Cost Accounting as a Tool for Increasing Cost Transparency in Selective Hepatic Transarterial Chemoembolization

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ABSTRACT

Purpose: To increase cost transparency and uncover potential areas for savings in patients receiving selective transarterial chemoembolization at a tertiary care academic center.

Materials and Methods: The hospital cost accounting system charge master sheet for direct and total costs associated with selective transarterial chemoembolization in fiscal years 2013 and 2014 was queried for each of the four highest volume interventional radiologists at a single institution. There were 517 cases (range, 83–150 per physician) performed; direct costs incurred relating to care before, during, and after the procedure with respect to labor, supply, and equipment fees were calculated.

Results: A median of 48 activity codes were charged per selective transarterial chemoembolization from five cost centers, represented by the angiography suite, units for care before and after the procedure, pharmacy, and observation floors. The average direct cost of selective transarterial chemoembolization did not significantly differ among operators at \$9,126.94, \$8,768.77, \$9,027.33, and \$8,909.75 ($P = .31$). Intraprocedural costs accounted for 82.8% of total direct costs and provided the greatest degree in cost variability (\$7,268.47–\$7,691.27). The differences in intraprocedural expense among providers were not statistically significant ($P = .09$), even when separated into more specific procedure-related labor and supply costs.

Conclusions: Cost accounting systems could effectively be interrogated as a method for calculating direct costs associated with selective transarterial chemoembolization. The greatest source of expenditure and variability in cost among providers was shown to be intraprocedural labor and supplies, although the effect did not appear to be operator dependent.

ABBREVIATION

HCC = hepatocellular carcinoma

Economic cost analyses in health care often attempt to compare the expense and outcomes of a new treatment or intervention to define its effectiveness relative to alternative methods. Health care costs are analyzed in myriad ways but usually are conducted from the perspective of the patient, third-party provider (ie, government health system), hospital, or society (1). Although most of these analyses outline direct and indirect medical costs, analyses undertaken from the societal perspective also strive to account for "nonmedical" costs incurred, such as the opportunity costs of a patient's prolonged absence from work.

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In patients with hepatocellular carcinoma (HCC) deemed unsuitable for resection or transplantation, transarterial chemoembolization has been shown to demonstrate a survival benefit in prospective randomized trials compared with the alternative approach of supportive care alone (2,3). However, the method by which transarterial chemoembolization is performed can vary greatly across individual providers and institutions. These variations are driven partly by differences in operator skill, institutional resources, and access to or experience with new and emerging technologies. Attempts at defining costs for transarterial chemoembolization in HCC have been undertaken in the literature from the hospital and third-party payer perspectives, providing an initial framework for defining and understanding the value of transarterial chemoembolization in HCC (4,5). These studies determined that expendable supplies were the largest component of the total cost for transarterial chemoembolization. Consequently, these findings led to the conclusion that individual operator discretion in using these expendables could have a drastic impact on cost and even determine whether a specific treatment can cost more or less than an alternative treatment (4,6).

The purpose of the present study was to analyze the direct costs of routinely performing selective transarterial chemoembolization with cone-beam computed tomography (CT) to uncover any differences in expendable costs among the primary interventional oncology treatment providers at a tertiary care academic medical center. The study further aimed to explore if any difference in cost among operators could serve as a tool to improve cost efficiency.

MATERIALS AND METHODS

A retrospective Health Insurance Portability and Accountability Act–compliant study approved by our institutional review board was carried out on all consecutive selective transarterial chemoembolization procedures performed for inoperable HCC by the four highest volume interventional oncologists at our institution in fiscal years 2013 and 2014 (September 1, 2012 through August 31, 2014). The study included 517 consecutive transarterial chemoembolization procedures. Cost data were acquired using the EPSi (Allscripts, Chicago, Illinois) operational system for financial budgeting and cost accounting. These data were used to calculate the total cost for each transarterial chemoembolization procedure from a hospital payer perspective.

Chemoembolization Cost Methodology

The total cost of each transarterial chemoembolization procedure was calculated by taking the sum of expenses reported from direct and indirect cost centers. A cost center in this structure represented an entity or department within the hospital necessary to provide the service being offered (ie, transarterial chemoembolization). The total number of cost centers included direct and indirect centers and could vary by the specific procedure or service provided. For transarterial chemoembolization, five direct cost centers were identified and denoted: angiography suite, pharmacy, holding unit before the procedure, recovery unit after the procedure, and 23-hour observation floor (Fig 1). Three indirect cost centers were also identified: information technology, human resources, and finance administration.

To obtain the monetary expense reported by each cost center, the aggregate cost was calculated from the sum of its activity codes. An activity code was the fundamental unit of cost in the system and used by all cost centers to determine the specific costs within each center's domain. For instance, the "angiography suite" cost center for transarterial chemoembolization derived its component cost per procedure from the sum of activity codes recorded within its center (Fig 2). Activity codes were similar to medical codes such as Current Procedural Terminology and International Classification of Diseases

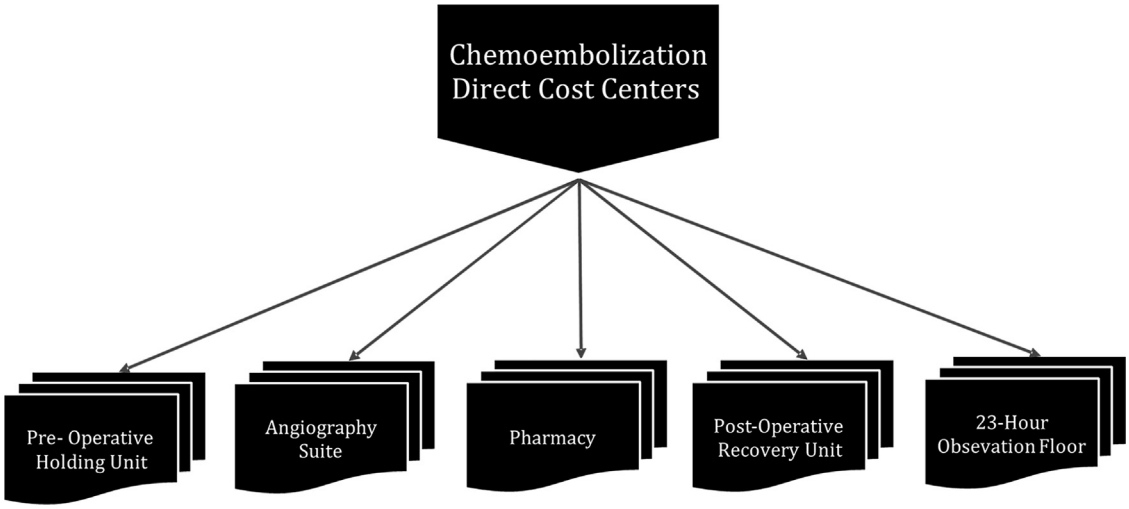

Figure 1. Direct cost centers associated with performing transarterial chemoembolization.