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Improving the Patient Experience in Breast Imaging and Intervention – A Patient-Centered Approach

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Background

Breast cancer screening is widely performed with mammography. Undergoing a mammography examination has been shown to impart psychological effects, including fear of pain and discomfort from breast compression and positioning, as well as anxiety and apprehension of receiving the test result. If a suspicious finding is identified on screening mammography, further investigation with diagnostic mammography, ultrasound, or magnetic resonance imaging (MRI) will be necessary. If a finding warrants a needle biopsy, the procedure will be performed under mammographic, ultrasound, or MRI guidance. If a small, early-stage breast cancer is diagnosed, a new minimally-invasive treatment called percutaneous cryoablation therapy is now an available option.

Breast needle biopsy and cryoablation procedures are associated with patient anxiety and fear of pain. These emotions can range from clinical anxiety to short-lived unease or worry. There is a paucity of physician-approved, patient-centered, and patient-friendly resources available at the breast center to inform patients on what to expect, including the anticipated level of pain or discomfort from undergoing a mammographic exam or breast procedure, technical aspects of a procedure, the potential range of biopsy results, and cryoablation therapy outcomes. This lack of information contributes to a high level of patient anxiety and stress, which may translate to decreased patient adherence to screening recommendations, higher rate of adverse events or cancelled procedures, reduced patient autonomy in shared and informed decision-making, suboptimal clinical and patient outcomes, and decreased patient satisfaction with the healthcare experience. There are also barriers to effective communication and information sharing related to the wide range of patient diversity and needs, encompassing language, socioeconomic, cultural, emotional, and physical factors.

Strategies to improve the patient experience are increasingly focused on patient-centered communication and education. Digital information-sharing is currently being explored for effective patient-provider interaction and communication of knowledge and guidance to help improve the patient experience and outcome. These include immersive and digitally enhanced videos with augmented reality (AR) technology, capturing the healthcare experience from the patient's perspective. These videos and other patient educational resources will reach the widest audience if made accessible through the patient portal.

Study aims

Objective 1

To create immersive first-person videos from the patient's perspective, demonstrating mammographic exams, multimodality breast biopsy procedures, and breast cryoablation. This aim is to enhance the patient's understanding of the exam or procedure, reduce or eliminate any unknowns and uncertainties before an exam or procedure, and set clear expectations for the patient encounter.

Objective 2

To create patient-centered and patient-friendly educational and informational materials regarding breast cancer screening, including indications and current recommendations, breast cancer diagnosis and prognosis, standard-of-care breast cancer treatments, and newly available therapies for select patients, such as cryoablation. These resources will be created in multiple formats, including brochures, pamphlets, electronic articles, medically illustrated visual aids, and digital video animations.

Design

Immersive First Person Stereoscopic Videos

As a team, we plan to create a set of patient-friendly immersive panoramic videos capturing the essential technical aspects of how mammographic exams and breast procedures are performed. The procedures include ultrasound-, stereotactic-, and MRI-guided breast needle biopsies, as well as percutaneous cryoablation therapy for breast cancer. These videos will be filmed with a 360° camera to simulate real-life patient experiences undergoing a mammogram or breast procedure (**Figures 1 and 2**). The videos will be filmed with the participation of myself, a physician breast radiologist and interventionalist, a mammography or ultrasound medical technologist, and using a life-like breast phantom. The content of the videos will be curated to include the relevant technical and non-technical aspects of a mammogram or procedure that would be useful for a patient to know in advance. This will help patients navigate through any initial questions or concerns, to be mentally prepared for these exams and to understand their pain management needs. For procedural videos, additional information will be provided, including realistic expectations for intraprocedural and post-procedural pain, type of anesthesia administered during the procedure, instructions on post-biopsy communications regarding biopsy results and post-procedural care. The videos will be created in different languages with narration to promote equitable access to a diverse patient population. The content of these educational videos will also be enhanced with AR technology, for example, with interactive images, text prompts, graphic overlays, and visual effects to engage attention and promote an interactive immersive experience for the patient.

Patient Education Materials

To keep pace with current screening guidelines, technological innovation, and breast cancer treatment advances, we aim to promote patient knowledge of breast health and breast cancer by providing the most up-to-date information to our diverse patient population as either hardcopy materials or materials in the electronic format delivered via the digital platform that are easily accessible through personal mobile or electronic devices (**Figure 3**). Topics pertinent to the breast, including mammography, breast biopsies, and cryoablation therapy, will be made readily available to patients at the breast center and through the patient portal. These patient-centered education materials will be created utilizing a variety of digital tools and technology, including illustrations, infographics, and video animation designed to convey patient-friendly information and basic knowledge in a manner that engages the audience and promotes understanding. These materials will be created in multiple languages to be culturally responsive and account for linguistic diversity. Supplementary materials will also be created to address the current disparity gap in providing patient information tailored to traditionally marginalized populations, such as those with physical disability and transgender patients.

Results

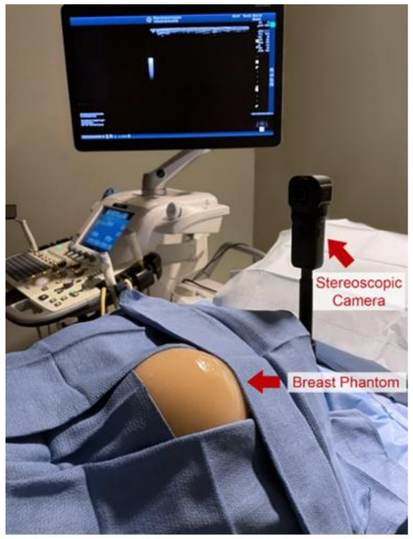


Figure 1: Ultrasound-guided breast biopsy simulation set up with a breast phantom for the filming of immersive first-person 360° stereoscopic video.



Figure 2: Immersive stereoscopic video in panoramic view demonstrating how an ultrasound-guided biopsy is performed, from the patient's perspective

Results

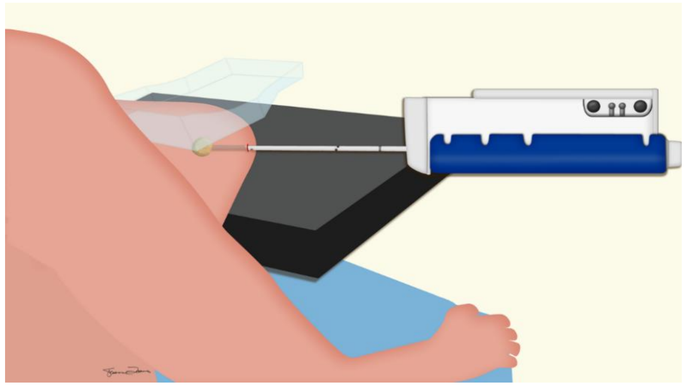


Figure 3: A medical illustration showing how a stereotactic-guided breast biopsy is performed.

Conclusion

The digital patient portal and digital health tools have revolutionized patient care delivery. This newfound method of patient engagement has profound impact on increasing patient health literacy and empowering patients to actively engage in their health care and health education. This platform enables delivery of trusted and reputable sources of health information and guidance designed for patient use directly to the patients from their clinical providers, providing the essential knowledge needed to navigate a complex health care landscape. This platform also provides an avenue for communication between patients and their providers, promoting greater patient-physician connectivity. Strengthening patient education and engagement will lead to an enhanced patient-centered experience, increased patient satisfaction, and improved health outcomes.

It is anticipated that patients who actively engage in the immersive videos before a mammographic exam or breast procedure are more likely to comply with screening mammogram recommendations, will experience less anxiety and fear, experience fewer adverse events or procedure cancellations, and have higher satisfaction with the medical care that they receive. We anticipate that a majority of patients would welcome the automatic and timely distribution of breast health educational content on their patient portals. We expect that patient-centered educational materials provided to patients will enhance their knowledge, alleviate uncertainties or worries, and empower them to have more autonomy when participating in shared decision-making with their physicians and clinical providers.

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