CrossMark

Transarterial Chemoembolization in the Coming Era of Decreased Reimbursement for Readmissions

Colin J. McCarthy, MD[a], Andrew X. Zhu, MD, PhD[b], Shehab A. Alansari, MD[a], Rahmi Oklu, MD, PhD[c,d]

Abstract

Purpose: CMS has identified readmission of patients within 30 days of discharge as a targeted quality metric and has instituted financial penalties to encourage hospitals to reduce readmissions. The aims of this study were to examine the rate of 30-day admissions after transarterial chemoembolization (TACE) at a single institution and to identify potential factors associated with readmission.

Methods: A total of 275 patients were identified who underwent a total of 457 TACE procedures over a 21-year period. Their electronic medical records were reviewed to evaluate the 30-day readmission rate in all patients undergoing TACE, and multiple logistic regression analysis was used to ascertain any clinical or demographic factors affecting the risk for readmission.

Results: Nineteen patients (4.2%) required readmission to the hospital within 30 days; 11 of these readmissions were directly attributable to TACE, with inpatient stays upon readmission ranging from 2 to 27 days. Fourteen patients (3.1%) returned to the emergency department (ED) within 30 days of TACE. Medicare patients were more likely to be readmitted to the hospital or require emergency department treatment within 30 days than patients with private health insurance ($P = .006$). Patients with worse performance status (Eastern Cooperative Oncology Group) were also more likely to require emergency department care within 30 days ($P = .04$).

Conclusions: TACE patients are at risk for readmission, often related to underlying medical comorbidities. Although extensively studied in other specialties, the Hospital Readmissions Reduction Program has received little attention in the radiology literature, and radiologists should familiarize themselves with this continually expanding initiative.

Key Words: TACE, chemoembolization, transarterial, oncology, readmissions

J Am Coll Radiol 2016;13:915-921. Copyright © 2016 American College of Radiology

INTRODUCTION

CMS has sought to reduce reimbursement to hospitals with high readmission rates, on the basis of hospital case mix, historical claims data, and CMS models [1]. As part

[a]Department of Imaging, Division of Vascular and Interventional Radiology, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts.

[b]Department of Medicine, Division of Hematology/Oncology, Massachusetts General Hospital, Harvard Medical School, Boston, Massachusetts.

[c]Biomaterials Innovation Research Center, Department of Medicine, Brigham and Women's Hospital, Harvard Medical School, Cambridge, Massachusetts.

[d]Division of Vascular and Interventional Radiology, Mayo Clinic, Scottsdale, Arizona.

Corresponding author and reprints: Rahmi Oklu, MD, PhD, Mayo Clinic, Division of Interventional Radiology, 13400 E Shea Boulevard, Scottsdale, AZ 85259; e-mail: oklu.rahmi@mayo.edu.

of the Patient Protection and Affordable Care Act, the Hospital Readmissions Reduction Program commenced in October 2012. A key metric is the 30-day readmission rate, which is used by CMS to calculate financial penalties for those institutions whose readmission rates are high [2]. Readmission analyses are thought to serve as an objective evaluation of effective discharge.

Although initially targeting three specific conditions (pneumonia, acute myocardial infarction, and heart failure), the list of conditions being targeted for readmission has expanded to include procedures, including elective hip or knee replacement surgery and, starting in 2017, will also review patients undergoing coronary artery bypass grafting [3-5].

Many studies in the field of interventional radiology have focused on outcomes (including 30-day mortality) and overall survival rates for chemoembolization, radioembolization, and radiofrequency ablation [6-10]. The

aims of this study was to examine the 30-day readmission rates after transarterial chemoembolization (TACE) and to identify risk factors associated with readmission.

METHODS

Institutional review board approval was obtained for this HIPAA-compliant, retrospective study. An electronic search of a database containing more than 12 million radiology reports from 21 years (1992-2013) was performed using a departmental search tool [11]. All reports containing the words *lidocaine* and *embolization* were collected; the term *lidocaine* allowed us to identify procedures in which lidocaine was given before femoral vascular access. Of 5,687 procedures, 275 patients were identified to have undergone TACE at our institution. In total, 457 TACE procedures were performed and included in the analysis. Patients undergoing ^{90}Y radioembolization were excluded.

We reviewed all TACE procedures performed between August 1992 and August 2013 (Table 1). In 76% of patients (n = 209), the underlying diagnosis was hepatocellular carcinoma. Other indications for TACE included metastatic colorectal carcinoma (n = 21), metastatic neuroendocrine tumor (n = 16), and metastatic melanoma (n = 6), with 23 patients undergoing TACE for other reasons. Drug-eluting embolic agents loaded with doxorubicin were the most commonly used chemotherapeutic agents, used in 70.2% of all embolization procedures. This reflects developments in the field of TACE and the fact that the number of cases performed increased in the later years of the study. The preprocedural laboratory data and performance status was reviewed for each patient (Table 2).

Review of electronic medical records, discharge summaries, radiology reports, and laboratory values was performed. When electronic medical records were available at affiliated institutions, these were also reviewed. Cross-sectional imaging was reviewed when necessary. Of these 275 patients, we evaluated for type of chemoembolization, length of stay, and 30-day revisits to the hospital, including 30-day inpatient readmissions, together with outpatient clinic or emergency department (ED) visits within that 30-day time frame. Because of the cost associated with an inpatient readmission, any such readmission within 30 days of the procedure was deemed to take priority over any other return visit (such as a clinic visit) for that patient. For example, if a patient had a clinic visit on day 18 but was readmitted to the hospital on day 22, this was counted as an inpatient readmission for the purpose of our analysis. Each readmission was carefully evaluated independently by two of the authors to determine whether the admission was related or unrelated to TACE. If the readmission was related to an expected or unexpected complication of the procedure, or an exacerbation of the patient's underlying condition, this was considered related. Of note, 16 TACE procedures were performed within 30 days of previous TACE; in some cases this was part of a clinical trial requiring frequent treatments, whereas in the other cases it was considered standard of care, for example, performing left-sided TACE after previous right-sided TACE. These were not counted as 30-day readmissions in our study because they were monitored in a 23-hour observation bed.

Statistical analysis was performed using Stata version 13 (StataCorp LP, College Station, Texas). Demographic and clinical characteristics were compared among ED visits and inpatient readmissions within 30 days of TACE versus control subjects by using χ^2 tests and one-way analysis of variance (Bonferroni method) for parametric continuous variables and Kruskal-Wallis tests for nonparametric data.

Those patients who did not return to either the ED or into an inpatient setting were regarded as the control

Table 1. Summary of patient demographics

Variable	Value
Number of patients	275
Number of procedures	457
Patient age (y)	61.6 (30-90)
Patient gender (%)	
Male	190 (69.1%)
Female	85 (30.9%)
Number of TACE procedures per patient	
1	93 (33.8%)
2	127 (46.2%)
3	45 (16.4%)
4	8 (2.9%)
5	2 (0.7%)
Insurance coverage	
Medicare/Medicaid	96 (34.9%)
Health insurance	170 (61.8%)
Self-pay	9 (3.3%)
Race	
African American	10 (3.6%)
American Indian	2 (0.7%)
Asian	22 (8.0%)
Hispanic	8 (2.9%)
Not recorded	9 (3.3%)
White	224 (81.5%)

Note: Data are expressed as number (percentage) or mean (range).
TACE = transarterial chemoembolization.