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Quality Measurement in Cancer Care Delivery

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ABSTRACT During the past decade, increasing emphasis has been placed on defining and measuring the quality of health care delivery. The Outcomes Committee of the Society of Surgical Oncology (SSO) was established in 2008 to explore and promote emerging outcomes-related topics that are most relevant to society membership. In recognition of the importance of health care quality, a mini-symposium was held at the SSO's 63rd Annual Cancer Symposium in St. Louis, Missouri, in March 2010. The primary objective of the symposium was to define what constitutes quality measurement in cancer care. This article presents an overview of the symposium proceedings.

Ensuring Quality Cancer Care, a landmark report from the Institute of Medicine (IOM), documented significant variability between ideal and actual cancer care in the United States.¹ Widespread variation in medical practices and outcomes in seemingly similar populations also has raised concerns about the overall quality of health care.² In response to these concerns, the National Cancer Institute launched a quality improvement plan, the Cancer Care Outcomes Research and Surveillance Consortium (Can-CORS) to: “assess the quality of care received by cancer

patients and survivors; explore the relationship between quality of care and patient health outcomes; and evaluate how characteristics of patients, providers, caregivers, and delivery systems affect quality of care and outcomes.”^{3,4} Nevertheless, quality of care remains difficult to define and challenging to measure. Practicing clinicians know that quality of health care goes beyond issues of survival and recurrence, and treatment decisions impact many aspects of a patient's life.⁵

Although surgeons have always been interested in the quality of the care they provide, it has been only during the past decade or so that quantitative measurement tools have been developed and applied. A number of national organizations, including the American College of Surgeons (ACS) have recognized the value of such tools and implemented quality measures in their respective fields. Consequently, the Outcomes Committee of the Society of Surgical Oncology (SSO) thought it would be timely to conduct a mini-symposium on quality measurement of cancer care delivery at the 63rd Annual Cancer Symposium held in St Louis, Missouri, in March 2010. The symposium was chaired by Dr. Stanley P. L. Leong, Professor Emeritus of Surgery at the University of California San Francisco and was moderated by Drs. Janice N. Cormier from the University of Texas MD Anderson Medical Center and Sandra L. Wong from the University of Michigan Health System, respectively. What follows is an overview of the proceedings from the mini-symposium.

The symposium began with a series of questions designed to elicit perspectives on quality measures from the SSO membership using an electronic response system. A summary of responses is presented in Fig. 1. Although

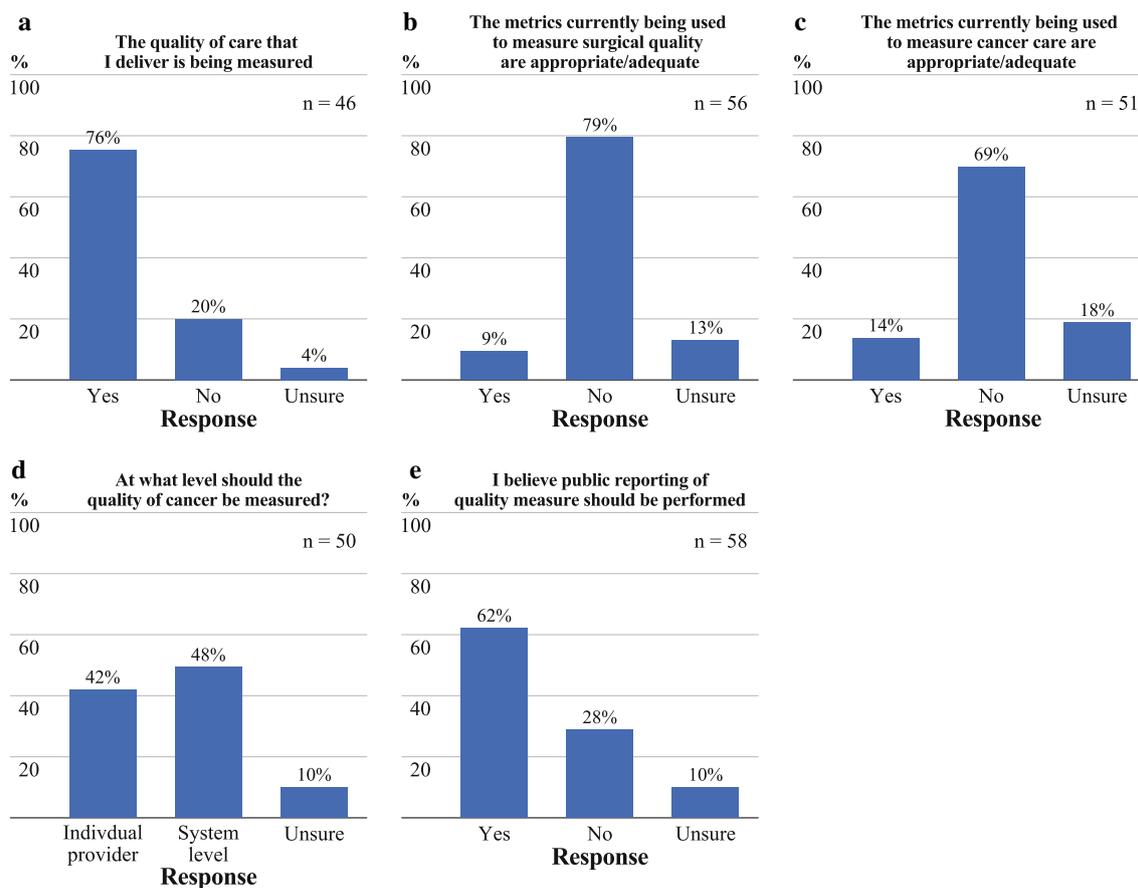


FIG. 1 SSO member responses to questions related to quality of care. **a** Measurement of quality. **b** Appropriateness of current metrics for surgical quality. **c** Appropriateness of current metrics for cancer care. **d** Level of measurement of quality. **e** Public reporting of quality

most respondents (76%) acknowledged that the quality of care they delivered was being measured in some capacity, only 9% felt that the metrics employed were appropriate or adequate. Respondents were evenly divided on whether quality of cancer care should be measured at the level of the individual provider (42%) versus at the system level (48%). The majority were in favor of public reporting of quality measures (62%).

Three invited speakers then delivered presentations concerning quality of cancer care: specifically how quality is defined, how quality is evaluated, and how quality improvement initiatives can be implemented. The first presentation entitled “Defining Quality in Cancer Surgery” was presented by Dr. Clifford Y. Ko, Professor of Surgery at the David Geffen School of Medicine at UCLA and the West Los Angeles VA Hospital, Director of the Division of Research and Optimal Patient Care, American College of Surgeons and Director of the ACS-NSQIP. The second presentation, “Quality Evaluation and Improvement in Cancer Care: Programs of the Commission on Cancer,” was delivered by Dr. Stephen B. Edge, Chair–Commission on Cancer, American College of Surgeons, Alfiero Foundation

Endowed Chair of Breast Oncology, Professor of Surgery and Oncology at the Roswell Park Cancer Institute, University of Buffalo. The last presentation was given by Dr. Laurence McCahill, Director of Surgical Oncology, Assistant Director of the Lacks Cancer Center, Saint Mary’s Health Care Center, Grand Rapids, Michigan, on “Cancer Care Quality in Upper Gastrointestinal Cancers.”

DEFINING QUALITY IN CANCER SURGERY

The primary challenge related to evaluating quality of care has been in establishing definitions for quality that: (1) are acceptable to various stakeholders; (2) include measurable elements; and (3) impact outcomes. From a patient’s perspective, a “quality” physician or hospital continues to be identified primarily by word of mouth, because metrics are crude and poorly conveyed to health-care consumers. Several private companies have attempted to bridge this communication gap by ranking hospitals and doctors and providing online, fee-based access to the public. However, ranking systems used are proprietary, and

in most cases the elements used to generate these quality grades are not available for critical assessment. To improve on current state of affairs, physicians must be primary stakeholders in the process of quality assessment and improvement.

Quality in cancer care can refer to surgical treatment or overall cancer care. With respect to surgical treatment, should quality-related outcomes be limited to the short-term, such as the frequency of anastomotic leaks after colon cancer surgery, or to intermediate outcomes, such as a tumor recurrence at 1 year? The American Medical Association (AMA) defines high-quality care as that “which consistently contributes to the improvement or maintenance of quality and/or duration of life.”⁶ A more recent and commonly used definition of quality is the “degree to which health services for individuals and populations increase the likelihood of desired health outcomes and care consistent with current professional knowledge.”⁷

Quality of care can be divided into three distinct concepts: process, structure, and outcome.⁸ Structure refers to institutional characteristics that are easily quantifiable, such as the number of hospital beds, available technology, and nurse-to-patient ratios. However, structural measures are difficult to modify at the individual provider level. Two examples that have recently received much attention are hospital procedure volume and surgeon procedure volume.^{9,10} Process of care refers to the actual characteristics of care delivered by providers. For the surgeon, this includes measures of preoperative (e.g., antibiotics administered at appropriate intervals before incision), intraoperative (e.g., use of total mesorectal excision (TME) for rectal cancer), and postoperative (e.g., length of stay) care. Outcomes measures have historically been considered the most important and easily measured quality metric and are commonly represented as mortality and morbidity. Mortality, however, is rarely useful except for the highest risk procedures, such as esophagectomy and pancreaticoduodenectomy. More recently, patient-reported outcomes, such as quality of life, are emerging as important indicators of patient-centered care.

To improve cancer care, it is important that quality measures selected are robust and reliable. What are the characteristics of a good measure? For the measure to be valid, the reliability of the data source is critical. Hospital registries, administrative data, and nationally collected data are all sources of cancer-related data with differing levels of capture for individual variables. How information is collected and recorded can impact data integrity. For example, the American College of Surgeons National Surgical Quality Improvement Project (NSQIP) ensures a high level of data integrity by employing an independent nurse researcher at each participating hospital to extract relevant data directly from medical charts and entering it

into a central database.¹¹ Relatively common outcome measures tend to be more accurate than measures of rare events and sufficient variation must be present for a measure to be useful in quality assessment. Finally, quality measures need to be clinically meaningful to physicians and patients alike to ensure broad acceptance.

What are the current measures available to assess quality of cancer surgery? The National Quality Forum (NQF) has endorsed three primary measures for breast cancer: (1) compliance with radiation administered within 1 year of diagnosis for women <70 years of age undergoing breast conservation surgery; (2) compliance with adjuvant chemotherapy considered or administered within 4 months of diagnosis for women <70 years of age and American Joint Commission on Cancer (AJCC) stage T1c, stage II or III hormone receptor-negative breast cancer; (3) compliance with adjuvant hormone therapy considered or administered within 1 year of diagnosis for T1c, stage II or III hormone receptor-positive breast cancer.¹² A fourth measure, which has been endorsed for surveillance but not reporting, is the performance of a needle biopsy to establish the diagnosis of breast cancer before surgical resection.¹³ These factors are somewhat limited in that they do not address the quality of breast cancer surgery, and others have proposed quality measures focused on the surgical aspect of breast cancer care.¹⁴ For colon cancer, one measure has been endorsed by the NQF for accountability: administration or consideration of adjuvant chemotherapy within 4 months of diagnosis for patients <80 years of age and AJCC stage III (lymph node-positive) colon cancer. An additional measure was endorsed for quality improvement: at least 12 regional lymph nodes removed and pathologically examined for resected colon cancer.¹⁵

The American Society of Clinical Oncology (ASCO) has developed a quality measurement and improvement program: the Quality Oncology Practice Initiative (QOPI).¹⁶ QOPI includes three broad measurement categories: core measures, disease-specific modules (e.g., breast, colorectal, non-small-cell lung cancer, and non-Hodgkin's lymphoma), and domain modules. The core measures include documentation of care, pathology confirmation of diagnosis, and staging within 1 month of first office visit among many others. The disease-specific modules address measures that relate to a particular cancer and reflect optimal care. Domain modules address care at the end of life, including hospice and palliative care, and symptom/toxicity management as part of ongoing treatment. Although the modules are focused primarily on structure and process measures at the level of individual medical oncologists or group practices, several variables may be of relevance to surgeons as well. The QOPI disease-specific modules for breast and colorectal cancer are outlined in Table 1.

TABLE 1 Disease-specific Quality Oncology Practice Initiative (QOPI) modules for breast and colorectal cancer

Disease-specific modules
Breast cancer
Family history for patients with breast cancer
Medical/surgical history for patients with breast cancer
Chemotherapy recommended within 4 months of diagnosis for women <70 years with AJCC stage I (T1c) to III ER/PR-negative breast cancer
Combination chemotherapy received within 4 months of diagnosis by women <70 years with AJCC stage I (T1c) to III ER/PR-negative breast cancer
Test for Her-2/neu gene overexpression
Trastuzumab recommended for patients with AJCC stage I (T1c) to III Her-2/neu-positive breast cancer
Trastuzumab received when Her-2/neu is negative or undocumented (lower score better)
Trastuzumab not received when Her-2/neu is negative or undocumented
Trastuzumab received by patients with AJCC stage I (T1c) to III Her-2/neu-positive breast cancer
Tamoxifen or AI recommended within 1 year of diagnosis for patients with AJCC stage I (T1c) to III ER or PR-positive breast cancer
Tamoxifen or AI received within 1 year of diagnosis for patients with AJCC stage I (T1c) to III ER or PR-positive breast cancer
Tamoxifen or AI received when ER/PR status is negative or undocumented (lower score better)
IV bisphosphonates administered for breast cancer bone metastases
Renal function assessed between first and second administration of bisphosphonates
Colorectal cancer
Family history for patients with colorectal cancer
Medical/surgical history for patients with colorectal cancer
CEA within 4 months of curative resection for colorectal cancer
Adjuvant chemotherapy recommended within 4 months of diagnosis for patients with AJCC stage III colon cancer
Adjuvant chemotherapy received within 4 months of diagnosis for patients with AJCC stage III colon cancer
Number of lymph nodes documented for resected colon cancer
Twelve or more lymph nodes examined for resected colon cancer
Adjuvant chemotherapy recommended within 9 months of diagnosis for patients with AJCC stage II or III rectal cancer
Adjuvant chemotherapy received within 9 months of diagnosis for patients with AJCC stage II or III rectal cancer
Colonoscopy before or within 6 months of curative colorectal resection
KRAS testing for patients with metastatic colorectal cancer who received anti-EGFR MoAB therapy
Anti-EGFR MoAb therapy received by patients with KRAS mutation (lower score better)
Anti-EGFR MoAb therapy not received by patients with KRAS mutation

AJCC American Joint Commission on Cancer, ER estrogen receptor, PR progesterone receptor, EGFR epidermal growth factor receptor, KRAS V-Ki-ras2 Kirsten rat sarcoma viral oncogene homolog

Composite quality measures also have been proposed by the Division of Quality Improvement at the American College of Surgeons for the assessment of cancer care. Individual quality measures assess only a single aspect of care; however, healthcare is complex and multidimensional and composite measures consisting of several single measures may be more reflective of the real-world picture. For example, in pancreatic cancer care ten structure, process, and outcome measures have been pooled to form a composite measure. Evaluation with these indicators has shown that most hospitals are compliant with less than half (median score of 4/10).¹⁷ Similarly for melanoma treatment, 26 valid measures have been identified, with a demonstrated level of compliance of only approximately 50% (median composite score of 5).¹⁸ By using these

formally developed quality indicators, hospitals can assess their adherence to current melanoma and pancreatic cancer care guidelines and can better direct quality improvement efforts.

QUALITY EVALUATION AND IMPROVEMENT IN CANCER CARE: PROGRAMS OF THE COMMISSION ON CANCER

The Commission on Cancer (CoC) is a body administered by the American College of Surgeons that is responsible for accreditation of cancer programs. More than 1,500 cancer programs across the United States are accredited by the CoC, representing 70% of cancer patients treated in the country annually. The CoC also has several

programs in place that focus on the quality of cancer care, including the development of tools for benchmarking and monitoring, which can be used for not only accreditation but also quality improvement across the continuum of cancer care (i.e., not limited to surgery). A patient-centered approach is being advocated and implemented by including members from three advocacy groups as well as the American Cancer Society. Currently the CoC is the only nationally represented community-based program that provides real-time feedback on quality standards.¹⁹

The CoC is completing a major overhaul of cancer program accreditation standards to be tested in 2011 and fully implemented in 2012 to incorporate performance measures, patient-centered outcomes, and other self-monitoring data tools. To date, the National Cancer Database (NCDB) has been the central cancer registry of all data collected from CoC approved programs.²⁰ The NCDB is extensively used for health services research, patterns of care, comparative effectiveness research, and increasingly for prospective quality evaluation and management.

Two ongoing initiatives available for use by CoC accredited programs are the Hospital Comparison Benchmark Reports and the Cancer Program Practice Profile Reports (CP3R). The goal is to facilitate quality of care comparisons across provider sites. For example, NCDB Survival Reports can easily be generated online to show survival outcomes for a spectrum of malignant disease (Fig. 2). The CP3R program applies the NQF measures for breast and colon cancer to data submitted to the NCDB by every accredited program. These data are then provided back to each program to check completeness of registry data and enable auditing of care as defined by these measures. Use of CP3R data by each program is voluntary, and

although some programs exhaustively review these data and have implemented actions to address quality concerns, these reports are generally underutilized by hospitals and programs.²¹ It is important to note that CP3R reports are not intended for individual reporting to insurance companies or for the application of “pay for performance” measures, and that the CoC is looking to expand the portfolio of measures in breast and colon cancer to include other cancer types.

A new program that complements CP3R data is designed to provide tracking of care for immediate feedback of actionable data. Current registries represent events and interventions that occurred in the past in the context of a particular patient’s cancer care. However, immediate data acquisition is more valuable to practicing physicians so that direct monitoring can lead to immediate quality improvement interventions when necessary. It is this vision that led to the development of the Rapid Quality Reporting System (RQRS) by the CoC.

The RQRS is a registry-based program with immediate case acquisition and real-time tracking of care. A rolling year-to-date performance is provided by RQRS, but more importantly alerts are generated if the expected treatment is not reported. For example, when data showing treatment concordant with NQF quality measures for breast cancer are not reported to RQRS within the required time frame, alerts will be generated by the RQRS system to the hospital program through registry staff and program leadership. Each program must then develop a mechanism through which individual patient alerts are transmitted to responsible providers and either updated treatment data added or the patient contacted to ensure that appropriate treatment is clearly offered. In addition to individual patient alerts, upon logging into the RQRS system the user sees a dashboard for each process measure in the system and a link to lists of patients for each measure with color-coded alerts to help identify those who may not have received the appropriate treatment intervention (Fig. 3). This program is currently completing beta testing at 60 centers across the United States and is on track to be rolled out to all CoC hospitals in late 2010 or early 2011. The CoC expects the RQRS eventually to become an integral part of the cancer program/hospital data management system to track care and provide immediate actionable feedback to improve quality of care.

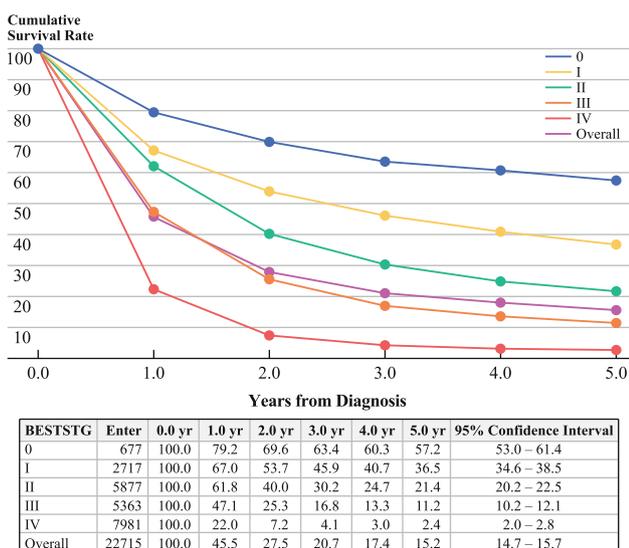
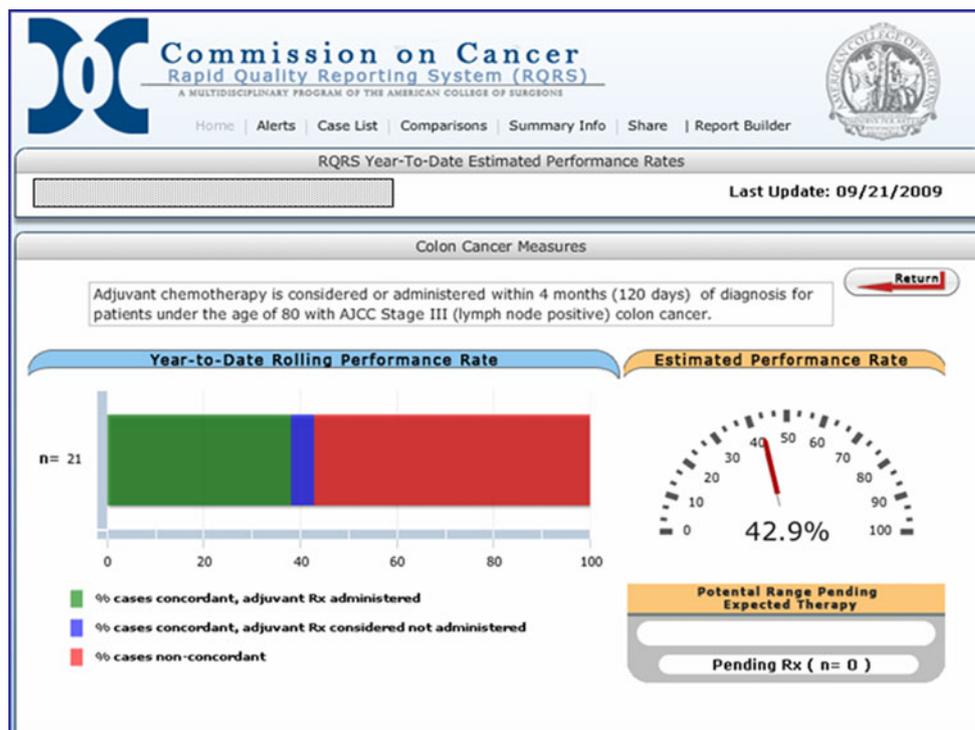


FIG. 2 Example of NCDB survival report for esophageal cancer

CANCER CARE QUALITY IN UPPER GASTROINTESTINAL CANCER

Expedient treatment plans from diagnosis to treatment have been difficult to implement in patients with upper gastrointestinal malignancies. In contrast, in many

FIG. 3 Example of a Rapid Quality Reporting System (RQRS) dashboard



multidisciplinary breast care centers, patients with abnormal screening mammograms are notified immediately to get a second diagnostic mammogram \pm ultrasound and core biopsy. Pathology turnover is approximately 2 days and multidisciplinary evaluation is scheduled at the time of the pathology report confirming malignancy. The evaluation sequence from confirmation of a malignant diagnosis to multidisciplinary evaluation by a surgeon, radiation oncologist, and medical oncologist may take as few as 5 to 6 working days. With upper gastrointestinal cancers, however, patients may present in an urgent manner to the emergency room, for example, with symptoms of dysphagia, which leads to the discovery of a mass in the distal esophagus. A primary care physician is usually the first notified and a gastroenterologist is subsequently consulted for esophagoduodenoscopy (EGD) with biopsy. Once the pathology is confirmed, endoscopic ultrasound and computed tomography are requested for tumor staging, and referral is made to a surgeon to discuss surgical treatment and possibly a medical oncologist for neoadjuvant chemoradiation. This uncoordinated, nonpatient-centered sequence of events may result in diagnosis to completion of clinical evaluation times of up to 6–8 weeks. Time to treatment initiation can be prolonged beyond 3 months from the time of initial disease presentation in a system of disjointed care (Fig. 4).

The Institute of Medicine (IOM) has suggested six goals for delivery of high-quality care: care should be (1)

effective and based on best evidence; (2) safe from avoidable errors; (3) timely to avoid unnecessary delays; (4) efficient to reduce excessive testing; (5) equitable; and (6) patient-centered. It has been suggested that coordination of care is an important seventh component of high-quality care. Aiello-Bowles et al. conducted a study in which 23 peer-nominated experts in policy, patient advocacy, and cancer treatment were interviewed to assess their recommendations for the delivery of quality care.²² Site visits and focus groups were conducted with patients, families, and providers. In all cases, coordination of care was identified as a critical component of quality cancer care. Our group also has demonstrated this in the past. In a survey study performed under the auspices of the SSO, members were asked to identify factors related to long-term cancer-related outcomes. Of all respondents, 87.2% identified a multidisciplinary approach to cancer treatment as being important in this regard.²³ We anticipate that this oft-neglected component of cancer care will receive more attention in the future and mechanisms to coordinate and streamline delivery of care implemented.

CONCLUSIONS

Significant progress has been made in the development and implementation of individual quality of cancer care indicators. However, although a number of structure, process, and outcomes measures have been examined, there is

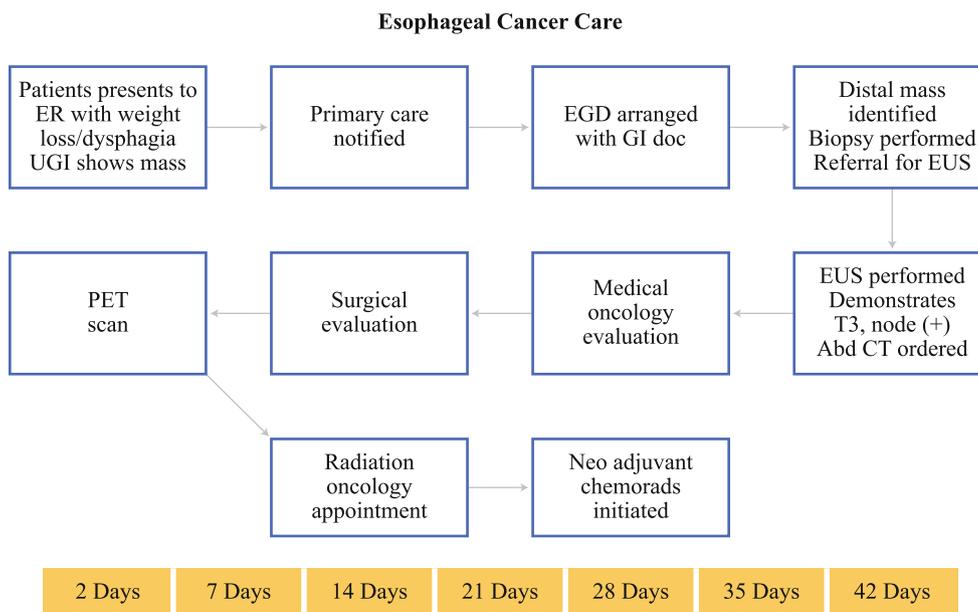


FIG. 4 Typical sequence of events in esophageal cancer care from diagnosis to initiation of treatment based on a multidisciplinary GI cancer clinic

currently no consensus on how these measures should be prioritized. Significant obstacles to the creation of valid and reliable quality measures remain and relate largely to insufficient granularity of available data and the lack of a validated methodology. As presented, there are a variety of complex issues that must be carefully considered when defining quality, evaluating quality, and implementing quality improvement initiatives. Currently, the CoC has the only existing infrastructure that can support real-time data monitoring and feedback to providers for quality improvement initiatives. With this and similar resources, physicians can and should actively engage in quality improvement programs designed to directly benefit patients with cancer.

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