The Effect of an Evidence-Based Medicine Curriculum on Breast Cancer Knowledge and Satisfaction of Surgical Residents

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OBJECTIVE: The current study was performed to determine if evidence-based medicine (EBM) curriculum would affect education of surgical residents.

DESIGN: A 5-year prospective study was designed to determine if EBM curriculum could improve residents' satisfaction and understanding of breast cancer management during a breast surgical oncology rotation. During the first 2 years, 45 journal articles were used. During the subsequent 3 years, journal articles were not used. The proportion of patients seen in clinic was collected as an objective measure of the "effort" made by the resident. The final assessment was a 120-question examination.

SETTING: Maricopa Medical Center, Phoenix, AZ. Safety net institution with General Surgery residency program.

PARTICIPANTS: Postgraduate year 2 general surgery residents.

RESULTS: Over 5 years, 30 postgraduate year 2 residents were involved. Univariate analysis showed that female sex ($p = 0.04$), residents with peer-reviewed publications ($p = 0.03$), younger age ($p = 0.04$), American Board of Surgery in-service training examination score ($p = 0.01$), and clinical effort ($p < 0.01$) were associated with higher scores. Although residents taught using the journal articles scored 7 points higher on the final examination, this was not significant ($p = 0.10$). Multivariate analysis showed that American Board of Surgery in-service training examination score and clinic efficiency remained statistically significant.

Residents who were taught using the EBM curriculum had significantly higher satisfaction (4.4 vs 3.5, $p = 0.001$) compared with those who did not go through the EBM curriculum.

CONCLUSIONS: The current study demonstrates that an EBM curriculum significantly improved resident satisfaction with the rotation. The EBM curriculum may improve residents' breast cancer knowledge. The most important predictor of resident performance was the effort of resident. (J Surg 72:717-725. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: resident, education, evidence-based medicine, satisfaction, training, trainee

COMPETENCIES: Patient Care, Medical Knowledge, Interpersonal and Communication Skills, Practice-Based Learning and Improvement

INTRODUCTION

Evidence-based medicine (EBM) is the paradigm for the practice of clinical medicine.[1] This practice requires the clinician to efficiently use published literature, interpret the results of clinical studies, and apply the results with clinical expertise to also consider the preferences and values of the patient.[2] Although EBM is used to guide clinical management in most specialties, its efficacy in teaching students and residents in training has been less well examined.[3] Because of its importance to the practice of clinical medicine, studies on algorithms or curricula to educate students and residents on EBM have been published.[4-6] Its use as the primary teaching tool in any particular field of medicine has not been studied previously.

Breast cancer research and treatment is the ideal example of an evidence-based field of medicine. Breast cancer is one

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of the most public diseases and research in the field is among the most well organized and well funded. As a result, published studies rapidly change clinical practice and national guidelines. For example, the results of the American College of Surgeons Oncology Group Z11 clinical trial were reported in 2010 and then published in February 2011.[7] This publication led to changes in clinical practice in 2011 and changed national guidelines in January 2012.[8]

Breast cancer treatment, as with all of oncology, is a multidisciplinary field. However, the surgeon is most commonly the first physician encountered by the patient. The surgeon must be prepared to outline at least a preliminary treatment plan and discuss the basic aspects of the other disciplines involved in the care of the patient with cancer. For example, one of the first, most urgent pressing questions of the new patients with breast cancer is, "Am I going to need chemotherapy?" Teaching during residency has traditionally involved patient-centered discussion, in the clinic, on inpatient hospital rounds, or in the operating room. Modern surgical residency is already under significant time constraints.[9] There is no available time to allocate clinical rotations to all the different specialties involved in cancer treatment.

The possibility of studying some of the more influential literature in breast cancer management was considered as a potential adjunct to the standard teaching (i.e., patient-focused discussion) in clinical practice. The current study was performed to determine if an EBM curriculum using published journal articles would affect education and satisfaction of surgical residents on breast cancer treatment and management.

METHODS

Maricopa Medical Center is the safety net institution in Phoenix, Arizona. The institution has several residency training programs in various medical specialties. This group of programs includes a fully accredited 5-year general surgery residency program that graduates 4 chief residents per year. During the postgraduate year 2 (PGY2), the residents do a 2-month breast surgical oncology rotation. There are 4 categorical residents and 2 undesignated preliminary surgical residents who cover the 12 months of each academic year. The breast surgical oncology rotation is supervised by a fellowship trained breast surgical oncologist (I.K.K.) and a physician assistant.

In June 2007, a prospective interventional study was designed to determine if an EBM curriculum could improve the understanding of basic breast oncology treatment and management when compared with standard teaching methods. Institutional review board exemption was obtained. For 2 years (July 2007 to June 2009), journal articles were used as the primary tool to teach residents about breast cancer management. The residents were given, on average, 4 to 5 articles per week to read. Each of the articles was discussed with the attending surgeon to ensure that interpretation of the articles was progressing in a reasonable fashion and basic concepts were grasped and synthesized. Only after completion of the discussion was the next article provided to the resident. The journals followed a systematic fashion, starting with surgical management of the breast[10-15] and lymph nodes,[16-23] then chemotherapy,[24-28] endocrine therapy,[25,32-35] targeted adjuvant therapy,[29-31] gene expression,[36,37] preoperative (neoadjuvant) chemotherapy,[38-41] ductal carcinoma in situ,[42-45] radiation therapy,[46-52] risk assessment, and prevention strategies.[53-58] The journal articles were selected based on their fit to learning goals of the rotation and their importance in changing the management of breast cancer (Table 1).

Residents were also encouraged to read on their own from standard surgical textbooks and from any other sources they deemed important to their learning in surgical residency. During the next 2 years (July 2009 to June 2011), structured discussion on topics in a similar systematic fashion was used as the primary tool to teach the residents. The discussions were organized similar to the review of the journal articles. Although the journal articles were not used, they were referenced during the discussions. The only exception was 2 journal articles were used to discuss the prognostic and predictive importance of a multigene assay in breast cancer,[36,37] because this information was not yet available in textbooks. In the final year of the study (July 2011 to June 2012), the standard teaching approach was used. Discussion of management was patient based without structured organized teaching sessions. The only exception during this final year was again the 2 journal articles about a multigene assay in breast cancer.[36,37]

As a basic needs assessment tool, the residents were given a 10-question pretest to assess their baseline knowledge of breast cancer management before the start of the rotation. Sociodemographic information about the residents was collected at the completion of each year after the rotations were completed. The information collected included age, sex, race, marital status, undergraduate school, and medical school. In addition, United States Medical licensing examination (USMLE) step 1 and 2 scores and American Board of Surgery in-service training examination (ABSITE) scores from the PGY2 were collected. The number of peer-reviewed publications of each resident was also collected at the completion of the PGY2 year.

Finally, it is clearly impossible to monitor a resident 24 hours a day to determine the time and effort put into the rotation. Objective measures, rather than subjective evaluations, have been shown to predict future outcomes in resident training.[59,60] Therefore, during the 2-month rotation, the proportion of patients seen in clinic by the resident was collected as an objective measure of the "effort" made by the resident during the rotation. The proportion of patients was used rather than the absolute number because