Breast cancer: detection, treatment, and survival

Dr. Emily Alicea-Muñoz
Cancer Conversations, CoS Staff Advisory Council
26 May 2021
Things I wish I knew about breast cancer before my boob tried to kill me

Caveat: not THAT kind of doctor!

Dr. Emily Alicea-Muñoz
Cancer Conversations, CoS Staff Advisory Council
26 May 2021
Breast cancer myths

• Wearing a(n underwire) bra causes breast cancer
• Not wearing a bra causes breast cancer
• You can only get breast cancer if it runs in the family
• Men don’t get breast cancer
• Only post-menopausal women can get breast cancer
• Pregnant women can’t get breast cancer
• There is only one type of breast cancer
• If you get breast cancer you have to have a mastectomy

https://www.breastcancer.org/symptoms/understand_bc/myths-facts
Breast cancer myths

• Wearing a(n underwire) bra causes breast cancer ← FALSE
• Not wearing a bra causes breast cancer ← FALSE
• You can only get breast cancer if it runs in the family ← FALSE
• Men don’t get breast cancer ← FALSE
• Only post-menopausal women can get breast cancer ← FALSE
• Pregnant women can’t get breast cancer ← FALSE
• There is only one type of breast cancer ← FALSE
• If you get breast cancer you have to have a mastectomy ← FALSE

https://www.breastcancer.org/symptoms/understand_bc/myths-facts
Breast cancer facts

• In the US, 1 in 8 women develop breast cancer
  • ~330,000 new cases per year
  • ~12,000 of those are under age 40
  • ~43,000 deaths

• In the US, 1 in 833 men develop breast cancer
  • ~2600 new cases per year
  • ~500 deaths

• Women with no family history of breast cancer make up 85% of all breast cancer diagnoses

https://www.komen.org/breast-cancer/risk-factor/age/
https://www.breastcancer.org/symptoms/understand_bc/statistics
https://www.healthline.com/health/breast-cancer/breast-cancer-20s-30s#risk-factors
Risk factors

- The obvious: sex, age, family history
  - Women have a higher risk than men
  - Older women have a higher risk than younger women
  - Having a family history of breast cancer increases your risk
- The usual: weight, diet, exercise, alcohol consumption, smoking, stress
- The ones you wouldn’t think about:
  - Exposure to estrogen (e.g., HRT, starting period very early, going through menopause very late)
  - Radiation exposure when young (at puberty or before)
  - Pregnancy and breastfeeding (this reduces the risk of breast cancer)

https://www.breastcancer.org/symptoms/understand_bc/risk/factors
BRCA1 and BRCA2

- Breast Cancer genes – tumor suppressor genes
  - BRCA1 in Chromosome 17
  - BRCA2 in Chromosome 13
- About 1 in 400 people carry BRCA mutations that cause increased risk of breast and ovarian cancer
  - People of Ashkenazi Jewish descent are more likely to have this mutation
  - 5-10% of women’s and up to 40% of men’s breast cancer diagnoses
- The “Angelina Effect” (2013) – more genetic testing and patients asking for information about preventative mastectomies after Angelina Jolie’s announcement
Boobs are complicated

**Lobules**
- Glands that produce milk

**Ducts**
- Thin tubes that carry milk

**Axillary lymph nodes**
- Carry lymphocytes (white blood cells) to the breasts

Non-cancerous things can also appear in the breast (e.g., cysts, fibroadenomas)

https://www.mskcc.org/cancer-care/types/breast/anatomy-breast
Types of breast cancer

Ductal carcinoma in situ
- Also known as “Stage 0” breast cancer
- About 1 in 5 new diagnoses

Invasive ductal/lobular carcinoma
- IDC is most common type of BC (80%)
- Starts in the ducts, spreads out
- ILC is less common (10%)
- Starts in the lobules, then spreads

Types of breast cancer

**Triple-negative breast cancer**
- Can be IDC or ILC (10-15% of all breast cancers) and is very aggressive

**Inflammatory breast cancer**
- Rare (1-5%), causes swelling and thickening of breast skin, starts at Stage III

**Paget disease of the breast**
- Very rare; affects skin of nipple and areola

**Angiosarcoma of the breast**
- Usually happens as complication of previous radiation treatment
How is breast cancer detected?

- Breast exam (self, doctor)
  - It’s important for women to know what their breasts look and feel like, in case any changes happen
- Imaging, including mammograms, ultrasounds, and MRIs
  - Women 45-54 years old should get a screening mammogram every year
  - Women 55 and older can get screening mammogram every two years

https://my.clevelandclinic.org/health/diagnostics/4877-mammogram
Be aware of boob changes

12 signs of breast cancer to learn about: knowyourlemons.com

https://www.knowyourlemons.com/
Ultrasound imaging

- This is how a **cyst** looks in a breast ultrasound image
- Round, dark (liquid-filled), light shadow below
- Cysts are common in younger (pre-menopausal) women, and can vary throughout the menstrual cycle
- Cysts are benign (not cancer); if you have a cyst you can leave it alone without worry
Ultrasound imaging

• This is how a **malignant tumor** (i.e., cancer) looks like in a breast ultrasound

• Irregular shape, spikiness, wider than tall, generally ugly and scary-looking

• This prompts the need for a biopsy
Biopsies

• Also known as “unreasonably aggressive boob acupuncture” *

• A necessary evil because you can’t really diagnose breast cancer from just an image

• First you get local anesthetic, but that’s still a needle to the boob

• Core-needle biopsy uses a thin, long, hollow tube to chomp out a chunk of tissue that will get sent to a lab for pathology

https://www.mayoclinic.org/tests-procedures/breast-biopsy/about/pac-20384812#dialogId59761569
When you get a diagnosis...

- It may come through a phone call
- You may need to ask the nurse to repeat the details several times, because you won’t actually hear anything they’re saying the first time around
- You may be thinking “Am I going to die?” over and over and over and over and over and over and...
- You may cry and be angry that this is happening
- They will give you the basic details determined by the pathology report and give you the next steps
- For me, the next steps were: (1) genetic testing, (2) breast MRI, (3) mammogram, (4) surgery (also more biopsies between steps 3 and 4)
When you get a diagnosis...

• Genetic testing is easy – just spit in the little tube and wait for the results
  • My results: no BRCA mutations, yay!

• Mammograms are no fun, but breast MRIs may be even more uncomfortable (and loud, MRIs are very loud)

https://www.mayoclinic.org/tests-procedures/breast-mri/about/pac-20384809
Boob squish

- Things to know when you go for a mammogram:
  - You can’t wear deodorant
  - Wear clothes that have a separate top and bottom
  - Anticipate spending 2-3 hours in there
  - Radiologist compares your current images to last year’s images to see if there’s any changes
  - If suspicious areas show up, they’ll do an ultrasound too
  - If the suspicious areas are very suspicious, they’ll send you for a biopsy
  - You can have more than one suspicious area in one or both breasts

- **PSA:** Getting multiple biopsies at the same time is no good, bad, awful, horrible, 0/10 do not recommend – ask for general anesthesia or something!
Boob squish

- Types of mammogram:
  - **Screening** – this is what most people get; they take a total of 2-5 pictures
  - **Diagnostic** – this is what you get if you have a history of breast cancer; it’s usually 15-20 picture (btw, each picture comes with a squish)

- Things that can show up in a mammogram:
  - Cancer (duh)
  - Deodorant – this will mess up the results
  - Microcalcifications – small calcium deposits, show up as little white spots
  - Cysts (liquid) and fibroadenomas (solid) – these are non-cancerous
Boob squish

- Every time you get a biopsy done, the doctor will insert a teeny little metal ball (a biopsy marker) to indicate that the area has been studied before.
- Cancers show up as white areas in a mammogram image.
- Dense breast tissue also shows up as white areas in a mammogram image.
- Younger (pre-menopausal) women usually have dense breast tissue.
Mammogram and biopsy results give the locations of areas of interest as hours in a clock face, distance from the nipple, and depth, so of course I mapped mine out in polar coordinates.
Getting the cancer out of there

**Lumpectomy**

- Breast-preserving surgery
- Can be done if tumor is small compared to size of breast
- Surgeon removes the tumor and small rim of tissue around it (called “margins”)
- Some lymph nodes are usually removed to assess spread of cancer
- I have two scars: the lumpectomy scar and the lymph node removal scar

[Image of breast with tumor and lumpectomy scar]
Getting the cancer out of there

**Mastectomy**

- Removal of all breast tissue, often including nipple and areola
- Recommended if there’s numerous tumors, or tumors are too big compared to size of breast
- There’s different types (total, skin-sparing, nipple-sparing, radical, modified radical, bilateral)
- Reconstruction often happens after mastectomy, but some women opt for no reconstruction and use prosthetics instead (or nothing at all)

After surgery

• Tumor gets sent to pathology to confirm cancer details
  • My results: Invasive ductal carcinoma, stage 1A, 2cm, clean margins, clear lymph nodes (0/2), estrogen positive (ER+), progesterone positive (PR+), HER2 negative, Ki-67 at 10% (low), oncotype score 6 (low)

• Recovery depends on what kind of surgery you had
  • It takes longer to recover from mastectomy than lumpectomy

• Removing lymph nodes increases risk of lymphedema (build-up of lymph fluid) in the arm on the same side of the body as the surgery

• May have pain and trouble moving the arm at the shoulder (I had 7 months of PT followed by 9 months of OT, and still never recovered full range of motion)

• May develop seroma (fluid buildup) in lumpectomy site
Chemotherapy

• Aside from surgery, the other two treatments to get rid of breast cancer are chemotherapy and radiation

• I did not have to do chemotherapy (low oncotype score in surgical pathology report) so I don’t know much about it

• Chemotherapy can be done before surgery (neoadjuvant) to try and shrink the tumor, or after surgery (adjuvant) to kill any leftover cancer cells

• Very often used in treatment of stage IV (metastatic) breast cancer

• You may lose your hair going through chemotherapy
Radiation

• Radiation kills any possible leftover cancer cells without killing healthy tissue around it

• This is possible because cancer cells divide faster so they’re more likely than healthy cells to be in active mitosis, and the radiation breaks down their DNA

• LINAC (linear accelerator) accelerates beam of electrons to 0.75c, strong magnet turns beam around 270 degrees to slam into a high-Z material, usually tungsten, thus emitting bremsstrahlung with average spectral energy of 1.8 MeV (with higher energy beams mixed in as well)
Radiation

• Planning is done with a CT scan; images get put through CAD software to create a 3D model with correct dimensions and tissue densities; radiation oncologist then uses this to plan treatment dosage and schedule

• My treatment:
  • Total dosage: 6040 cGy spread over 33 treatments
  • 28 regular treatments at 180 cGy/session
  • 5 boosts at 200 cGy/session

• Note: 1 Gray (Gy) is the deposit of 1 joule of ionizing radiation per kg of tissue (1 Gy = 1 Sievert = 100 rad = 100 rem)

• For comparison, a dental x-ray is 0.5 mrem, which is 5 μGy, so my total radiation dose was equivalent to about 12 million dental x-rays

Radiation

- Radiation is delivered in tangential beams to avoid internal organs (lungs, heart)
- LINAC apparatus moves around – I got two beams, one from the top left and the other from the bottom right
- Radiation is completely painless (and you don’t develop superpowers from it, boo)
- Each beam takes 10-30 seconds to deliver the full dosage (exact time depends on temperature, humidity, etc)

http://www.aboutcancer.com/bre4b.htm
https://www.researchgate.net/figure/The-FOV-Field-Of-View-concept-in-radiotherapy-after-breast-cancer-surgery_fig1_332938085
Radiation

- They use lasers to position you

- You get sharpie marks on your skin that need to stay on the entire two months of the treatment (they get covered with tape and re-inked frequently as they fade)

- If ink fades too quickly, you get tattooed dots (I have one in the middle of my chest)

http://radonc.radiationnation.com/delay-initiating-breast-radiotherapy/
Radiation side effects

• You know how sunburns (UV, ~10 ev) can get really bad?
• Radiation therapy is a million times more energetic, so you can develop a REALLY BAD radiation burn – to this day I still have the radiation field tan lines (3yrs after treatment)
• Managed with prescription steroid creams and raw aloe (which is very slimy and stinky, ew, but feels so good on radiation-burned skin)
• You may blister and peel, which is very painful
• Your skin will redden, then darken (this includes the nipple and areola)
• No hair will ever grow again (or at least within 3yrs) in the radiation field
Radiation side effects

Other possible side effects:

- FATIGUE. Horrible, awful fatigue that lasts for months and months afterwards
- Thickening of skin within radiation field
- Radiation fibrosis (development of scar tissue in chest/arm muscles)
- The radiated breast may feel firmer and may sag less with age than the breast that was not irradiated
- Radiation can cause damage to nerves in the shoulder/armpit area
- It may be difficult or impossible to breastfeed from a breast that went through radiation therapy

https://www.breastcancer.org/treatment/radiation/side_effects
https://www.komen.org/breast-cancer/treatment/type/radiation-therapy/side-effects/
Hormone therapy

• If your breast cancer hormone-receptor positive (estrogen, progesterone), then hormone therapy comes after active treatment (surgery, radiation, chemo)

• This lowers the risk of recurrence and of developing cancer in the other breast

• Two main categories:
  • estrogen blockers (*Tamoxifen*), used for men and pre-menopausal women
  • aromatase inhibitors, used mostly for post-menopausal women

• Hormone therapy is recommended to take 5-10 years (I’m 3yrs in now)

• Possible side effects of Tamoxifen: menopause-like symptoms (hot flashes, night sweats, irregular periods), uterine polyps that can lead to endometrial cancer (yeah...), cataracts, blood clots

https://www.breastcancer.org/treatment/hormonal
https://www.breastcancer.org/treatment/hormonal/comp_chart
https://www.komen.org/breast-cancer/treatment/type/hormone-therapy/
https://www.komen.org/breast-cancer/treatment/type/hormone-therapy/tamoxifen/side-effects/
When treatment is over...

- You had all the biopsies and MRIs and mammograms, then surgery and recovery, and radiation and chemo, and recovery from those, and then... what?
- **The transition from “cancer patient” to “cancer survivor” can be difficult**
  - You have scars, physical and emotional, that can take a long time to heal
  - You feel tired, your body has gone through a lot in a relatively short time
  - You don’t see your doctors every day anymore, now it’s every 6 months to a year
  - You have the ever-present worry of the cancer coming back
  - Therapy helps, as does having a strong support network: family, friends, significant others, coworkers, etc
- You could also distract yourself by finishing up a PhD thesis 😊
With thanks to my cancer team

Dr. Adrienne Zertuche
Dr. Bill Barber
Jennifer Munn, RN
Dr. Samantha Shams
Dr. Adam Nowlan
Lauren McDermott, PA-C
Tori Thompson, LCSW
Dr. Perry Ballard