

Procedural Impact of a Dedicated Interventional Oncology Service Line in a National Cancer Institute Comprehensive Cancer Center

Mary Ellen Koran, PhD^a, Andrew J. Lipnik, MD^b, Jennifer C. Baker, MSN, APRN^b, Filip Banovac, MD^b, Reed A. Omary, MD, MS^b, Daniel B. Brown, MD^b

Abstract

Purpose: We tested the hypothesis that establishing a dedicated interventional oncology (IO) clinical service line would increase clinic visits and procedural volumes at a single quaternary care academic medical center.

Methods: Two time periods were defined: July 2012 to June 2013 (pre-IO clinic) and July 2013 to June 2014 (first year of dedicated IO service). Staff was recruited, and clinic space was provided in the institution's comprehensive cancer center. Clinic visits and procedure numbers were documented using the institution's electronic medical record and billing forms. IO procedures included were transarterial chemoembolization, Y-90 radioembolization, perfusion mapping for Y-90, portal vein embolization, and bland embolization. We compared changes in clinic visit and procedure numbers using paired *t* tests. Changes after IO initiation were compared to 1-year changes in the Medicare 5% Limited Data Set by cross-referencing Current Procedure Terminology and International Classification of Diseases codes in 2012 and 2013.

Results: Clinic visits increased from 9 to 204 ($P = .003$, $t = 8.89$, $df = 3$). Procedures increased from 60 to 239 ($P = .018$, $t = 3.85$, $df = 4$). Procedural volumes increased at least 150% for each subtype. The volumes in the 5% Limited Data Set did not change significantly over the 2-year period (443 to 385, $P > .05$).

Conclusions: The establishment of a dedicated IO service significantly increased clinic visits and procedural volumes. National trends were unchanged, suggesting that the impact of our program was not part of a sudden increase of IO procedures.

Key Words: Interventional radiology, practice development, chemoembolization, radioembolization, portal vein embolization

J Am Coll Radiol 2016;13:1145-1150. Copyright © 2016 American College of Radiology

INTRODUCTION

Interventional radiologists have increasingly focused on oncologic procedures as a growth area over the last 15 years [1,2]. Spurred by randomized prospective trials demonstrating overall survival improvement with

chemoembolization of hepatocellular carcinoma (HCC) [3,4], the expanded use of intra-arterial and ablative therapies has led to their inclusion within national guidelines for hepatobiliary malignancy, neuroendocrine tumors, and renal cell carcinoma [5-7]. Data acquisition leading to evidence-based recommendations for other tumors has been limited by challenges in patient recruitment. This difficulty is related to extensive variability between interventional oncology (IO) practices regarding disease types referred, a factor that limits the type of large-scale recruiting seen in medical oncology trials [8].

One potential reason for variable success in IO practice development could relate to lack of a defined process, including availability of ancillary staff. Practice building in IO is largely anecdotal, without objective data that quantifies growth when attempts are made to focus attention on

^aVanderbilt University School of Medicine, Nashville, Tennessee.

^bDepartment of Radiology, Vanderbilt University Medical Center, Nashville, Tennessee.

Corresponding author and reprints: Daniel B. Brown, MD, Department of Radiology, Vanderbilt University Medical Center, 1161 Medical Center Drive, CCC-1118 Medical Center North, Nashville, TN 37232; e-mail: daniel.b.brown@vanderbilt.edu.

This work was partially supported by the Vanderbilt Institute for Clinical and Translational Research (VICTR) grant VR13395. Reed Omary is cofounder of IORAD, LLC, and is funded by NIH R01 CA159178. Dan Brown is a consultant for Cook Medical, and is funded by NIH R01 EB020040. The other authors have no conflicts of interest related to the material discussed in this article.

this area of interest [9]. Our primary hypothesis in this report was that development of an IO-specific service line in a quaternary National Cancer Institute Comprehensive Cancer Center would significantly increase both clinic and procedure volumes. We also hypothesized that any increases resulting from development of the IO service line would exceed national trends.

METHODS

Institutional Analysis

Institutional Review Board approval was obtained to analyze procedure volume and clinic visit numbers from a single quaternary care university hospital. Two time periods were defined: the year before and the year after the implementation of an IO service line (7/2012-6/2013 and 7/2013-6/2014, respectively). Starting July 1, 2013, an IO director was recruited with support staff (full-time nurse and nurse practitioner), and clinic space was provided in the institution's National Cancer Institute Comprehensive Cancer Center. One half-day per week of clinic time and time to attend tumor boards was built into the clinicians' schedules. The cancer center supported the IO service line, recognizing the value in optimizing clinical and research collaboration. An interventional radiology (IR) suite was dedicated to scheduling IO procedures as a first priority. Before July 1, 2013, patients were seen in clinic before the procedure date only if the patients requested a separate consultation. After July 1, 2013, all new patient referrals were scheduled to be seen in the IO clinic. Follow-up patients were seen as well, with time to follow-up determined by pathologic entity. After a trial period of task redundancy, the nurse practitioner was tasked with running the IO clinic, managing inpatients, ordering imaging via service protocols, and triaging calls from patients. The IO nurse's responsibilities included scheduling procedures, imaging, and lab studies, as well as monitoring insurance pre-certification. These roles allowed maximal independence in assigned tasks for the staff.

Clinic visits and procedure numbers were documented using the institution's electronic medical record and billing forms, and were compiled across four quarters of each year. IO procedures included in this analysis were vascular and included transarterial chemoembolization (TACE), yttrium-90 (Y-90) perfusion mapping (MAA) and radioembolization, portal vein embolization, and bland embolization of hepatic tumors (bland). The Shapiro-Wilk test was used to test the normality of difference between the data points of each year across

quarters for the clinic visit data and across procedure type for the procedure data. After normality could be assumed, we compared changes between the two years in clinic visits and procedure numbers, using a paired *t* test in each instance, with $P < .05$ judged statistically significant.

Medicare Analysis

Based on changes in our outcomes, we elected to compare the findings to national trends. Review of our payer mix demonstrated that 51% of new patients had Medicare, 26% had Medicaid, and 23% had private insurance. Given this distribution, we obtained Institutional Review Board approval to analyze de-identified data via our institution's Health Services Research Core using the Medicare Limited Data Set (LDS). The LDS represents a random 5% survey of the Medicare population, and data from the years 2012 and 2013 were utilized. Patients treated with the procedures listed above (TACE, Y-90, MAA, and portal vein embolization) were included, with the exception of bland embolization, as we did not want to inadvertently include hepatic embolization for non-oncologic indications, such as trauma. The Current Procedure Terminology (CPT) codes associated with the procedures were cross-referenced with the relevant International Classification of Diseases, ninth rev codes from the Denominator, Carrier, Inpatient, and Outpatient standard analytic files, as shown in [Table 1](#). Total procedure numbers were tabulated with the goal of determining whether our growth reflected or exceeded national trends.

As above, the Shapiro-Wilk test was used to test the normality of difference between the data points across procedure type for the LDS data. After this, changes between the two years' procedure numbers were performed using paired *t* tests, with $P < .05$ judged statistically significant.

RESULTS

Institutional Data

Total clinic visits increased from 9 to 193 after implementation of the IO clinic ([Table 2](#)). Compared across fiscal quarters, assumptions of normality could be applied to the data ($W = 0.98$, $P > .05$) and a paired *t* test showcased a statistically significant difference between the two years ($P = .0008$, $t = 13.8$, $df = 3$). Eighty-eight percent of the clinic visits were new patients and the number of clinic visits increased each quarter of operation. During this time, physician participation in tumor board increased by over tenfold, from 6 to 70 hours.

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