for hypoplastic left heart syndrome.
Am J Cardiol. 1994 Jun 1; 73(15): 1118-23.
This is a study of 13 neonates who underwent stage I palliation with catheters inserted in the high superior vena cava for intermittent measurement of saturation in the SVC, and calculation of Qp/Qs is thus more reliable even with acceptable arterial saturation.

70. Schroeder VA, Pearl JM, Schwartz SM, Shanley TP, Manning PB, Nelson DP.
Combined steroid treatment for congenital heart surgery improves oxygen delivery and reduces post bypass inflammatory mediator expression.
Circulation. 2003 Jun 10; 107(22): 2823-8.
This study showed that compared to intraoperative use of steroid alone (methylprednisolone 30mg/kg), the combined preoperative and intraoperative use of steroid (same dosage) was associated with attenuated inflammatory mediator expression (reduced myocardial mRNA expression for IL-6, MCP-1, and ICAM-1) as well as reduced fluid requirements, lower body temperature, and lower ΔA-VO2 for the first 24 hours after surgery.

71. Schulze-Neick I, Hartenstein P, Li J, Stiller B, Nagdyman N, Hubler M, Butrous G, Petros A, Lange P, Redington AN.
Intravenous sildenafil is a potent pulmonary vasodilator in children with congenital heart disease.
Circulation. 2003 Sep 9; 108 Suppl 1: II167-73.
This was the first study that compared inhaled nitric oxide (20 ppm) with intravenous sildenafil (0.25 to 1 mg/kg) in children after cardiac surgery and showed that while sildenafil more effectively reduced PVR in postoperative patients (25.8 vs 14.6%), it increased intrapulmonary shunting more than nitric oxide (25.5 vs 16.5%).

72. Schulze-Neick I, Ho SY, Bush A, Rosenthal M, Franklin RC, Redington AN, Penny DJ.
Severe airflow limitation after the unifocalization procedure: clinical and morphological correlates.
Circulation. 2000 Nov 7; 102(19 Suppl 3): III142-7.
This clinical study elucidated the mechanism of severe airflow limitation in children with pulmonary atresia, ventricular septal defect, and major aortopulmonary collaterals as interruption of the tracheobronchial blood supply during mobilization of MAPCAs that lead to airway ischemia.

73. Schulze-Neick I, Penny DJ, Derrick GP, Dhillon R, Rigby ML, Kelleher A, Bush A, Redington AN.
Pulmonary vascular-bronchial interactions: acute reduction in pulmonary blood flow alters lung mechanics.
Heart. 2000 Sep; 84(3): 284-9.
This study of pulmonary vascular-bronchial interaction in children with congenital heart disease showed that acute changes in pulmonary blood flow are associated with simultaneous changes in lung mechanics (decrease in ventilatory tidal volume and dynamic respiratory system compliance and increase in respiratory system resistance).

74. Schwartz SM, Duffy JY, Pearl JM, Nelson DP.
Cellular and molecular aspects of myocardial dysfunction.
Crit Care Med. 2001 Oct; 29(10 Suppl): S214-9.
This is an overview of the cellular and molecular aspects of acute myocardial dysfunction after cardiopulmonary bypass (the inflammatory reaction, protease activation, etc) as well as chronic myocardial dysfunction with heart failure (renin-angiotensin system, beta-adrenergic system, and apoptosis).

75. Schwartz SM, Gordon D, Mosca RS, Bove EL, Heidelberger KP, Kulik TJ.
Collagen content in normal, pressure, and pressure-volume overloaded developing human hearts.
Am J Cardiol. 1996 Apr 1; 77(9): 734-8.
This laboratory investigation concluded that collagen fraction was greater, especially in the subendocardium, in older infants with pressure and volume overload of the right ventricle (8 vs < 4% for newborns with the same lesion or infants with tetralogy of Fallot).

76. Shaddy RE.
Optimizing treatment for chronic congestive heart failure in children.
Crit Care Med. 2001 Oct; 29(10 Suppl): S237-40.
This is a short review of medical therapy of heart failure in children that covers use of diuretics, digoxin, angiotensin-converting enzyme inhibitors, and beta-blockers.

77. Shekerdemian LS, Bush A, Lincoln C, Shore DF, Petros AJ, Redington AN.
Cardiopulmonary interactions in healthy children and children after simple cardiac surgery: the effects of positive and negative pressure ventilation.
Heart 1997 Dec; 78(6): 587-93.
This study examined the effects of positive vs negative pressure ventilation and showed that cuirass negative pressure ventilation led to a 28% increase in cardiac output in postoperative patients that involved cardiopulmonary bypass, and this increase was greater than patients who had PDA closure (with 11% increase in cardiac output).

78. Shekerdemian L, Bohn D.
Cardiovascular effects of mechanical ventilation.
Arch Dis Child 1999 May; 80(5): 475-80.
This review focuses on the influence of ventilation on cardiac function, cardiovascular effects of changes in intrathoracic pressure and in lung volume, and heart-lung interactions in the intensive care setting.

79. Shore S, Nelson DP, Pearl JM, Manning PB, Wong H, Shanley TP, Keyser T, Schwartz SM.
Usefulness of corticosteroid therapy in decreasing epinephrine requirements in critically ill infants with congenital heart disease.
Am J Cardiol. 2001 Sep 1; 88(5): 591-4.
This retrospective review of infants who required ≥ 0.15 ug/kg/minute of epinephrine respond to steroids (even at low dose of < 100 mg/M2/day of hydrocortisone equivalents) with decrease in inotrope requirement and a concomitant 15% increase in mean arterial blood pressure.

80. Simsic JM, Bradley SM, Mulvihill DM.
Sodium nitroprusside infusion after bidirectional superior cavopulmonary connection: preserved cerebral blood flow velocity and systemic oxygenation.
J Thorac Cardiovasc Surg. 2003 Jul; 126(1): 186-90.
This is a prospective patient-controlled study of 9 infants undergoing bidirectional cavopulmonary anastomosis who received nitroprusside (dose range 1-4 ug/kg/minute) that showed a decrease in mean systemic blood pressure (from 69 to 58 mmHg) without accompanying change in cerebral blood flow or oxygen saturation.

81. Stocker C, Penny DJ, Brizard CP, Cochrane AD, Soto R, Shekerdemian LS. Intravenous sildenafil and inhaled nitric oxide: a randomized trial in infants after cardiac surgery.
Intensive Care Med. 2003 Nov; 29(11): 1996-2003.
This prospective randomized trial in 15 infants showed sildenafil (0.35 mg/kg over 20 minutes) augmented the pulmonary vasodilator effect of inhaled nitric oxide (20 ppm) but produced systemic hypotension (13-17%) and impaired oxygenation (decrease in PaO2 of ~30 mmHg).

82. Stayer SA, Diaz LK, East DL, Gouvion JN, Vencill TL, McKenzie ED, Fraser CD, Andropoulos DB.
Changes in respiratory mechanics among infants undergoing heart surgery.
Anesth Analg 2004; Jan; 98(1): 49-55.
This is a prospective study of 106 infants and their respiratory mechanics after cardiac surgery that showed respiratory resistance improved after correction of lesions with increased pulmonary blood flow and dynamic respiratory compliance decreased after surgery for lesions with decreased pulmonary blood flow.

83. Stromberg D.
Pediatric cardiac intensivists: are enough being trained?
Pediatr Crit Care Med. 2004 Jul ;5(4): 391-2.
This survey of pediatric cardiac intensive care unit directors showed that recruitment was ongoing in 46% of the institutions with a discrepancy between current and growing need for trained pediatric cardiac intensivists.

84. Szabo G, Buhmann V, Graf A, Melnitschuk S, Bahrle S, Vahl CF, Hagl S.
Ventricular energetics after the Fontan operation: contractility-afterload mismatch.
J Thorac Cardiovasc Surg. 2003 May; 125(5): 1061-9.
This animal study, using pressure-volume conductance catheters to examine ventriculoarterial coupling (ratio of end-systolic pressure/stroke volume to slope of the end-systolic pressure-volume relationship), demonstrated that the Fontan operation leads to contractility-afterload mismatch and decreased coupling ratio (from 0.76 to 0.42) due to both increased impedance and deterioration of myocardial contractility (thus reduced efficiency).

85. Tabbutt S.
Heart failure in pediatric septic shock: utilizing inotropic support.
Crit Care Med. 2001 Oct; 29(10 Suppl): S231-6.
This is a review of pediatric septic shock with a focus on myocardial dysfunction and therapeutic strategies, including cardiovascular pharmacological agents and more controversial cardiovascular support (such as mechanical support).

86. Tabbutt S, Duncan BW, McLaughlin D, Wessel DL, Jonas RA, Laussen PC.
Delayed sternal closure after cardiac operations in a pediatric population.
J Thorac Cardiovasc Surg. 1997 May; 113(5): 886-93.
This is a prospective, randomized, crossover trial in 10 neonates with hypoplastic left heart syndrome comparing hypoxia (17% F_IO2) and hypercarbia (2.7% F_ICO2) and showed oxygen delivery (calculated as SaO2/(SaO2 – SvO2)) is unchanged during hypoxia but increased during hypercarbia (from 6.14 to 3.64).

87. Tabbutt S, Ramamoorthy C, Montenegro LM, Durning SM, Kurth CD, Steven JM, Godinez RI, Spray TL, Wernovsky G, Nicolson SC.
Impact of inspired gas mixtures on preoperative infants with hypoplastic left heart syndrome during controlled ventilation.
Circulation. 2001 Sep 18; 104(12 Suppl 1): 1159-64.
This retrospective review of 178 patients who had delayed sternal closure showed significant increases in left and right atrial pressure upon sternal closure (7.7 to 9.8 mmHg and 8.0 to 10.1 mmHg, respectively) with concomitant small increases in ventilatory parameters (peak inspiratory pressure, delivered breaths per minute, and fraction of inspired oxygen).

88. Taeed R, Schwartz SM, Pearl JM, Raake JL, Beekman RH 3rd, Manning PB, Nelson DP.
Unrecognized pulmonary venous desaturation early after Norwood palliation confounds Gp:Gs assessment and compromises oxygen delivery.
Circulation. 2001 Jun 5; 103(22): 2699-704.
This clinical study in 12 neonates after the Norwood operation (measuring simultaneous arterial, SVC, and pulmonary venous oximetry) showed that pulmonary venous desaturation (< 95%) occurred in 30% of patients and that higher pulmonary venous saturation to improve oxygen delivery can be achieved with judicious use of inspired oxygen and PEEP.

89. Tanoue Y, Sese A, Ueno Y, Joh K, Hijii T.
Bidirectional Glenn procedure improves the mechanical efficiency of a total cavopulmonary connection in high-risk Fontan candidates. Circulation. 2001 May 1; 103(17): 2176-80.
In this catheterization study of 18 patients who underwent a bidirectional Glenn procedure before the Fontan operation (vs 29 patients who had the Fontan operation without a preceding bidirectional Glenn operation), the patients who had the interim bidirectional Glenn operation had a more favorable afterload (effective arterial elastances, or Ea)/contractility (end systolic elastances, or Ees) ratio (ventriculoarterial coupling).

90. TIbby SM, Murdoch IA.
Monitoring cardiac function in intensive care.
Arch Dis Child 2003 Jan; 88: 46-52.
This is a systematic review of various aspects of cardiac function and cardiac output measurement in terms of methodology, interpretation, and the contribution to concepts of oxygen delivery and consumption in the critical care setting.

91. Turanlahti M, Boldt T, Palkama T, Antila S, Lehtonen L, Pesonen E.
Pharmacokinetics of levosimendan in pediatric patients evaluated for cardiac surgery.
Pediatr Crit Care Med. 2004 Sep; 5(5): 457-62.
This single-dose (12 ug/kg) study to delineate the pharmacokinetics and hemodynamics as well as safety of the new calcium-sensitizing agent levosimendan in 13 children showed a slower terminal elimination half-life in younger children (3-6 months)(2.3 vs 1.6 hours).

92. Tweddell JS, Hoffman GM, Mussatto KA, Fedderly RT, Berger S, Jaquiss RD, Ghanayem NS, Frisbee SJ, Litwin SB.
Improved survival of patients undergoing palliation of hypoplastic left heart syndrome: lessons learned from 115 consecutive patients. Circulation. 2002 Sep 24; 106(12 Suppl 1): I82-9.
This analysis of a consecutive series of 115 neonates after the Norwood palliation for hypoplastic left heart syndrome showed improved survival with combined strategy of early identification of decreased systemic output with continuous SvO2 monitoring, use of afterload reduction with phenoxybenzamine, and use of anti-inflammatory therapies such as aprotonin and modified ultrafiltration.

93. Verheijen PM, Lisowski LA, Stoutenbeek P, Hitchcock JF, Brenner JI, Copel JA,,Kleinman CS, Meijboom EJ, Bennink GB.
Prenatal diagnosis of congenital heart disease affects preoperative acidosis in the newborn patient.
J Thorac Cardiovasc Surg. 2001 Apr; 121(4): 798-803.
This retrospective study of 408 neonates who had surgical intervention revealed that neonates who had prenatal diagnosis had less likelihood of having metabolic acidosis (pH < 7.20)(8.8 vs 20.7%), especially in left-sided obstructive lesions.

94. Walsh EP, Saul JP, Sholler GF, Triedman JK, Jonas RA, Mayer JE, Wessel DL.
Evaluation of a staged treatment protocol for rapid automatic junctional tachycardia after operation for congenital heart disease.
J Am Coll Cardiol. 1997 Apr; 29(5): 1046-53.
This staged therapy protocol study for junctional ectopic tachycardia in 71 patients showed that this postoperative tachydysrhythmia was associated with younger age and ventricular septal defect closure and that combined hypothermia and procainamide was most efficacious in resistant cases.

95. Wernovsky G, Wypij D, Jonas RA, Mayer JE Jr, Hanley FL, Hickey PR, Walsh AZ, Chang AC, Castaneda AR, Newburger JW, Wessel DL.
Postoperative course and hemodynamic profile after the arterial switch operation in neonates and infants. A comparison of low-flow cardiopulmonary bypass and circulatory arrest.
Circulation. 1995 Oct 15; 92(8): 2226-35.
This study focused on the postoperative course in 122 neonates after the arterial switch operation who had complete hemodynamic profiles and showed that the nadir in cardiac output was at 9-12 hours after surgery (with a mean decrease in cardiac index of 32.1%, including 23.8% of patients who had cardiac index < 2.0 L/minute/M2).

96. Wernovsky G, Rubenstein SD, Spray TL.
Cardiac surgery in the low birth weight neonate. New approaches.
Clin Perinatol 2001 Mar; 28(1): 249-64.
This is a comprehensive review of the pertinent issues in the low birth weight neonate with congenital heart disease with some emphasis on perioperative medical management of this high-risk patient population.

97. Wessel DL.
Managing low cardiac output syndrome after congenital heart surgery. Crit Care Med. 2001 Oct; 29(10 Suppl): S220-30.
A review of strategies for treatment of low cardiac output syndrome after cardiac surgery covering topics such as use of right to left shunt to preserve cardiac output, pharmacologic support, pulmonary hypertension, diastolic dysfunction, and mechanical support.

98. Wessel DL, Adatia I, Giglia TM, Thompson JE, Kulik TJ.
Use of inhaled nitric oxide and acetylcholine in the evaluation of pulmonary hypertension and endothelial function after cardiopulmonary bypass.
Circulation. 1993 Nov; 88(5 Pt 1): 2128-38.
This clinical investigation studied postoperative endothelial dysfunction and showed that plasma cGMP levels were unchanged after infusion of acetylcholine but increased more than threefold during use of inhaled nitric oxide (which also decreased PVR by 33% whereas acetylcholine had little effect), thus supporting the purported role of cGMP as the second messenger effecting smooth muscle relaxation.

99. Wheeler DS, Wong HR.
The impact of molecular biology on the practice of pediatric critical care medicine.
Pediatr Crit Care Med. 2001 Oct; 2(4): 299-310.
This review elucidates the essential aspects of molecular biology in the intensive care setting such as sepsis, acute respiratory distress syndrome, and multiorgan dysfunction syndrome as well as new terminology such as pharmacogenomics and immunophenotyping.

100. Zahn EM, Dobrolet NC, Nykanen DG, Ojito J, Hannan RL, Burke RP
Interventional catheterization performed in the early postoperative period after congenital heart surgery in children.
J Am Coll Cardiol. 2004 Apr 7; 43(7): 1264-9.
This retrospective study reviewed the experience of 62 patients (median age 4 months) who underwent catheterizations within 6 weeks of surgery (median postoperative day 9), including 30 procedures involving angioplasty or stent implantation without suture disruption or trans-mural vascular tear, with an overall survival of 83%.