Respiratory Gating

If radiation therapy is part of your treatment plan, respiratory gating may be used. Depending on your type of cancer and your treatment facility, there are a few types of respiratory gating. In this article, we will talk about why respiratory gating is used and some of the most common techniques and devices. Talk with your radiation oncology team about the specifics of your plan.

What is Respiratory Gating?

Respiratory gating is a breathing technique used during external radiation therapy. It uses a device that monitors your breathing and adjusts the radiation beam as needed during treatment.

External radiation therapy uses a precise beam of radiation, aimed into the body to damage cancer cells (tumor). It is important that the radiation beam targets all or most of the tumor, while sparing as much healthy tissue as possible. As you breathe in and out, tumors in the belly or chest area can shift or move. This movement is normal. Respiratory gating focuses on the tumor’s movement through the breathing process, so that your tumor stays the primary target of radiation. It is most often used in the treatment of tumors in the chest, abdomen (belly), and breast.

What can I expect?

Most often, your care team will decide if respiratory gating is right for you during the planning stages of radiation therapy, also known as “simulation.” During simulation, you will have a CT (cat) scan of the region to be treated. Information from the CT scan is used to find the treatment fields and create a "map" for the radiation team to design the treatment. If the provider sees that your tumor moves as you breathe during the CT scan, respiratory gating may be recommended.

Although there are a few ways to do respiratory gating, the goal is the same: to monitor and control your breathing to make the radiation as accurate as possible. Whichever technique is used, you will have a chance to practice and learn more about it before starting treatment. Some examples of respiratory gating include:

- **4D (4-Dimensional) Gating**: You may have a Velcro belt around your waist with a block on it. This tracks the movement of your chest and belly with each breath. The 4D images (taken during simulation) let your care team see where your tumor is during the phases of your breathing. Most 4D gating devices have infrared lights connected to a camera. This tells the radiation beam to go on and off at the right time.

- **Deep Inspiratory Breath Hold (DIBH)**: These devices include the SDX system and ABC (active breathing control). You may be asked to breathe into a mouthpiece, which tracks your inhale (breathing in) and exhale (breathing out). There will be a clip on your nose to keep air from going in and out of your nose. You might also wear video glasses. These glasses show you a graph, or wave, that links up with your breath. When you breathe in, the line goes up. When you breathe out, the line goes down. Your radiation therapist can also see this wave on their computer. You will be asked to hold your breath at certain times.

- **Abdominal Compression**: A belt with a compression “plate” may be placed around your belly. This puts pressure on your belly and diaphragm (the main muscle used in breathing). This limits the movement of your chest and belly during inhale and exhale, leaving less room for tumor movement.

Regardless of which technique is used at your treatment facility, your care team wants you to be as comfortable as possible. Talk with your provider about your plan and the devices used at your facility.