AbstractID: 9786 Title: Advances in Breast Imaging

Over the last decade, there have been tremendous advances in breast imaging. As many facilities make the transition from film screen to digital mammography, it is appropriate to examine the accomplishments of the past and to acknowledge current technological limitations. In addition, we should carefully study evolving technologies in breast imaging with the goal of developing highly sensitive and highly specific techniques. This presentation will examine recent progress in digital mammography, including contrast-enhanced imaging, tomosynthesis, and breast CT, from a breast imager's perspective.

Randomized clinical trials and meta-analyses have shown that screening mammography results in a decrease in breast cancer mortality. Although mammography is efficacious in most women, we know that mammography is not a perfect test, epecially in women with radiographically dense breasts. Furthermore, false positive and false negative mammograms are difficult to eliminate. As digital mammography replaces film screen mammography in many practice settings, cancer detection rates may rise slightly and call back rates may decrease slightly.

Overlapping densities and areas of dense tissue often make interpretation of film screen mammograms difficult.. Overlapping parenchyma and dense tissue hinder digital mammography less than film screen mammography, but these overlying structures are not eliminated with digital mammography. Major efforts have been made in digital tomosynthesis and breast CT in order to advance beyond projection imaging. Tomosynthesis involves the acquisition of tomographic images in the digital mammography unit, while breast CT is based on a volumetric acquisition with the patient positioned prone in a machine that is similar to a unit used for stereotactic biopsies.

Conventional digital mammography, digital tomosynthesis, and breast CT may be combined with the injection of iodinated contrast material in order to visualize tumor vascularity and increase the conspicuity of breast tumors. These techniques may also be used to monitor response to neoadjuvant chemotherapy.

Over the next decade, tomosynthesis and breast CT will transition from research applications to clinical realities. Further studies are needed in order to determine how to use these emerging tools in an effective, efficacious manner.

Educational Objectives:

1. To review advances in breast imaging over the last decade.
2. To understand the strengths and weaknesses of film screen and digital mammography.
3. To appreciate the potential roles of digital tomosynthesis and breast CT.
4. To understand the application of iodinated contrast material in digital mammography, tomosynthesis, and breast CT.