Tissue Fixation Protocol Modification to Improve Pathology Diagnosis for Breast Cancer in Zambia

Mark A. Bailey1, Aaron L. Shibemba2, Isaac Mweeba2, Dalliah M. Black1, Mary M. Edgerton1
1 University of Texas M.D. Anderson Cancer Center, Houston, Texas, USA
2 University Teaching Hospital, Lusaka, Zambia

Introduction
The challenge for low resource clinical histopathology laboratories located in sub-Saharan Africa, is to establish an effective and consistent method to chemically fix patient biopsy and surgical tissue. Modifying the fixation protocol will improve the quality assurance of breast cancer diagnosis utilizing immunohistochemistry.

Goal
The goal of this study was to provide a standardized fixation protocol for the University Teaching Hospital histopathology laboratories in Lusaka routinely utilizing immunohistochemistry for breast cancer diagnoses.

Method
After surgical excision of breast tissue specimens and the samples were placed in unbuffered 10% saline formalin. The saline formalin, due to acidity of the chemical fixative, was identified as the root cause of poor tissue morphology that also led to false negative IHC results. Therefore we replaced the 10% formal saline with buffered 10% formalin and increased the processing times to improve the tissue morphology and staining quality. In addition we introduced the manual citrus-based antigen retrieval polymeric detection IHC technique to test the breast specimens for ER, PR and HER2 biomarkers.

Results
We established a quality assurance protocol to ensure that excised breast tissue specimens are properly grossed and chemically fixed to avoid inaccurate diagnosis. Data was collected for 15 patients ranging in age from 29-80 years.

Left Breast Mastectomy
Fixative: 10% Formal Saline

H&E (10x)  ER Ab (10x)

Left Breast Mastectomy
Fixative: 10% NBF

H&E (10x)  ER Ab (10x)

Conclusion
The improvement was achieved by using lab supplies located in the UTH hospital's storeroom. The formulation of phosphate compounds; deionized water; 37-40% formaldehyde and acidic acid were used to prepare 10% NBF and a revised processing schedule was adopted to ensure ideal and appropriate timed fixation. A QA program with IHC testing for breast cancer specimens has been implemented in Zambia as a model for low resource countries.