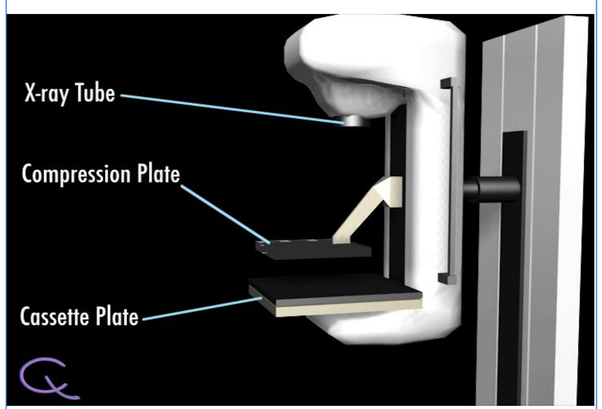
Accuracy and Safety of Thermography as the Primary Screening Tool for Breast Cancer

An Integrative Research Review

Mary Payne, BSN, RN
Lubbock Christian University Graduate Student

BACKGROUND & SIGNIFICANCE

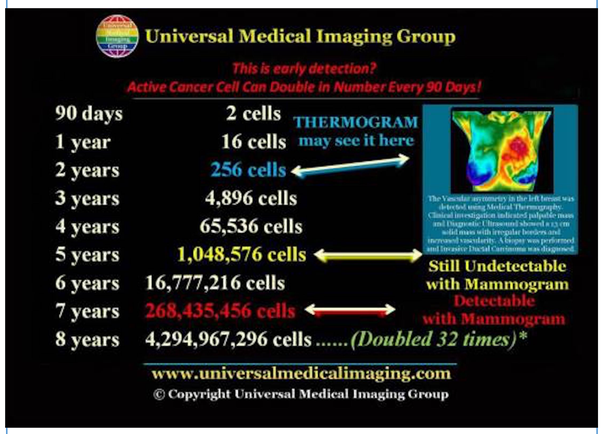
- Breast cancer is a tumor in which the cells grow and duplicate very quickly and destroy the surrounding healthy cells (Milosevic, Jankovic, et al., 2018).
- Breast cancer remains one of the main causes of death in women. Research shows that most mammography can have a false negative rate of up to 30% (Morales-Cervantes, 2018).
- The disease rarely shows symptoms at the early stages, when it can be managed more easily as well (Milosevic, Jankovic, et al., 2018).
- Mammography (recommended every 5 years after the age of 40) is much less effective when breast tissue is very dense or if implants are in pce, therefore the likelihood of detecting tumors early on or at all is less likely (Lashkari, Pak, Firouzmand, 2016).
- For every 2000 people screened by mammography in 10 years, it is predicted that one will not die of breast cancer and of that 2000 people screened, 10 healthy people will be treated unnecessarily (Gotzsche & Jorgensen, 2013).
- Some studies have shown significant leads to thermography being beneficial in breast cancer diagnosis (Wahab, Salim, Ahamat, et al., 2016). Others find the sensitivity and specificity is not strong enough. This IRR was done to review high level evidence in hopes of revealing a safe and accurate replacement for mammography screening.



Stone, J. (2011). *Mammography.* [Digital Image]. https://www.flickr.com/photos/60983548@N06/5581624762

RESEARCH QUESTION

Is breast thermography an accurate and safer alternative to mammography in early detection of asymptomatic women?



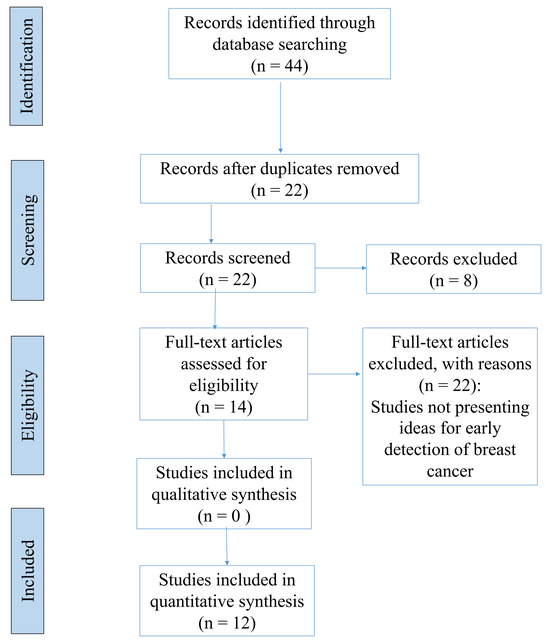
Universal Medical Imaging Group. (2013). [Digital Image] https://elixirultineretii.wordpress.com/2013/06/19/thermography-for-breast-cancer-prevention/#jp-carousel-1840

METHODOLOGY

- An integrative research review was performed using the process outlined in Whittemore and Knafl (2005) and Brown (2018).
- PubMed, Cochrane, CINAHL, Medline Complete, Academic Search Ultimate, Complementary Index, and Directory of Open Access Journals were searched using the following terms: "breast thermography" or "infrared imaging" and "mammography" and "early detection" and "breast cancer."
- Search criteria were limited to full text articles published between the years 2015 and 2020 except for PubMed and Cochrane which both used 2013-2020.
- After screening the articles, 22 were excluded for reasons including- full text unavailable, and lack of information addressing thermal imaging for breast cancer detection.
- Finally, the studies were then synthesized and and compared with each other for further analysis of results.

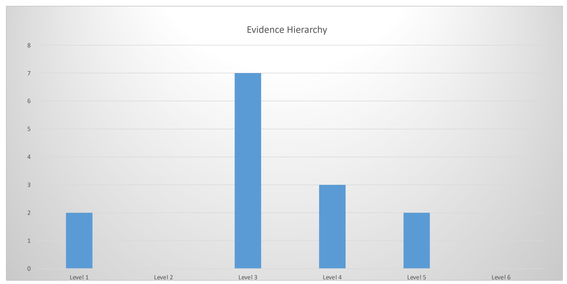
LITERATURE SEARCH FLOW DIAGRAGM

PRISMA



RESULTS

- Forty-four articles were initially identified. Twelve of which were found pertinent and high-level evidence for this IRR.
- Level of evidence rated using the PRISMA guide (Long & Gannaway, 2015).



LITERATURE SYNTHESIS

- Studies have found that the sensitivity of thermography is higher than mammography. At this point studies suggest thermography in adjunction with other breast cancer screenings (Alikhassi, Hamidpour, et. al, 2018; Morales-Cervantes, Kolosovas-Machuca, et. al, 2018)
- Thermography can detect tumors in women with more dense breast tissue, (Wahab, Salim, Ahamat et. al, 2016)

LITERATURE SYNTHESIS CONT'D

- A study in 2016 found that when thermography and mammography are combined, the accuracy is 100%. Thermography caught the misdiagnosis from mammography every time (Prasad, Ramachandra, Kumar, et al, 2016).
- From studies in the past 5 years there are many different tools that are safer and accurate when screening for breast cancer besides mammography. (Park, Lim Jo et. Al, 2018; Masoomi, Stapleton, Alsousari, 2015; Mehnati, Khorram, Zakerhamidi, Fahima, 2018; Swarnalakshmi & Aarthee, 2017).
- Thermography is very promising in assisting with diagnosing breast cancer early and could reduce the list of women who need mammography screening (Milosevic, Jankovic, Milenkovic, & Stojanov, 2018; Lashkari, Pak, & Firouzmand, 2016).
- Screening for breast cancer could actually be hurting more women than helping the small percentage that it does (Gotzsche & Jorgensen, 2013).
- More studies with asymptomatic women are needed before implementing other forms of breast cancer screening (Vreugdenburg,Willis,Mundy, et. al 2013).

CLINICAL IMPLICATIONS

- Evidence from these articles included in this IRR suggests the cost, discomfort, exposure to radiation, and false results that come from mammography are undeniable. It is pertinent that an alternative method is found and researched to replace mammography. Until then, many women will be treated unnecessarily, or their diagnoses will be missed in time.

CONCLUSION

- Results form this IRR found that there is a place for thermography in the early detection of cancer. With the information we have now, it is safest to only use adjunctly.
- Due to the rate of breast cancer deaths and the need for timely treatments, the need for level 1 evidence to supporting or denying this question is vast.

REFERENCES

Available upon request.

Mary Payne, mpayne0648@lcu.edu