Performance Parameters of an Abbreviated Breast MRI Protocol

Authors : Andy Ho

Abstract : Breast cancer is a common cancer in Australia. Early diagnosis is crucial for improving patient outcomes, as later-stage detection correlates with poorer prognoses. While multiparametric MRI offers superior sensitivity in detecting invasive and high-grade breast cancers compared to conventional mammography, its extended scan duration and high costs limit widespread application. As a result, full protocol MRI screening is typically reserved for patients at elevated risk. Recent advancements in imaging technology have facilitated the development of Abbreviated MRI protocols, which dramatically reduce scan times (<10 minutes compared to >30 minutes for full protocol). The potential for Abbreviated MRI to offer a more time- and cost-efficient alternative has implications for improving patient accessibility, reducing appointment durations, and enhancing compliance—especially relevant for individuals requiring regular annual screening over several decades. The purpose of this study is to assess the diagnostic efficacy of Abbreviated MRI for breast cancer screening among high-risk patients at the Royal Prince Alfred Hospital (RPA). This study aims to determine the sensitivity, specificity, and inter-reader variability of Abbreviated MRI protocols when interpreted by subspecialty-trained Breast Radiologists. A systematic review of the RPA's electronic Picture Archive and Communication System identified high-risk patients, defined by Australian 'Medicare Benefits Schedule' criteria, who underwent Breast MRI from 2021 to 2022. Eligible participants included asymptomatic patients under 50 years old and referred by the High-Risk Clinic due to a high-risk genetic profile or relevant familial history. The MRIs were anonymized, randomized, and interpreted by four Breast Radiologists, each independently completing standardized proforma evaluations. Radiological findings were compared against histopathology as the gold standard or follow-up imaging if biopsies were unavailable. Statistical metrics, including sensitivity, specificity, and inter-reader variability, were assessed. The Fleiss-Kappa analysis demonstrated a fair inter-reader agreement (kappa = 0.25; 95% CI: 0.19–0.32; $p < 0.0001$). The sensitivity for detecting malignancies was 0.72, with a specificity of 0.92. For benign lesions, sensitivity and specificity were 0.844 and 0.73, respectively. These findings underline the potential of Abbreviated MRI as a reliable screening tool for malignancies with significant specificity, though reduced sensitivity highlights the importance of robust radiologist training and consistent evaluation standards. Abbreviated MRI protocols exhibit promise as a viable screening option for high-risk patients, combining reduced scan times and acceptable diagnostic accuracy. Further work to refine interpretation practices and optimize training is essential to maximize the protocol's utility in routine clinical screening and facilitate broader accessibility.

Keywords : abbreviated, breast, cancer, MRI

Conference Title : ICO 2024 : International Conference on Oncology
Conference Location : Kuala Lumpur, Malaysia
Conference Dates : December 09-10, 2024