Impact of Co-morbidities on Practice Patterns in the Management of Gastric Cancer: Findings from the Quality Research in Radiation Oncology (QRRO) GI Committee Process Survey

QRRO Quality Research in Radiation Oncology
American College of Radiology Clinical Research Center

ACR American College of Radiology

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Purpose/Objectives

- The American College of Radiology (ACR) QRRO aims to provide an evidence base for quality of care in radiation (RT) practice and delivery.
- Through randomized national process surveys, data is collected on RT practice patterns for major cancers allowing for:
  - tracking and benchmarking the utilization of advanced RT technology
  - documenting the effects of clinical trials results, practice guidelines and appropriateness criteria
  - identify factors associated with higher compliance with clinical standards
  - defining a core set of process and quality assurance measures
  - disseminating information and educating target audiences
- Gastric cancer was selected as one of 5 disease sites for study to determine the national patterns of RT practice for AJCC 2002 Stage IB–IV (non-metastatic) disease. Findings thus far have confirmed the national adoption of CT-based RT planning for this site (*ASCO 2011, Goodman et al*).
- The specific aim of this retrospective analysis was to determine the impact of patient co-morbid illness on national gastric cancer practice patterns as the presence of co-morbidities may result in selection bias in cancer management because of the concern that patients will not tolerate definitive therapy.

Study Design

National Process Survey & Co-morbidity Assessment

- Retrospective on-site record review of patients receiving RT from 2005 to 2007 for Stage IB-IV (non-metastatic) gastric cancer including assessment of patient medical history and co-morbidities, tumor characteristics, cancer work-up and treatment received (RT, surgery and chemotherapy).
- Two-stage stratified random sample of record reviews:
  - Random sample of radiation oncology facilities within four strata: (academic, non-academic by three size groups)
  - Random sample of eligible patients within each facility
- The effect of patient co-morbidities on practice patterns (receipt of planned RT; surgery and chemotherapy; type of resection; completion of primary tumor or lymph node resection; reduction of RT fields; need for parenteral or enteral nutritional support, and the ability to administer concurrent chemotherapy) was assessed using the Adult Co-morbidity Evaluation Index (ACE-27).
- Co-morbidities were graded by QRRO abstractors according to rules specified in the Piccirillo Index (*Piccirillo et al; J Registry Management 30(4): 8-14, 2003*) as none (grade 0), mild (grade 1), moderate (grade 2) or severe (grade 3).
- Pearson's chi-square was used to test for associations between co-morbidities and practice patterns.

Results

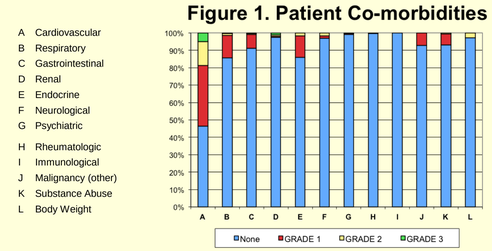
- A total of 250 eligible patients treated for gastric cancer from 45 institutions were reviewed.
- Six facilities had no eligible patients.
- Stratum-adjusted weighted percentages were calculated to reflect the patient and tumor characteristic distribution in the population as a whole and are shown to the right in **Table 1**.
- Median age was 63 years; 65% male; 68% Caucasian; 89% KPS ≥ 80; 89% treated at non-academic institutions.
- Overall, 14% were AJCC 2002 stage I, 27% II, 30% IIIA, 9% IIIB and 14% IV disease.
- Based on the Piccirillo Index, 68% of patients experienced a co-morbidity (grade 1 in 43%, grade 2 in 15%, and grade 3 in 10%) in at least one of 12 organ systems, (**Figure 1,** on the right). Of note, in cases in which 2 or more grade 2 co-morbidities occur in different organ systems, the overall co-morbidity is designated as grade 3.

Table 1: Patient & Tumor Characteristics

Characteristic	Weighted Patients (n =9,567)	Unweighted (n = 250)
Median age at start of RT, years (range)	63 (33-94)	
	No. (%*)	No. of Patients
Sex		
Male	6,187 (64.7)	166
Female	3,380 (35.3)	84
Race		
White	6,519 (68.1)	150
Black/African-American	1,654 (17.3)	58
Asian	612 (6.4)	17
Other/Unspecified	782 (8.2)	25
Ethnicity		
Hispanic	1,370 (14.3)	30
Not Hispanic/Unspecified	8,197 (85.7)	220
Primary Payment Method		
Medicare	3,731 (39.0)	85
Private Insurance	2,811 (29.4)	85
Health Maintenance Organization	1,231 (12.9)	29
Medicaid	365 (3.8)	14
Government Insurance	699 (7.3)	19
Self-Pay	375 (3.9)	11
Not Specified	355 (3.7)	7
Practice Stratum		
Academic	1,074 (11.2)	108
Large Non-Academic (>3 linacs**)	2,259 (23.6)	79
Medium Non-Academic (2 linacs**)	2,764 (28.9)	30
Small Non-Academic (1 linac**)	3,470 (36.3)	33
Karnofsky Performance Status* **		
<80	1,072 (11.2)	22
≥80	8,485 (88.7)	227
Stage (AJCC 2002)		
Stage IB	1,314 (13.7)	33
Stage II	2,623 (27.4)	73
Stage IIIA	2,881 (30.1)	81
Stage IIIB	879 (9.2)	25
Stage IV	1,293 (13.5)	29
Stage Unknown	577 (6.0)	9

*Percents may not add to 100 due to rounding errors; ** linac = linear accelerator; *** KPS was not recorded for 1 patient (weighted sample, n=10)

Figure 1. Patient Co-morbidities



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Association of Patient Co-morbidities & Practice Patterns

- As depicted in **Table 2**, the presence of co-morbidity (using the ACE-27) was associated with the following: performing less than a total gastrectomy, *P=0.055*; less than a complete primary resection, *P=0.044*; and performing a laparoscopic resection, *P=0.058*; as well as significantly influencing a change in the planned multi-disciplinary treatment, *P<0.00001.*

Table 2: Association of Patient Co-morbidities and Practice Patterns

	PICCIRILLO CO-MORBIDITY INDEX					
	None	Mild	Moderate	Severe	Total	*P*-value
Treatment Characteristics	%*	%*	%*	%*	%*	
Type of Resection						*P*=0.0555
No surgical resection	19.1	17.7	32.8	48.0	23.3	
Total gastrectomy	25.6	10.0	16.3	4.1	15.4	
Partial gastrectomy**	54.5	71.4	44.3	47.9	59.7	
Unknown	0.6	0.9	6.6	0.0	1.6	
Resection Performed Laparoscopically						*P*=0.0579
Not applicable-No resection	19.1	17.7	32.8	48.0	23.3	
No	65.1	68.8	36.1	52.0	61.2	
Yes	2.2	2.1	15.8	0.0	3.9	
Unknown	13.6	11.4	15.3	0.0	11.6	
Completion of Primary Resection						*P*=0.0442
Not applicable-No resection	19.1	17.7	32.8	48.0	23.3	
RX	0.3	1.4	0.7	0.0	0.8	
R0	64.2	70.6	36.1	19.6	58.5	
R1	10.7	1.6	7.5	11.3	6.4	
R2	0.9	2.2	7.5	21.2	4.4	
Unknown	4.7	6.5	15.3	0.0	6.6	
Treatment Plan Contra-indicated or Changed Due to Co-morbidities**						*P*<0.0001
Not applicable-No co-morbidities					32.2	
No		92.1	63.1	16.5	50.7	
Yes		5.4	27.5	74.3	13.6	
Unknown		2.5	9.5	9.2	3.6	

*Percentages are based on the weighted number of patients and may not sum to 100% due to rounding; ** Includes esophago-gastrectomy and other; RX = completeness of tumor resection cannot be assessed; R0 = no residual tumor; R1 = microscopic residual tumor; R2 = macroscopic residual tumor

Conclusions

- The presence of patient co-morbidities appeared to influence treatment delivery in stage IB-IV (non-metastatic) gastric cancers receiving adjuvant RT.
- Therefore, incorporation of co-morbidity assessment in future prospective gastric cancer studies is warranted to determine whether pretreatment co-morbid illness is associated with non-compliance with protocol treatment guidelines and, potentially, diminished treatment effectiveness.