

Key notes on: Cardiac Disease and Pregnancy

- Cardiac disease in pregnancy is a leading cause of maternal mortality in Australia
- Changing profile of cardiac disease in pregnancy – more women with congenital heart disease are surviving to have children & increasing number of childbearing age women with ischaemic heart disease
- Pre-conception counselling should be offered to all women with cardiac disease
- Normal physiological adaptations of pregnancy can ‘unmask’ previously undiagnosed cardiac conditions
- Large range of cardiac conditions with variable effects on maternal and perinatal outcomes – and cardiac status can change unpredictably
- Mechanical heart valves pose a significant risk and challenge regarding prevention of thrombosis and haemorrhage
- Some standard cardiac medications are contraindicated in pregnancy e.g. ACE inhibitors
- Multidisciplinary and collaborative management should be the aim for maternity care – and include the woman and her partner in decision making
- Multidisciplinary planning for labour and birth should be done well in advance of term; mode of birth is usually guided by obstetric indication
- Most research has been about medical management – little evidence to guide nursing and midwifery care

Key resources/recommended reading

Electronic references/Guidelines:

RHD Australia (ARF/RHD writing group), National Heart Foundation of Australia and the Cardiac Society of Australia and New Zealand. Australian guideline for prevention, diagnosis and management of acute rheumatic fever and rheumatic heart disease (2nd edition) (2012). Available at: <http://www.rhdaustralia.org.au/>

RCOG Cardiac Disease and Pregnancy (Good Practice No. 13) (2011). Available at: <https://www.rcog.org.uk/en/guidelines-research-services/guidelines/good-practice-13/>

Regitz-Zagrosek V, Roos-Hesselink JW, Bauersachs J, Blomström-Lundqvist C, Cifková R, De Bonis M, et al. 2018 ESC Guidelines for the management of cardiovascular diseases during pregnancy. *European Heart Journal*. 2018;39(34):3165-241. Available at: <https://www.escardio.org/Guidelines/Clinical-Practice-Guidelines/Cardiovascular-Diseases-during-Pregnancy-Management-of>

Canobbio MM, Warnes CA, Aboulhosn J, Connolly HM, Khanna A, Koos BJ, et al. Management of Pregnancy in Patients With Complex Congenital Heart Disease: A Scientific Statement for Healthcare Professionals From the American Heart Association. *Circulation*. 2017;135(8):e50–87.

Afshan B. Hameed, Christine H. Morton, and Allana Moore. Improving Health Care Response to Cardiovascular Disease in Pregnancy and Postpartum Developed under contract #11-10006 with the California Department of Public Health, Maternal, Child and Adolescent Health Division. California Department of Public Health, 2017. Available at: <https://www.cmqcc.org/resources-toolkits/toolkits/improving-health-care-response-cardiovascular-disease-pregnancy-and>

SA Health Perinatal Guidelines Cardiac Disease in Pregnancy (2014). Available at: http://www.sahealth.sa.gov.au/wps/wcm/connect/c88d89804ee1e907af07afd150ce4f37/Cardiac+disease_Clinical+Guideline_final_Dec14.pdf?MOD=AJPERES&CACHEID=c88d89804ee1e907af07afd150ce4f37

Articles of interest:

- Millington S, Magarey J, Dekker GA, Clark RA. Cardiac conditions in pregnancy and the role of midwives: A discussion paper. *Nursing Open*. 2019. Available at: <https://onlinelibrary.wiley.com/doi/full/10.1002/nop2.269>
- Waksmanski CA. Cardiac imaging and functional assessment in pregnancy. *Seminars in Perinatology*. 2014;38(5):240-4.
- Bowater SE, Thorne SA. Management of pregnancy in women with acquired and congenital heart disease. *Postgraduate Medical Journal*. 2010 February 1, 2010;86(1012):100-5.
- Lau ES, Sarma A. The Role of Cardiac Biomarkers in Pregnancy. *Current Treatment Options in Cardiovascular Medicine*. 2017;19(7):49.
- Tanous D, Siu SC, Mason J, Greutmann M, Wald RM, Parker JD, et al. B-Type Natriuretic Peptide in Pregnant Women With Heart Disease. *Journal of the American College of Cardiology*. 2010;56(15):1247-53.
- van Hagen IM, Boersma E, Johnson MR, Thorne SA, Parsonage WA, Escribano Subías P, et al. Global cardiac risk assessment in the Registry Of Pregnancy And Cardiac disease: results of a registry from the European Society of Cardiology. *European Journal of Heart Failure*. 2016;18(5):523-33.
- Roberts WT, Adamson D. Cardiovascular disease in pregnancy. *Obstetrics, Gynaecology & Reproductive Medicine*. 2013;23(7):195-201.
- Ruys TPE, Maggioni A, Johnson MR, Sliwa K, Tavazzi L, Schwerzmann M, et al. Cardiac medication during pregnancy, data from the ROPAC. *International Journal of Cardiology*. 2014;177(1):124-8.
- Ruys TP, Roos-Hesselink JW, Hall R, Subirana-Domènech MT, Grandó-Ting J, Estensen M, et al. Heart failure in pregnant women with cardiac disease: data from the ROPAC. *Heart*. 2014;100:231-8.
- Roos-Hesselink JW, Ruys TPE, Stein JI, Thilén U, Webb GD, Niwa K, et al. Outcome of pregnancy in patients with structural or ischaemic heart disease: results of a registry of the European Society of Cardiology. *European Heart Journal*. 2013;34:657-65.
- Silversides CK, Grewal J, Mason J, Sermer M, Kiess M, Rychel V, et al. Pregnancy Outcomes in Women With Heart Disease: The CARPREG II Study. *Journal of the American College of Cardiology*. 2018;71(21):2419-30.
- Kuklina EV, Callaghan WM. Chronic heart disease and severe obstetric morbidity among hospitalisations for pregnancy in the USA: 1995–2006. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2011;118:345-52.
- Simpson LL. Preconception considerations. *Seminars in Perinatology*. 2014;38(5):236-9.
- Facca TA, Mastroianni-Kirsztajn G, Sabino ARP, Passos MT, dos Santos LF, Famá EAB, et al. Pregnancy as an early stress test for cardiovascular and kidney disease diagnosis. *Pregnancy Hypertension*. 2018;12:169-73.
- Cauldwell M, Johnson M, Jahangiri M, Roos-Hesselink J. Cardiac interventions and cardiac surgery and pregnancy. *International Journal of Cardiology*. 2019;276:43-7.
- Halpern DG, Weinberg CR, Pinnelas R, Mehta-Lee S, Economy KE, Valente AM. Use of Medication for Cardiovascular Disease During Pregnancy: JACC State-of-the-Art Review. *Journal of the American College of Cardiology*. 2019;73(4):457-76.
- Roos-Hesselink JW, Baris L, Johnson M, De Backer J, Otto C, Marelli A, et al. Pregnancy outcomes in women with cardiovascular disease: evolving trends over 10 years in the ESC Registry Of Pregnancy And Cardiac disease (ROPAC). *European Heart Journal*. 2019 (early view).
- Sliwa K, Azibani F, Baard J, Osman A, Zühlke L, Lachmann A, et al. Reducing late maternal death due to cardiovascular disease - A pragmatic pilot study. *International Journal of Cardiology*. 2018;272:70-6.
- Robinson JR. Pregnancy-Related Coronary Artery Dissection: Recognition of a Life Threatening Process. *Dimensions of Critical Care Nursing*. 2018;37(2):62-8.

Congenital Heart Disease

Lindley KJ, Conner SN, Cahill AG. Adult Congenital Heart Disease in Pregnancy. *Obstetrical & Gynecological Survey*. 2015;70:397-407.

Ngu K, Hay M, Menahem S. Case Studies of the Perceptions of Women with High Risk Congenital Heart Disease Successfully Completing a Pregnancy. *Heart, Lung and Circulation*. 2014;23(9):811-7.

Ávila P, Mercier L-A, Dore A, Marcotte F, Mongeon F-P, Ibrahim R, et al. Adult Congenital Heart Disease: A Growing Epidemic. *Canadian Journal of Cardiology*. 2014;30(12, Supplement):S410-S9.

D'Souza R, Sermer M, Silversides CK. Pregnancy in women with congenital heart disease. *Obstetric Medicine: The Medicine of Pregnancy*. 2015;8(1):18-25.

Roos-Hesselink J, Ruys P, Johnson M. Pregnancy in adult congenital heart disease. *Current Cardiology Reports*. 2013;15(9):1-9.

Greutmann M, Pieper PG. Pregnancy in women with congenital heart disease. *European Heart Journal*. 2015;ehv288.

Brickner ME. Cardiovascular Management in Pregnancy Congenital Heart Disease. *Circulation*. 2014;130:273-82.

Zentner D, Kotevski A, King I, Grigg L, d'Udekem Y. Fertility and pregnancy in the Fontan population. *International Journal of Cardiology* 2016; 208 97–101.

Acute Myocardial Infarction and Ischaemic Heart Disease

Turitz AL, Friedman AM. Ischemic heart disease in pregnancy. *Seminars in Perinatology*. 2014;38(5):304-8.

Fryearson J, Adamson DL. Heart disease in pregnancy: Ischaemic heart disease. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2014;28(4):551-62.

Burchill LJ, Lameijer H, Roos-Hesselink JW, Grewal J, Ruys TP, Kulikowski JD, et al. Pregnancy risks in women with pre-existing coronary artery disease, or following acute coronary syndrome. *Heart*. 2015;101(7):525-9.

James AH, Jamison MG, Biswas MS, Brancazio LR, Swamy GK, Myers ER. Acute Myocardial Infarction in Pregnancy: A United States Population-Based Study. *Circulation*. 2006;113(12):1564-71.

Mehta LS, Beckie TM, DeVon HA, Grines CL, Krumholz HM, Johnson MN, et al. Acute Myocardial Infarction in Women: A Scientific Statement From the American Heart Association. *Circulation*. 2016;133(9):916-47.

Robinson JR. Pregnancy-Related Coronary Artery Dissection: Recognition of a Life Threatening Process. *Dimensions of Critical Care Nursing*. 2018;37(2):62-8.

Valvular Disease

Sullivan E, Vaughan G, Li Z, Peek MJ, Carapetis JR, Walsh W, et al. The high prevalence and impact of rheumatic heart disease in pregnancy in First Nations populations in a high-income setting: a prospective cohort study. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2019.

Nishimura RA, Warnes CA. Anticoagulation during pregnancy in women with prosthetic valves: evidence, guidelines and unanswered questions. *Heart*. 2015;101(6):430-5.

Windram JD, Colman JM, Wald RM, Udell JA, Siu SC, Silversides CK. Valvular heart disease in pregnancy. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2014;28(4):507-18.

van Hagen IM, Thorne SA, Taha N, Youssef G, Elnagar A, Gabriel H, et al. Pregnancy Outcomes in Women With Rheumatic Mitral Valve Disease. Results From the Registry of Pregnancy and Cardiac Disease. *Circulation*. 2018;137(8):806-16.

Lawley C, Lain S, Algert C, Ford J, Figtree G, Roberts C. Prosthetic heart valves in pregnancy, outcomes for women and their babies: a systematic review and meta-analysis. *BJOG: An International Journal of Obstetrics & Gynaecology*. 2015;122(11):1446-55.

Tsiaras S, Poppas A. Mitral valve disease in pregnancy: outcomes and management. *Obstet Med*. 2009 March 1, 2009;2(1):6-10.

Goland S, Schwartzberg S, Fan J, Kozak N, Khatri N, Elkayam U. Monitoring of Anti-Xa in Pregnant Patients With Mechanical Prosthetic Valves Receiving Low-Molecular-Weight Heparin: Peak or Trough Levels? *Journal of Cardiovascular Pharmacology and Therapeutics*. 2014;19(5):451-6.

McLintock C. Anticoagulant choices in pregnant women with mechanical heart valves: Balancing maternal and fetal risks – the difference the dose makes. *Thrombosis Research*. 2013;131, Supplement 1(0):S8-S10.

van Hagen IM, Roos-Hesselink JW, Ruys TPE, Merz WM, Goland S, Gabriel H, et al. Pregnancy in Women With a Mechanical Heart Valve: Data of the European Society of Cardiology Registry of Pregnancy and Cardiac Disease (ROPAC). *Circulation*. 2015;132(2):132-42.

Economy KE, Valente AM. Mechanical Heart Valves in Pregnancy: A Sticky Business [editorial]. *Circulation*. 2015;132(2):79-81.

Peripartum cardiomyopathy

Arany Z, Elkayam U. Peripartum cardiomyopathy. *Circulation*. 2016;133(14):1397-409.

Koczo A, Marino A, Jeyabalan A, Elkayam U, Cooper LT, Fett J, et al. Breastfeeding, Cellular Immune Activation, and Myocardial Recovery in Peripartum Cardiomyopathy. *JACC: Basic to Translational Science*. 2019;4(3):291-300.

Sliwa K, Hilfiker-Kleiner D, Petrie MC, Mebazaa A, Pieske B, Buchmann E, et al. Current state of knowledge on aetiology, diagnosis, management, and therapy of peripartum cardiomyopathy: A position statement from the Heart Failure Association of the European Society of Cardiology Working Group on peripartum cardiomyopathy. *European Journal of Heart Failure*. 2010;12(8):767-78.

Sliwa K, Hilfiker-Kleiner D, Mebazaa A, Petrie MC, Maggioni AP, Regitz-Zagrosek V, et al. EURObservational Research Programme: a worldwide registry on peripartum cardiomyopathy (PPCM) in conjunction with the Heart Failure Association of the European Society of Cardiology Working Group on PPCM. *European Journal of Heart Failure*. 2014;16(5):583-91.

Desplantie O, Tremblay-Gravel M, Avram R, Marquis-Gravel G, Ducharme A, Jolicoeur EM. The Medical Treatment of New-Onset Peripartum Cardiomyopathy: A Systematic Review of Prospective Studies. *Canadian Journal of Cardiology*. 2015;31(12):1421-6.

Herrey AS. Pregnancy in inherited and acquired cardiomyopathies. *Best Practice & Research Clinical Obstetrics & Gynaecology*. 2014;28(4):563-77.

Hilfiker-Kleiner D, Sliwa K. Pathophysiology and epidemiology of peripartum cardiomyopathy. *Nat Rev Cardiol*. 2014;11(6):364-70.

Arrhythmias

Adamson DL, Nelson-Piercy C. Managing palpitations and arrhythmias during pregnancy. *Postgraduate Medical Journal*. 2008;84(988):66-72.

DiCarlo-Meacham LA, Dahlke LJ. Atrial Fibrillation in Pregnancy. *Obstetrics & Gynecology*. 2011;117(2, Part 2):489-92.

Dennis AT, Gerstman MD. Management of labour and delivery in a woman with refractory supraventricular tachycardia. *International Journal of Obstetric Anesthesia*. 2014;23(1):80-5.