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Summary of Session 1

Breast Cancer Screening and Early Diagnosis

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Current screening recommendation

Mammography improves breast cancer patient outcomes including survival with strong evidence. Mortality reduction in the range of 25-48% has been shown in population studies and randomised controlled trials since 1960s. Mammography is advancing and can now detect tumours at smaller size and lower stage, thus reducing morbidity and the need of chemotherapy and mastectomy. All guidelines suggest mammography as the standard screening method for breast cancer. However, guidelines from different organisations and countries are confusing and conflicting, with different recommendations such as the starting age for screening, the age to stop screening and the frequency of screening.

Table 1. Recommendations for mammography screening by different guidelines.

Organisation	Year	Starting age	Frequency	When to stop	Additional recommendations
American College of Radiology (ACR)/ Society of Breast Imaging (SBI)	2010	40	Annually	Life expectancy <5-7 years	
American Society of Breast Surgeons (ASBrS)	2019	40	Annually	Life expectancy <10 years	• 3D mammogram preferred, regardless of degree of risk and breast density • Supplemental USG for dense breast

Taiwan screening program results

Screening of Chinese population has been studied in Taiwan. In a large population cohort study, three screening strategies, namely universal biennial mammography screening, risk-based biennial mammography screening and sole annual clinical breast examination, were performed on 1.4 million asymptomatic Taiwanese women aged 50-69 from 1999-2009.[1] The results showed that universal biennial mammography was the most effective strategy for detecting breast cancer early, with a decrease in mortality by 40% through reduction in ≥ stage 2 disease.[1] The study provides good evidence to support introducing universal screening in Chinese population.

Recommendation for Hong Kong

Statistics from Hong Kong Cancer Registry showed that a high proportion (around 30%) of new cases were identified in women aged 40-49 every year.[2] Therefore, Dr. Lui commented that screening should start at 40 years of age in women. Women at premenopausal age usually have dense breast, which refers to a mammographic finding with higher proportion of fibroglandular tissue compared to fatty tissue. It may obscure signs of breast cancer and lower the sensitivity of mammogram. Dense breast increases the risk for developing breast cancer by 4-6 times.

Studies have shown that supplemental USG screening in high-risk women with dense breast resulted in the detection of 1.1 to 7.2 additional breast cancer patients per 1,000 women. J-START trial (2015) in Japan showed the use of adjunctive USG to supplement mammogram increased the sensitivity of detecting cancer from 77% to 91.1% and decreased interval cancer rate by half.[3] ACRIN 6666 and ASTOUND trial both showed that supplemental USG improved sensitivity in women with dense breast.[4-5]

FDA advances landmark policy changes to modernize mammography services and improve their quality

In the US, every mammography facility for breast cancer screening is under the control of Mammography Quality Standards Act (MQSA) and must be certified by FDA. In March 2019, FDA proposed new policies to modernize FDA oversight of mammography services, addressing a number of important advances in mammography which include 3D mammogram and the need for uniform breast density reporting.

3D mammogram (Digital Breast Tomosynthesis/ DBT)

Current limitation of 2D mammogram is that tissue superimposition by overlapping glandular tissue may hide cancer or mimic pathology, causing false negative or false positive. With 3D mammogram, a rotating X-ray tube captures multiple projection images of the compressed breast at different angles. The computer then generates 1-mm thin slices of the breast, synthesizing multiple 2D images for diagnosis. Multiple studies have showed 3D mammogram outperforms 2D mammogram by increasing the detection of invasive cancer, increasing the positive predictive value (PPV) for both recall and biopsy, and reducing overall recall. A recent study showed DBT achieved higher cancer detection for all breast density.[6] The largest increased in cancer detection and greatest shift towards smaller, node-negative invasive cancer was found to be in women aged 40-49, which proves DBT to be useful in screening in this age group. Increased proportion of cancer with better prognosis was also found in DBT. Data from Taiwan showed DBT resulted in increased early cancer detection, increased cancer detection rate and increased detection of node-negative breast cancer in Chinese population.[7]

The advantage of 3D mammogram arises from better morphological details, where margins can be better analysed and spiculations are more obvious, resulting in more cancer detection and less false positive. Studies have shown that 3D mammogram is useful in all breast density including dense and fatty breast.

Concerning the radiation exposure caused by mammography, a local study in Queen Mary Hospital found that in women with dense breast, 2D mammogram caused higher radiation exposure than 3D mammogram, reflected by the lower average glandular dose (AGD) in 3D mammogram. Since 80% of women in Hong Kong have dense breast, most of the local patients can benefit from 3D mammogram with less radiation exposure. In fact, 3D mammogram does not need additional spot compression views, thus radiation dose could be lower.

Different studies have confirmed that the compression force is reduced in 3D mammogram, while retaining similar clarity and not affecting image interpretation by radiologists. Newer machine with curved compression paddle also helps improve patient comfort when having a 3D mammogram.

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