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Decreasing Benign Breast Ultrasound Biopsies: Prospective Use of AI Decision Support

Victoria L. Mango MD, Kristen M. Coffey MD, Lev Barinov PhD, Richard S. Ha MD

- After implementation of AI decision support, the benign biopsy rate decreased from 71.79% to 59.2% while the overall biopsy rate stayed constant.
- PPV3 increased from 28.2% to 40.8%.

Objective

To examine the affect of prospective AI decision support (Koios DS Breast) use on breast ultrasound biopsy performance metrics.

Materials and Methods

Non-identifiable HIPAA compliant data collected for QI/QA purposes only was analyzed. We evaluated breast ultrasound biopsy performance metrics of a large private practice radiology group for a 12-month period before and for 12 months following a 6 month adaption period of AI technology (Koios DS for Breast). Radiologists utilized the AI technology in real-time as part of their routine clinical practice at their discretion when making their final diagnostic judgment. Use of the technology was verified via audit and quality logs from Koios DS. One radiologist left the practice and four radiologists joined the practice in the assessed intervals. Impact on physician performance was assessed by comparing retrospectively obtained metrics of physician performance before Koios DS was in use to prospective metrics after Koios DS was implemented, following a 6-month acclimatization period.

Results

12 radiologists, 10 of whom are breast fellowship-trained, read a total of 6,087 diagnostic breast ultrasound exams following the implementation of AI, 2,060 in the 6-month period immediately following AI installation and 4,027 exams in the 7–18 months following AI installation that were tracked for comparison to the 12 months preceding AI installation. When comparing 12 months prior to the implementation of AI decision support to the tracked 12-month period after, the benign biopsy rate decreased from 71.79% to 59.2% (p = .04), while the overall biopsy rate stayed constant between the two periods: 117/3761 (3.1%) to 125/4027 (3.1%), p = 0.98. PPV3 increased from 28.2% to 40.8% (p = .04). Koios utilization rate on diagnostic breast ultrasound studies was 57.9%.

CONCLUSION

Prospective use of AI decision support in breast ultrasound interpretation by radiologists in our quality assessment correlates with improved diagnostic performance with decreased benign biopsy rates and increased PPV, while maintaining a consistent biopsy rate. A direct causal relationship cannot be inferred and warrants further investigation with a control group study design.