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Are Surgical Milestone Assessments Predictive of In-Training Examination Scores?

Mary K. Kimbrough, MD,*,† Carol R. Thrush, EdD,*,† Emily Barrett, BA,* Frederick R. Bentley, MD,*,† and Kevin W. Sexton, MD*,†

*College of Medicine, University of Arkansas for Medical Sciences, Little Rock, Arkansas; and †Department of Surgery, University of Arkansas for Medical Sciences, Little Rock, Arkansas

OBJECTIVES: With the recent utilization of Accreditation Council for Graduate Medical Education developmental milestones as part of resident evaluation, we sought to explore whether milestone-based ratings were associated with American Board of Surgery In-Training Examination (ABSITE) scores.

METHODS: Mid-year milestone ratings were obtained from the Accreditation Council for Graduate Medical Education Accreditation Database System for years 2014, 2015, and 2016 for all postgraduate years 1-5 general surgery residents in our program and paired with ABSITE scores ($n = 69$) from January of the following year. Linear regression was used to assess predictor importance of milestones on both ABSITE percentage correct scores and ABSITE percentile scores.

RESULTS: Minimal to small positive correlations were observed between milestones and ABSITE percentile scores ($r = 0.09\text{-}0.25$), while moderately large correlations were observed between milestones and percentage correct scores ($r = 0.65\text{-}0.76$). The Medical Knowledge 1 (MK1) milestone significantly predicted ABSITE percentage correct scores, and explained 60% of the variance (adjusted $R^2 = 0.603$). MK1 also significantly predicted ABSITE percentile scores, although weaker in magnitude, with MK1 explaining 20% of the variance (adjusted $R^2 = 0.197$). Postgraduate year level and other milestones were not influential predictors of ABSITE scores.

CONCLUSIONS: The mid-year MK1 milestone rating was predictive of ABSITE scores and may serve as a useful marker for Clinical Competency Committees to identify residents who could benefit from additional support to prepare for the ABSITE, although given the small exploratory nature of this study, additional research is still needed. (J Surg Ed ■:■■■-■■■. © 2017 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgery residency training, Accreditation Council for Graduate Medical Education (ACGME), American Board of Surgery In-Training Examination (ABSITE), milestones, prediction

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

INTRODUCTION

Individual resident factors and residency program characteristics are known to influence surgical resident performance on the American Board of Surgery In-Training Examination (ABSITE). Specifically, resident factors such as prior test scores (United States Medical Licensing Examination I and II and Medical College Admission Test), personal beliefs, and study habits are associated with ABSITE performance.[1,2] Residency program characteristics such as tracking resident reading by program directors, dedicated remediation strategies, and other factors such as vacation schedules have also shown associations with ABSITE scores.[3-5] ABSITE scores have become increasingly important for resident advancement in programs and for attaining fellowship positions.[5,6] Several studies have also shown ABSITE scores are associated with future performance on American Board of Surgery written and oral examinations.[6-8]

Of the studies that have looked at relationships between general surgery resident evaluation measures and performance on the ABSITE, the findings are somewhat mixed.[9-11] One multisite study found significant correlations between

competency-based ratings assigned by faculty and ABSITE total percentile scores.[9] Another study found no relationship between rotation-specific evaluations and ABSITE percentile or percentage correct scores.[10] A third study found that rotation-specific evaluation scores were not associated with ABSITE percentage correct scores at one program and were only moderately correlated at a second program.[11]

With Accreditation Council for Graduate Medical Education (ACGME) developmental milestones now part of all general surgery residents' evaluations,[12,13] we sought to explore whether mid-year milestone-based ratings given by the Clinical Competency Committee (CCC) were predictive of ABSITE scores the following January. This study was designed with a practical bent, asking the question of whether any mid-year milestone evaluation ratings could inform program leadership of residents that might benefit from additional support in time to prepare for the upcoming ABSITE.

METHODS

After obtaining Institutional Review Board approval, this study was conducted using residency program data from a medium-sized general surgery residency program based at a public academic health center in the mid-south United States. Mid-year milestone ratings completed by the program's CCC were obtained from the ACGME Accreditation Database System for years 2014, 2015, and 2016. For each year, the mid-year milestone ratings were paired with ABSITE scores ($n = 69$) from January of the following year for all postgraduate years (PGY) 1-5 residents in our program.

Data sources used by the CCC to assign milestone ratings consist of end-of-rotation faculty and student evaluations (Likert-type ratings and narrative ratings), case log reports, prior ABSITE scores, and mock oral examination scores. Review of all data sources is combined with group discussion about the various personal interactions with each resident and observations made by CCC members. The CCC, which consists of 9 faculty members and the residency program coordinator, assigns milestone ratings sequentially for each individual resident via group consensus.

Spearman correlations with two-tailed p values were computed to assess bivariate correlations between milestones and ABSITE scores. Linear regression with a default block entry method was used to analyze the predictor importance of milestone ratings, and PGY level, on both ABSITE percentage correct scores and ABSITE percentile scores, using the Statistical Package for the Social Sciences (SPSS, version 22.0).

All milestones were entered as potential predictors in the model including: Patient Care 1 (PC1-Performance of History and Physical), Patient Care 2 (PC2-Recognition and Management of Post-Operative Problems), Patient Care 3 (PC3-Surgical Skills), Medical Knowledge 1 (MK1-Knowledge of Surgical Conditions), Medical Knowledge 2 (MK2-Knowledge of Operative Steps, Peri-Operative Care, and Post-Operative Complications), Practice-Based Learning and Improvement 1 (PBLI1-Teaching), Practice-Based Learning and Improvement 2 (PBLI2-Self-Directed Learning), Practice-Based Learning and Improvement 3 (PBLI3-Self-Directed Learning), Professionalism 1 (PROF1-Care for Diseases and Conditions), Professionalism 2 (PROF2-Maintenance of Physical and Emotional Health), Professional 3 (PROF3-Performance of Assignments and Administrative Tasks), Interpersonal and Communication Skills 1 (ICS1-Care for Diseases and Conditions), Interpersonal and Communication Skills 2 (ICS2-Coordination of Care), and Interpersonal and Communication Skills 3 (ICS3-Performance of Operations and Procedures).

RESULTS

The mean ABSITE percentile scores were 49.3 ± 26.6. The mean ABSITE percentage correct scores were 72.3 ± 6.9. The Table shows Spearman correlations between milestone ratings and ABSITE scores. Minimal to small positive correlations were observed between milestones and ABSITE percentile scores, ranging from $r = 0.09$ to 0.25. Moderately large correlations were observed between milestones and percentage correct scores, ranging from $r = 0.65$ to 0.76. There was no significant difference in ABSITE

TABLE. Bivariate Correlations Between General Surgery Milestone Ratings and ABSITE Percentile and Percentage Correct Scores

	Spearman Correlations	
	ABSITE Percentile Scores	**ABSITE Percentage Correct Scores**
PC1	0.147	0.703**
PC2	0.125	0.689**
PC3	0.180	0.715**
MK1	0.252*	0.759**
MK2	0.176	0.701**
SBP1	0.139	0.710**
SBP2	0.143	0.717**
PBLI1	0.093	0.650**
PBLI2	0.123	0.679**
PBLI3	0.153	0.705**
PROF1	0.138	0.713**
PROF2	0.141	0.720**
PROF3	0.138	0.713**
ICS1	0.093	0.695**
ICS2	0.129	0.695**
ICS3	0.115	0.681**

*p < 0.05 (significant correlation).
**p < 0.001 (significant correlation).