

# Thoracic Surgery in the Pregnant Patient

Brian Whang, MD

## KEYWORDS

- Pregnancy • Thoracic surgery • Gestational cancer • Empyema • Pneumothorax
- Diaphragmatic hernia

## KEY POINTS

- Ionizing radiation affects the fetus depending on dose and timing of exposure. The use of radiographs, CT, and ultrasound is acceptable during pregnancy. MRI may be used in a limited fashion. PET should not be used until after delivery.
- Surgery using general anesthesia can be safely performed after the first trimester. There are cardiovascular, pulmonary, and gastrointestinal changes in pregnancy that must be considered in the conduct of surgery. Ideal pain management makes use of epidural anesthesia while limiting reliance on opiate medications.
- Empyema is a frequent complication of pneumonia during pregnancy, and video-assisted thoracoscopic surgery drainage can be safely performed. Spontaneous pneumothorax has a high rate of recurrence during pregnancy. Diaphragmatic hernia may be exacerbated while gestation progresses, which can lead to incarceration and strangulation.
- Lung cancer is rare during pregnancy, but the incidence is rising. Lung cancer reaches an advanced stage when recognized. Occasions for curative surgery are infrequent, and chemotherapy is the mainstay of treatment. There is a limited role for radiotherapy.
- Shared decision making should be a goal throughout the management of the pregnant thoracic patient.

## INTRODUCTION

Although an uncommon occurrence, the thoracic surgeon may sometimes be asked to consult on the management of a patient who is pregnant. There are no specific diseases that are uniquely germane to pregnancy in the thoracic wheelhouse, although several common conditions are known to afflict pregnant women with notable frequency, such as empyema, spontaneous pneumothorax, and diaphragmatic hernia.<sup>1–13</sup> Neoplasms of the chest may also be encountered. Increased smoking among women and delayed childbearing are expected to contribute to a rise in gestational cancer, including that of lung cancer.<sup>14–18</sup> Given the concerns for both mother and fetus, many aspects of management, from diagnosis to treatment, are

influenced by the relative merits and risks for both entities. This overview illustrates such considerations when approaching diagnostic imaging, perioperative care, and predominant thoracic conditions described in the literature, with particular attention paid to the treatment of cancer. The unifying principle of all these endeavors should be shared decision-making, in which the patient is sufficiently informed and supported to make choices that are congruous with her values and beliefs.<sup>15,17,19–21</sup>

## DIAGNOSTIC IMAGING

The use of radiographs and CT is pervasive in the standard work-up of thoracic patients. The deleterious effects of ionizing radiation on the fetus,

---

Disclosure Statement: There are no disclosures or conflicts of interest.

Division of Thoracic Surgery, Brigham and Women's Hospital, 75 Francis Street, Boston, MA 02115, USA

E-mail address: [bwhang@bwh.harvard.edu](mailto:bwhang@bwh.harvard.edu)

Thorac Surg Clin ■ (2017) ■–■

<https://doi.org/10.1016/j.thorsurg.2017.08.002>

1547-4127/17/© 2017 Elsevier Inc. All rights reserved.

however, are well documented, based on studies of atomic bomb survivors, patients exposed to medical radiation, and animal models.<sup>22</sup> During the first 2 weeks after conception, the irradiated embryo either dies or undergoes normal development, following the all-or-nothing rule.<sup>14,15</sup> The 3-week to 8-week period of early organogenesis that follows is keenly sensitive to the effects of radiation. Death, developmental malformations, and growth retardation may occur with doses as low as 50 mGy to 250 mGy. Fetal doses of 100 mGy to 250 mGy are generally cited as thresholds for such teratogenicity.<sup>15,22,23</sup> During weeks 8 to 15, there is a high risk of severe mental retardation at doses of 60 mGy to 310 mGy as well as microcephaly over a threshold of 200 mGy. At 16 weeks to 25 weeks, a low risk for severe mental retardation exists at doses over 250 mGy.<sup>23</sup> After 25 weeks, the deterministic effects are thought to be insignificant.<sup>17</sup> The stochastic effects include a 6.4% risk of carcinogenesis from childhood to young adulthood per gray of gestational radiation exposure.<sup>24</sup>

Fortunately, diagnostic radiography can be safely used when abiding by limitations on dose, gestational age, and radiation field.<sup>14,15,17,25–27</sup> When using the principle of as-low-as-reasonably-achievable (ALARA), a routine chest CT delivers indirect fetal exposure that is less than 0.2 mGy.<sup>15,28</sup> The dose of a chest radiograph is estimated at 0.0004 mGy.<sup>15</sup> Given these small doses, external shielding is not necessary, although the patient may find it reassuring.<sup>22</sup> Internal shielding is also achievable through the ingestion of oral barium.<sup>29</sup> In addition, the use of iodinated intravenous (IV) contrast has not been shown to be teratogenic. Because it can cross the placenta, however, there is the theoretic risk of neonatal hypothyroidism. Again, this is not supported by the literature. Nonetheless, its use should be restricted to when absolutely necessary.<sup>23</sup>

MRI seems to be an attractive option, given its clinical utility and independence from ionizing radiation. Some investigators advocate its use as a safe and appropriate modality for metastatic work-up.<sup>20,25</sup> No studies have yet to demonstrate harm to the fetus. There are concerns, however, over the potential for tissue heating and other biological insults as well as auditory damage produced by varying gradient electromagnetic fields.<sup>22</sup> Consequently, current guidelines recommend the use of MRI only when there are no suitable alternatives, the information is likely to affect patient care, and the study cannot wait until after the completion of pregnancy.<sup>27,30</sup> Similarly, although there are no documented teratogenic effects of gadolinium in humans, its use is also

restricted by the same criteria, and there must be collaboration between the radiologist and referring physician.<sup>30</sup>

PET is another imaging modality commonly used in the work-up of thoracic malignancy, but it cannot be recommended during pregnancy. This is due to the prohibitive amount of radiation exposure from the passage of fludeoxyglucose F 18 across the placenta.<sup>31</sup> Even after delivery, breastfeeding must be temporarily suspended due to the high concentration of Fludeoxyglucose F 18 in breast milk.<sup>32</sup>

Ultrasound has the best safety profile of all, and it has particular clinical utility in image-guided procedures, such as thoracentesis and percutaneous biopsy of cervical and supraclavicular lymph nodes. Loculated pleural and pericardial effusions can be precisely investigated, and chest wall masses can often be examined with sufficient clarity. Ultrasound can also be a useful adjunct in the evaluation of abdominopelvic disease.<sup>25,27</sup>

## PERIOPERATIVE ISSUES

Nonobstetric surgery is performed on 0.5% to 2% of pregnant women in North America per year.<sup>33</sup> Anesthetic agents are potentially teratogenic, so the use of general anesthesia is best avoided until the second trimester.<sup>34</sup> The actual risk of spontaneous abortion is 1% to 10% in the first trimester,<sup>17,35</sup> but this risk becomes comparable to the normal miscarriage rate when appendectomies are excluded. Relative risk for low birth weight and premature labor is only slightly increased throughout gestation (1.5–2.0),<sup>36</sup> although it is relatively higher during the third trimester.<sup>3</sup> As with miscarriage, the rate of premature labor is also affected by surgical site; it is more common with lower abdominal or pelvic surgeries.<sup>37</sup> The safety and feasibility of thoracic surgical intervention have been well documented in the literature, including that of video-assisted thoracoscopic surgery (VATS).<sup>2,3,10,27,38–41</sup> The use of CO<sub>2</sub> insufflation in VATS, however, has not yet been reported. If surgery cannot be delayed until the onset of fetal maturity, then the risk profile favors proceeding in the interest of maternal health.<sup>17</sup>

The fetal and maternal safety at hand is the salutary effect of modern anesthetic and operative management that has been mindful of several nuances in pregnant physiology. In the mother, there is increased blood volume, heart rate, and cardiac output. This is accompanied by supine hypotension, elevated diaphragm, decreased pulmonary functional residual capacity, delayed gastric emptying, and hypervascularity of the respiratory

Download English Version:

<https://daneshyari.com/en/article/8820787>

Download Persian Version:

<https://daneshyari.com/article/8820787>

[Daneshyari.com](https://daneshyari.com)