**6. Breast Cancer Screening: Mammograms**

Mrs. M questioned whether she should get another mammogram. She was in her upper 50’s, and thus clearly within the age group where mammograms are not only recommended but have also been demonstrated to reduce breast cancer mortality. Her friends and family wanted her to get the test, and everything she read insisted she get her mammogram every year. Even her insurance company and the mammogram facility sent her reminders to assure that she get her annual screening.

“It’s such an easy test,” she told me, “but I hate it.”

I asked her why she felt compelled to get the test, and why her family was pushing her in that direction.

“That’s easy,” she said. “Everyone knows that it saves lives. I heard it cuts the risk of dying in half. Really, I would have to be crazy not to get it.”

I then asked her why she was reluctant to get the test.

“It hurts,” she said with a smile. “You should try it once and see what it feels like. And the last two times I had it they found abnormal stuff. I had to get an ultrasound and another kind of mammogram, and then had to go for a biopsy to prove it wasn’t cancer. That’s the third biopsy I had to have. My sister and mother went through the same thing.”

She admitted to being very anxious after every mammogram, losing sleep, and even missing days of work. She was having panic attacks simply thinking about getting the test again.

Mrs. M knew a friend who had a breast cancer discovered with a mammogram and she was treated and cured. She also knew of several people who died from breast cancer, and they had been getting mammograms too. So to her, despite everything she heard and was told, she was not convinced that mammograms were really helping to keep people alive longer. And she knew that for her, there did not seem to be any sense in finding more false positives and having more biopsies that revealed nothing. She seemed very torn about what to do.

We talked about what the likelihood was that a mammogram could prevent a breast cancer death, and what the likelihood was that a mammogram would show another false positive finding that would potentially require more testing or a biopsy. Mrs. M looked at the numbers and, without a pause, declared that she was done getting mammograms. Others of my patients look at those same numbers and come to the opposite conclusion, but for Mrs. M, whose anxiety level escalated when even discussing breast cancer screening given her past experience, the numbers actually helped to allay her fears.

**A. Key Questions**

* Given a patient’s personal demographics and family history, how good is mammography at detecting a cancer that, if not removed, would be potentially dangerous?
* What are the personal risks of mammography? What is the likelihood that a mammogram will detect a finding that is not cancer but requires further testing?
* What are the next steps typically taken if the mammogram is abnormal, and would the patient be willing to undergo those steps?
* If breast cancer is detected, would the patient accept treatment? What are typical treatments?
* If the patient agrees to mammography, how often should it be done? If done less than the recommended rate, how will that impact her health?
* At what age should patients stop getting mammograms?

**B. Risks and Benefits**

* Mammography has become an accepted screening procedure that is sanctioned by most cancer organizations and is paid for annually by most insurance carriers. Women typically start screening at age 45 and continue to have the test annually for much of their lives. New recommendations suggest that screening stop in the mid-70s.
* **The most recent studies suggest that, with lifetime screening, approximately 1/1000 breast cancer deaths are averted compared to those who are not screened (Fig. 6.1).**
* There is little empirical evidence that the overall death rate is decreased with mammograms.
* Mammograms do have a large false positive rate, with over 500/1,000 women screened having abnormalities on their mammogram that are later found to be benign. One recent study suggested that 200/1,000 women screened develop psychological trauma from the high rate of abnormal mammograms**, while 64/1,000 women screened have unnecessary biopsies (Fig. 6.2)**
* **Of 1,000 screened with mammograms over a lifetime, 10 have unnecessary treatment, which includes 2.4/1,000 who have unnecessary surgery, radiation, or chemotherapy (Fig. 6.3).**

**BRCTS**

**Breast Cancer Screening: Mammograms**

**Benefits of Breast Cancer Screening**

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**Fig. 6.1 – If there were 1,000 women sitting in a theater who have had mammograms over a lifetime, there would be approximately 1 less breast cancer death, represented by 1 blackened seat, over that time period when compared to 1,000 women who have not had mammograms.**

**Frequency of False Positives in Abnormal Mammograms**

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**Fig. 6.2 – If there were 1,000 women sitting in a theater who have had mammograms over a lifetime, there would be an additional 64 women, represented by blackened seats, who require a biopsy for what proves to be a benign lesion compared to 1,000 women not screened. Overall with mammography, 500 out of 1,000 women have false positive results compared to those who did not undergo screening.**

**Unnecessary Treatment as a Result of Mammograms**

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**Fig. 6.3- If there were 1,000 women sitting in a theater who have had mammograms over a lifetime, 10 additional women, represented by blackened seats, would be subjected to unnecessary treatment when compared to 1,000 women who did not undergo screening. This includes an excess of 2.4 people out of 1,000 who have unnecessary surgery, radiation, or chemotherapy.**

**C. Discussion**

The primary purpose of screening mammography is to detect breast cancer at its earliest stage so that it can be effectively treated. Breast cancer is a prevalent and devastating disease in women. The life-time risk of developing breast cancer in American women is about 120/1,000, and approximately 40,000 people die of breast cancer each year. This risk decreases after the age of sixty.[[1]](#endnote-1)[[2]](#endnote-2) The risk is higher with people who have a strong family history and who carry a certain genetic mutation. Breast cancer can lead to death even decades after it is initially discovered.

Since breast cancers often do metastasize, especially in younger women, it is felt that waiting for a cancer to form a palpable lump is often too late. Mammograms can detect abnormal clusters of calcium in the breast that are harbingers of either cancer or carcinoma-in-situ, which is believed will transform into cancer if left alone. An early study suggests that in 3 years approximately 50/1,000 indeterminate micro-calcifications transform into cancer.[[3]](#endnote-3) The sensitivity and specificity of micro-calcifications are low. Approximately 10-20/1,000 breast cancers produce micro calcifications, and approximately 10-20/1,000 micro calcifications become cancer.[[4]](#endnote-4) Therefore, the presence or absence of these calcifications does not indicate that a person either has or is free from cancer.

After an abnormal mammogram, patients will often be biopsied with a needle to extract tissue and ascertain whether the area of concern is cancerous. Depending on that result, patients may elect to have the breast removed (mastectomy), have the cancer removed from the breast followed by six weeks of daily radiation treatments (lumpectomy), receive hormonal treatments, and/or even receive chemotherapy.

Do mammograms mitigate the risk of detecting and dying from breast cancer? The US Preventive Service Task Force recommends mammogram screening every other year for women between 50-75 years old. The data for screening under 50 is specious and individualized, and, according to the site, “Among women 75 years and older, evidence of benefits of mammography is lacking.”[[5]](#endnote-5) But what is the absolute risk reduction of mammogram screening among the 50-75 year group, which is where Mrs. M sits, and what are the risks of the test itself?

A recent, robust study suggests that among 1,000 women screened with mammograms, one cancer death may be prevented with essentially, no reduction in overall death rate. The study also suggests that over the past 30 years 1.3 million women were over-diagnosed by mammography, resulting in 64 unnecessary biopsies out of 1,000 women screened. Most tumors detected over the thirty year period, the study concluded, were not clinically relevant.[[6]](#endnote-6)

Several other studies have reached similar conclusions, demonstrating both minimal benefit and risk from breast cancer screening.[[7]](#endnote-7) [[8]](#endnote-8) [[9]](#endnote-9) [[10]](#endnote-10) In the elderly, mammography leads to the detection of fewer episodes of clinically significant breast cancer and more false positive tests that cause potential harm. [[11]](#endnote-11) A 2011 Cochrane analysis estimates that for every 2,000 women screened with mammography over ten years, one will have her life prolonged, 10 will receive unnecessary treatment, and 200 will experience psychological distress from false positive findings.[[12]](#endnote-12)

Gilbert Welch from Dartmouth, whose group has extensively studied mammograms, summarized recent findings in the *New York Times*. He reported that among 1,000 women screened with mammography, 0-3 will avoid a breast cancer death, 3-14 will be over-diagnosed and over-treated, and 490-670 will have false positive tests.[[13]](#endnote-13)

A recent study finds that because so many breast cancers grow slowly, do not grow at all, or actually regress, early detection of breast cancer by mammography causes 2.36/1,000 screened women to receive unnecessary and potentially dangerous surgery, chemotherapy, and/or radiation for cancers that would not have killed them.[[14]](#endnote-14) This study attracted a great deal of media attention, but it seems to mirror the findings of earlier research.

A less discussed potential downside of mammography, especially with its high false positive rate leading to large numbers of biopsies and unnecessary treatments, is that people like Mrs. M become very anxious. Studies do demonstrate that many women have heightened levels of anxiety from mammograms, especially those who have several false positives.[[15]](#endnote-15) Overall, women who do have mammograms should be made aware of the potential risks and benefits of the test and be prepared for the high possibility of false positives.

1. <http://www.cancer.gov/cancertopics/factsheet/detection/probability-breast-cancer> [↑](#endnote-ref-1)
2. <http://www.cancer.org/cancer/breastcancer/detailedguide/breast-cancer-key-statistics> [↑](#endnote-ref-2)
3. #  Berend, M, et. al. (1992) “The Natural History of Mammographic Calcifications Subjected to Interval Follow-up,” Archives of Surgery, December, 1992, 127(11): 1309-13.

 [↑](#endnote-ref-3)
4. http://lubbockonline.com/business-focus/2011-10-24/microcalcifications-found-mammogram-can-lead-diagnosis-dcis-early-breast [↑](#endnote-ref-4)
5. <http://www.uspreventiveservicestaskforce.org/uspstf/uspsbrca.htm> [↑](#endnote-ref-5)
6. Bleyer, A and Welch, G (2005) “Effect of Three Decades of Screening Mammograms on Breast Cancer Incidence,” New England Journal of Medicine, 2012, 367: 1998-2005 [↑](#endnote-ref-6)
7. Welch, HG, (2009) “Over Diagnosis of Mammogram Screening: The Question if not Whether but How Often it Occurs,” BMJ, 2009, 339: 182-3 [↑](#endnote-ref-7)
8. Welch, HG, et. al. (2010) “Screening Mammography: A Long Run for a Short Ride,” New England Journal of Medicine, 2010, 363 [↑](#endnote-ref-8)
9. Phillips, KA, et. al. (1999) “Putting the Risk of Breast Cancer into Perspective,” New England Journal of Medicine, 1999, 340(2): 141-4 [↑](#endnote-ref-9)
10. Zahl, DH, et. al. (2008) “The Natural History of Invasive Breast Cancer Detected by Screening Mammography,” Archives of Internal Medicine, 2008, 168(21): 2311-15 [↑](#endnote-ref-10)
11. Smith-Bindman, R, et. al. (2000) “Is Screening Mammography Effective in Elderly Women?,” American Journal of Medicine, February 2000, 108(2): pp. 112-9 [↑](#endnote-ref-11)
12. Gøtzsche PC, Nielsen M (2011). "Screening for breast cancer with mammography". *Cochrane Database Syst Rev* (1): [↑](#endnote-ref-12)
13. Welch, H, (2013) “Breast Cancer Screenings: What we Still Don’t Know,” The New York Times, December 30, 2013 [↑](#endnote-ref-13)
14. Kolata, G, (2014) “Vast Study Casts Doubts on Value of Mammogram,” The New York Times, February 12, 2014. <http://www.nytimes.com/2014/02/12/health/study-adds-new-doubts-about-value-of-mammograms.html?_r=0> [↑](#endnote-ref-14)
15. Lerman, C, et. al. (1991) “Psychological and Behavior Implications of Abnormal Mammograms,” Annals of Internal Medicine, 1991, 114(8): 657-61 [↑](#endnote-ref-15)