JACC: CASE REPORTS VOL. 1, NO. 2, 2019
PUBLISHED BY ELSEVIER ON BEHALF OF THE AMERICAN COLLEGE OF CARDIOLOGY FOUNDATION.

VIEWPOINT

VOICES OF CARDIOLOGY

Pregnancy During Cardiology Training

We Need a Policy

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From Aristotle to Oprah, the importance of work-life balance has been iterated over history. In the context of cardiology training, it is necessary to develop a pragmatic approach. Guaranteeing the well-being of the physician will ensure the development of a competent, caring, and resilient health care professional.

According to the American College of Graduate Medical Education, 23.4% of women matched in cardiology in 2017 (1,2). Women in this phase of their training are in their peak childbearing years. The mean age of a cardiology fellow in the first year of fellowship is 31.8 years old and the mean average in the United States for first pregnancy in college-educated women is 31 years (3). It is expected that women enrolling in cardiology programs will seek or plan pregnancy during their training. Given the ongoing efforts to boost recruitment of qualified women in the male-dominated field of cardiology, it is of utmost importance that the biological needs of female physicians pursuing further training be addressed on a systems level.

Accreditation and training societies have not stipulated clear guidelines to accommodate the needs of pregnant fellows or early parents. Ongoing efforts through the Women in Cardiology Section have been focused on advocating for pregnancy-related issues (4–6). In **Figure 1**, we propose a list of the salient issues to address at different stages when planning a pregnancy that can serve as guidance for program directors and fellows.

Conception and pregnancy are considered a private matter. However, the announcement of pregnancy is essential in certain specialties due to the potential for radiation exposure to the fetus. However, the timing of notification is challenging. There is no mandatory policy to disclose the pregnancy in every state, leaving the decision to disclose to the pregnant fellow when she is ready. Unfortunately, first trimester miscarriage rates are high. Some estimates project loss rates of recognized pregnancies to be as high as 15%, and are even higher in physicians (7). The additional emotional burden of potential pregnancy loss precludes premature notification of pregnancies but represents a real logistic issue when arranging work schedules. The Women in Cardiology Section has conducted a voluntary anonymous survey of cardiologists regarding their experience with pregnancy, breastfeeding, parenting, and family planning (6). Cardiology fellowship is a critical time period when women are trying to establish their careers while growing their families, leading to a delicate interplay between family planning and career considerations. Many women try to avoid pregnancy during training to prevent radiation, yet prior surveys have shown that 57% of female cardiologists were exposed to occupational radiation during pregnancy (5). Based on an informal social media survey, it appears that fellows are in a particularly difficult position to control their own schedules, requiring negotiations, team work, and thinking freely outside the box.

RADIATION EXPOSURE

Electrophysiologists, interventionalists, and nuclear cardiologists have long understood the risks of radiation (8). The consensus document from the Society for Cardiovascular Angiography and Interventions states that current data do not demonstrate an increased risk to the fetus of women in the catheterization laboratory (9,10). Based on the National Council for Radiation Protection, there is a published statement with recommendations for

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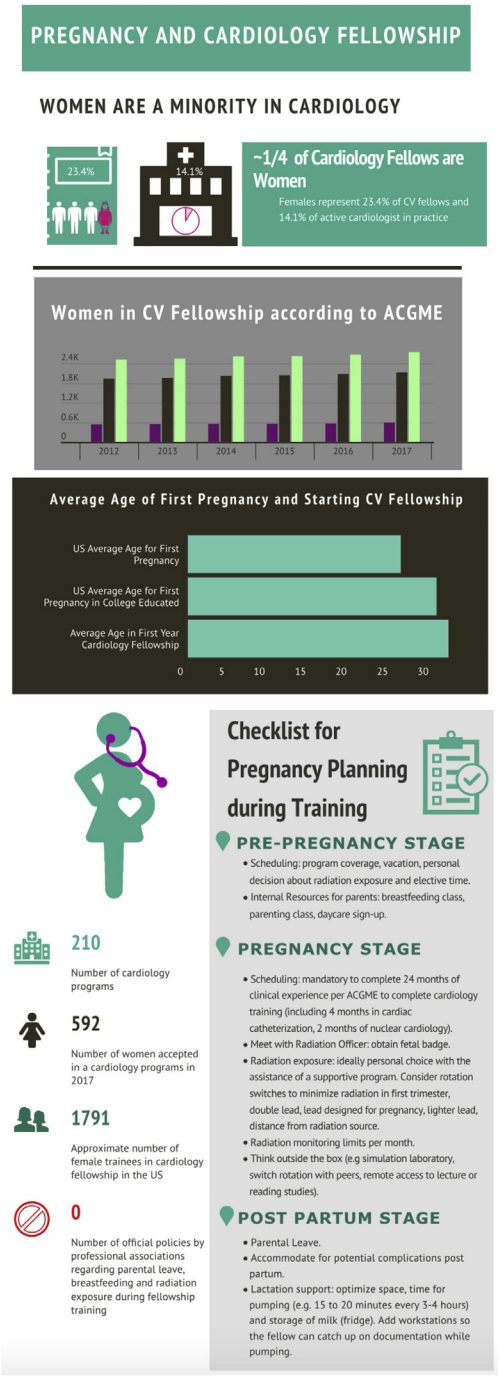
ISSN 2666-0849 https://doi.org/10.1016/j.jaccas.2019.05.028

FIGURE 1 Pregnancy and CV Fellowship



Women represent a minority in training programs. We present a graph with the number of fellows by sex enrolled from 2012 to 2017 according to American College of Graduate Medical Education (ACGME). The average ages for pregnancy according to U.S. census data and ACGME. Last, we propose a checklist to guide the pregnant fellow and program director.
CV = cardiovascular; US = United States.

acceptable radiation doses per month (50 mrem/month) and cumulatively for the entire pregnancy (maximum 500 mrem) (11), with suggestions for radiation monitoring and reduction strategies. This radiation dose is equivalent to 100 to 1,000 fluoroscopic procedures of 5 min each per gestational month (12).

Whereas there are still concerns related to risks to a developing fetus, during the period prior to the implantation, radiation exposure increases the risk of death of the embryo (13). Given that in many instances the woman can be unaware of the pregnancy, the actual risk of miscarriage from radiation exposure in early weeks is unknown. Unfortunately, delaying notification of pregnancy until the second trimester allows for radiation exposure during critical organogenesis (weeks 2 to 8). There are specific thresholds that can result in major malformation and growth retardation. Between 8 and 15 weeks of gestation, the complications for excess radiation are potential for growth retardation and severe mental disability (14).

Fellows are exposed to scatter radiation that is attenuated under 0.5 mm of lead at the waist with a lead apron. Lead varies from 0.25 to 1 mm in thickness. Marx et al. (15) recorded a total of 9 mrem with 0.5 mm of lead at the waist. A pregnant interventionalist wearing double lead for the entire gestational period can have an average dose of 30 mrem and approximately 20 pounds extra added due to the protection gear (14). Imaging cardiologists participating in structural cardiology cases are also exposed to radiation. The International Commission on Radiological Protection recommends a supplementary dose limit of 2 mSV to the abdominal surface of a pregnant member of staff to provide protection to her fetus.

There is also radiation exposure to the staff from nuclear medicine patients that received technetium Tc 99m or iodine I 131 (16). Fetal doses to nursing staff caring for a patient receiving technetium Tc 99m were estimated to vary from 0.86 to 1.6 mSv. There are recommendations that the pregnant imaging staff should perform no more than 6 nuclear medicine studies a day (16).

Ideally, standing >6 feet from the radiation source may reduce the exposure (12). There is also available a “maternity” lead that wraps around the waist and has additional 0.5 to 1.0 mm of protection. If fetal doses are >500 mGy, there is significant fetal damage and some agencies discuss the possibility of termination (12). There are no guidelines from the American College of Graduate Medical Education for pregnant fellows and occupational radiation exposure. This is an area that should be considered

for further clarification and protections for pregnant fellows, but overall, we propose to respect the personal choices supported by the knowledge about the effects of radiation exposure.

PARENTAL LEAVE

Leave policies for recovery and child care needs after pregnancy are poorly defined and of short duration. Especially in small training programs, placing additional call needs on others is associated with guilt for the pregnant fellow. Although 12 weeks of leave are permitted by the federal Family Medical Leave Act, returning to work after 12 weeks can delay the completion of training (17). Also, being employed by the institution for at least 1 year prior to eligibility for paid Family Medical Leave Act time adds a layer of financial burden. If additional subspecialty fellowship training is pursued, then timing of training completion and obtaining a position outside the fellowship match are also confounding issues. The American Board of Internal Medicine permits 1 month away from training per year, which can include vacation, illness, or parental or family leave (17). A fellow can take up to 1 additional month away from training without a requirement to extend the length of training if the program director can attest that the fellow has achieved clinical competence. Additionally, all fellows that attain clinical competence are allowed a total of 15 weeks away from training within a 2-year period, without the need to extend training time. Open discussion with fellowship program directors is needed to develop solutions such as offering opportunities for remote conference attendance while on parental leave or during milk expression.

Potential alternatives for coverage of clinical responsibilities are switching with co-fellows that wish to gain additional specialty experience and redistribution of workload among fellows, attending, advanced nurse practitioners, and physician assistants. Remote training in cardiac imaging rotations or simulation laboratory training during catheterization months also may allow for greater flexibility.

LACTATION RESOURCES

Accommodations require a private, quiet room and a few minutes to relax to facilitate lactation. Although most cardiologists (92%) attempt to initiate breastfeeding, the rate of breastfeeding beyond 6 months declines to 46% (18). Refrigeration is required to be easily accessible to store expressed milk and help limit time away from clinical duties. Women fellows who wish to pump at work should be allowed to scrub out of noncritical cases without negative consequences such as perceived lack of engagement in patient care. A change in culture and open communication is necessary to support women cardiologists who wish to breastfeed.

CONCLUSIONS

Graduate medical programs are educating more fellows who seek pregnancy or are of childbearing age. There is a lack of defined guidelines for the complex scenario of pregnancy during medical training. We need to reduce the obstacles, and increase society and program leadership of physicians that have a supportive inclination to mentor and guide women to successful careers. A significant number of pregnant physicians report negative reactions from their peers and faculty (18). The need for an open discussion and normalization of parenthood will allow our profession to continue to recruit and support women fellows. Although one-half of medical graduates are now women, women are less likely to pursue cardiology. Causes of this sex disparity include lack of female role models, sex discrimination, and pregnancy and child care concerns. Publications on teaching programs report formal parental leave policies in 90% of pediatric and 80% of obstetrics and gynecology residencies even a decade ago (4,11). It is time to bring down barriers to sex equality in cardiology training. This issue of well-being affects both sexes in our community and commands attention.

ACKNOWLEDGMENTS The authors thank Yevgeniy Brailovsky, DO, Steven Feinstein, MD, Tisha Suboc, MD, and Siri Kunchakarra, MD, for their ongoing advocacy for Women in Cardiology and work-life balance.

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JACC: CASE REPORTS, VOL. 1, NO. 2, 2019
AUGUST 2019:221–4

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KEY WORDS fellowship, parenting, pregnancy