12.7.2.2 Pregnancy in cancer survivors

Improved cancer treatments have led to an increased number of women with pregnancies after oncological therapy. Previous treatment with anthracycline chemotherapy or chest radiotherapy implies a 15-fold increased lifetime risk of developing HF. Furthermore, both the cancer and the cancer treatment have an impact on fertility, pregnancy outcomes, and cardiovascular health. The major risk factors for cardiovascular events during pregnancy in cancer survivors include CTRCD (28%; 47.4 times higher odds), younger age at cancer diagnosis,[758,759] higher cumulative doses of anthracycline, and greater duration between cancer treatment and first pregnancy.[758,759]

Recommendation Table 22 — Recommendations for cardio-oncology and pregnancy

Recommendations	Class[a]	Level[b]
It is recommended that pregnant women with cancer who require cardiotoxic cancer therapy are jointly managed by the Pregnancy Heart Team and the cardio-oncology team.[43]	I	C
Cardiac troponin and NP measurements may be considered at baseline and during anthracycline chemotherapy in pregnant women with cancer.[734,756]	IIb	C

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NP, natriuretic peptide.
[a]Class of recommendation.
[b]Level of evidence.

13. Adverse pregnancy outcomes and long-term management

Adverse pregnancy outcomes (APO), including gestational hypertensive disorders, pre-eclampsia, gestational diabetes mellitus (GDM), small or large for gestational age babies, or pre-term birth are a group of interrelated disorders that share common pathways.[760] Placental dysfunction and oxidative stress in the context of cardiometabolic, genetic, or environmental risk factors may cause APOs.[761] A multidisciplinary care approach is essential (*Figure 23*)[761,762] for optimizing modifiable cardiovascular risk factors after all APOs.[761,762]

13.1. Adverse pregnancy outcomes

13.1.1. Post-partum hypertensive disorders

Hypertension in the post-partum period is most common in women with antenatal hypertensive disorders, but it can also develop *de novo* in the post-partum period. New-onset or *de novo* post-partum pre-eclampsia is increasingly recognized as an important contributor to maternal morbidity and mortality in the post-partum period (*Figure 24*).[763]

Women with pregnancy-related hypertensive disorders, most notably pre-eclampsia, have a higher incidence of several CVDs, including CAD, stroke, and HF.[762,764] Treatment for uncomplicated post-partum hypertension (first 6 weeks after delivery) includes nifedipine and labetalol (metoprolol if labetalol is unavailable).[764] A small randomized controlled trial showed that administration of furosemide in the first 5 days post-partum in women with gestational hypertension and pre-eclampsia significantly reduced the prevalence of persistently elevated BP at 7 days.[765] Methyldopa should be avoided because of the risk of post-partum depression.[602,766] Agents used for the management of acute, severe hypertension in the post-partum period are similar to those used during pregnancy and include labetalol, hydralazine, and nifedipine (see *Sections 5* and *12*).[767] For women with persistent hypertension, antihypertensive therapy should be initiated with reference to lactating status following current guidelines (see *Section 5*).[584,585,767]

13.1.2. Gestational diabetes mellitus

Gestational diabetes mellitus is characterized by glucose intolerance that is first recognized during pregnancy.[768] Haemoglobin A1c testing may help to identify women at high risk.[768,769] Women with GDM have a sharply increased risk of developing type 2 diabetes later in life and a significantly higher likelihood of experiencing adverse cardiovascular events.[770–772] Women with GDM are recommended to undergo a formal oral glucose tolerance test (oGTT) 6–12 weeks post-partum with a repeat assessment at 6–12 months (*Figure 25*). Thereafter, regular annual follow-up with glucose tolerance monitoring is recommended.[773–775]

13.1.3. Pre-term birth

Pre-term delivery occurs after 20 and before the completion of 37 weeks of gestation, regardless of birth weight. There are strong associations between pre-term delivery (alone or with pregnancy-related hypertensive disorders), CVD, and mortality.[771,772] Women with pre-term deliveries are more likely to have an increasing BP trajectory after pregnancy and to be affected by accelerated atherosclerosis independent of traditional CVD risk factors.[776,777] The earlier pre-term delivery occurs, the more strongly it is associated with hypertension and CVD in later life. The relationship of pre-term birth to type 2 diabetes mellitus and dyslipidaemia is inconsistent.

13.1.4. Small for gestational age

Delivering a SGA baby (weight <10th percentile) has not been consistently related to an increased CVD risk, but has been associated with hypertension and diabetes.[761,771,772] Conversely, large for gestational age babies (weight >90th percentile) have been reported to increase maternal CVD risk, but the evidence is limited.[761]

13.1.5. Pregnancy loss and placental abruption

Placental abruption, spontaneous pregnancy loss or stillbirth, and foetal loss after 28 weeks of gestation have been associated with an increased risk of future CVD, with a particularly high risk of hypertension and type 2 diabetes mellitus.[771,778] One or more terminations are associated with a higher CVD risk, however, with limited evidence.[779]

13.2. Breastfeeding

Breastfeeding fosters the recovery of maternal physiological systems to their pre-conception state. Breastfeeding women have a better cardiometabolic profile, and breastfeeding up to 12 months after childbirth has been shown to lower future risk of CVD and mortality,[780–783] potentially due to lowered BP.[784–787] Longer breastfeeding periods are associated with better CVD outcomes.[782,784,788–790] The role of breastfeeding for women who experienced an APO is less clear, but it also appears to have beneficial effects.[789,791,792] There is inconclusive evidence about the beneficial effects of breastfeeding on the cardiovascular health of older women (i.e. aged ≥55 years).[720,788,793,794]

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