Impact of ethnicity on gastric cancer outcomes in a multiethnic population

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Abstract:

Background: Gastric cancer continues to be a major health issue, with previous studies demonstrating a higher prevalence of cancer in Asian, Hawaiian, and Pacific Islander populations. Our objective in this study was to determine the association between ethnicity, treatment, histology, and survival among patients with gastric or gastroesophageal junction adenocarcinoma.

Methods: Oncological data of 615 patients presenting with gastric or gastroesophageal at Queen's medical center between 2000 and 2015 were collected. Measures of association (chi-square, Cox regression) were used to analyze differences in mortality and ethnicity. Factors hypothesized to contribute to cancer mortality (age at diagnosis, insurance, histologic grade, etc.) were also included in the analysis.

Results: Samoans, Hawaiians, and Filipinos were significantly younger than white patients at the time of diagnosis (p<.001). Multivariate Cox regression shows that in resectable patients, Samoan [HR 5.14 (1.4-18.4, 95% CI), p=0.012] and Filipino [HR 2.51 (1.0-6.0, 95% CI), p=0.039] ethnicity adversely impacted survival, even after adjusting for variables hypothesized to influence survivability.

Discussion: Ethnic disparities that cannot be solely explained by clinical characteristics or insurance exist. There also appears to be an ethnic disparity in HER2 expression, but continued study is needed. Further study into possible causes, such as molecular characteristics of tumors, and differences in healthcare access and utilization, is warranted.

Objective:

To determine the impact of ethnicity on gastric and gastroesophageal adenocarcinoma outcomes.

Background:

- In the Asia-Pacific region, disease rates for gastric cancer are among the highest globally.
- Compared to Caucasians, cancer mortality rates for Asian Americans, Native Hawaiians, and Pacific Islanders has been show to be twice as high.
- Previous studies have indicated differences in gastric cancer incidence based off of ethnicity/race and socioeconomic factors.
- However, no recent analysis of a multiethnic population has been performed.
- Also, few studies have analyzed the association between HER2, ethnicity, and gastric cancer.
- Hawaii's ethnic diversity provides an ideal population to study the impact of ethnicity on gastric cancer.

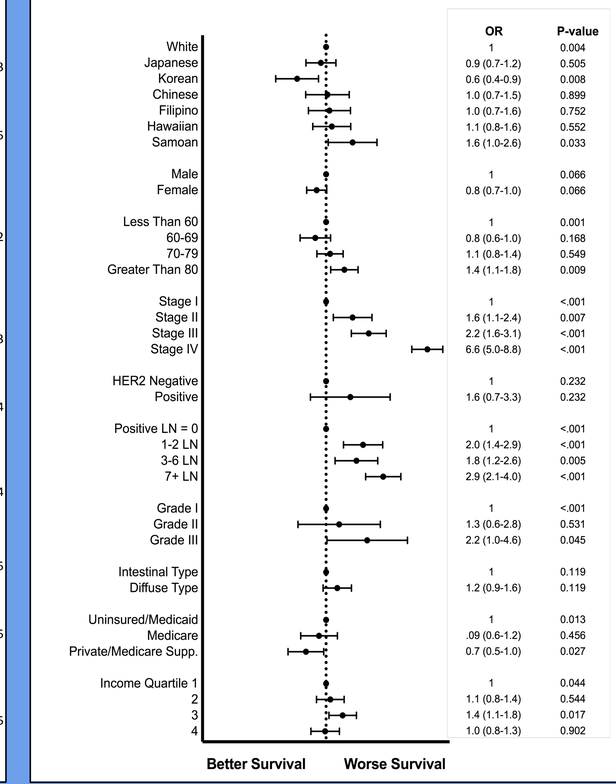
Methods:

- Data were abstracted from the Queen's Medical Center (QMC) Oncology Data Registry (ODR) and pathology department
- 615 eligible patients were included in the analysis
- Study variables included: sex, age, stage, HER2 status, lymph nodes (LN) examined, positive LN, LN ratio, grade, histology, location, treatment, insurance, median income
- Descriptive statistics and chi-square analysis for categorical variables
- Cox proportional hazards modeling used to obtain OR, 95% CI
- SPSS v23.0 for Windows (Chicago, Illinois)

Baseline Characteristics (%)

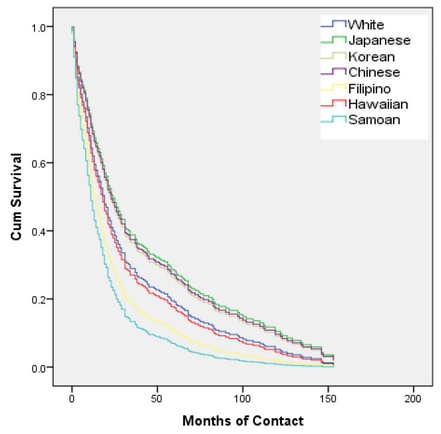
		White	Japanese	Chinese	Korean	Filipino	Hawaiian	Samoan	p value
Total		**86**	**238**	**50**	**61**	**48**	**66**	**31**	
Sex									
	Male	54 (63)	143 (60)	28 (56)	35 (57)	28 (58)	32 (48)	22 (71)	0.453
	Female	32 (7)	95 (40)	22 (44)	26 (43)	20 (42)	34 (52)	9 (29)	
Age (Years)									
	< 60	27 (31)	30 (13)	15 (30)	19 (31)	16 (33)	22 (33)	14 (45)	<0.0005
	60-69	17 (20)	45 (19)	7 (14)	12 (20)	12 (25)	17 (26)	8 (26)	
	70-79	31 (36)	80 (34)	6 (12)	21 (34)	14 (29)	19 (29)	7 (23)	
	≥ 80	11 (13)	83 (35)	22 (44)	9 (15)	6 (13)	8 (12)	2 (7)	
Stage									
	I	13 (16)	59 (27)	10 (21)	26 (46)	8 (18)	8 (14)	3 (11)	0.002
	II	16 (20)	30 (14)	5 (11)	13 (23)	7 (16)	8 (14)	2 (7)	
	III	17 (21)	45 (20)	11 (23)	4 (7)	11 (24)	16 (28)	6 (22)	
	IV	35 (43)	87 (39)	21 (45)	13 (23)	19 (42)	26 (45)	16 (59)	
HER2 Status									
	Negative	21 (96)	37 (95)	13 (77)	12 (92)	8 (89)	11 (100)	4 (57)	0.023
	Positive	1 (5)	2 (5)	4 (24)	1 (8)	1 (11)	0 (0)	3 (43)	
Grade									
	I	2 (3)	7 (3)	0 (0)	0 (0)	1 (3)	0 (0)	1 (4)	0.774
	II	22 (30)	55 (25)	11 (23)	18 (32)	8 (21)	18 (31)	6 (23)	
	III	49 (67)	160 (72)	37 (77)	39 (68)	29 (76)	41 (70)	19 (73)	
Histology									
	Intestinal	23 (68)	105 (72)	15 (63)	27 (68)	14 (56)	22 (63)	9 (82)	0.584
	Diffuse	11 (32)	40 (28)	9 (38)	13 (33)	11 (44)	13 (37)	2 (18)	
Non-Surgical Treatment									
	None	36 (61)	93 (56)	24 (57)	26 (54)	19 (58)	27 (61)	20 (80)	0.435
	Neo/Adjuvant	23 (39)	73 (44)	18 (43)	22 (46)	14 (42)	17 (39)	5 (20)	
Insurance									
	Medicaid/Uninsured	6 (7)	5 (2)	7 (14)	8 (13)	5 (12)	5 (8)	11 (39)	<0.0005
	Medicare	24 (30)	84 (36)	20 (41)	25 (42)	14 (33)	25 (40)	12 (43)	
	Private	51 (63)	144 (62)	22 (45)	27 (45)	24 (56)	33 (52)	5 (18)	
Median Income Quartiles									
	1	18 (21)	54 (23)	16 (33)	22 (37)	13 (28)	16 (24)	5 (17)	<.00005
	2	29 (34)	55 (23)	5 (10)	19 (32)	11 (24)	21 (32)	3 (10)	
	3	15 (17)	64 (27)	15 (31)	9 (15)	11 (24)	16 (24)	19 (66)	
	4	24 (28)	64 (27)	13 (27)	10 (17)	11 (24)	13 (20)	2 (7)	

Univariate Analysis



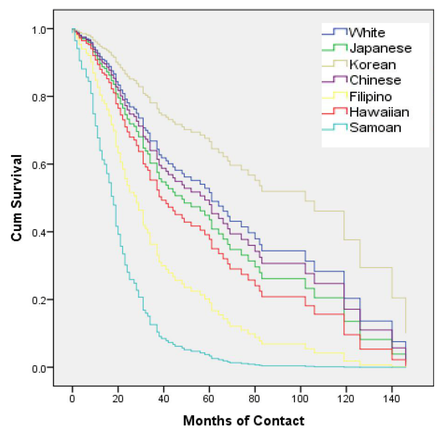
	OR	P-value
White	1	0.004
Japanese	0.9 (0.7-1.2)	0.505
Korean	0.6 (0.4-0.9)	0.008
Chinese	1.0 (0.7-1.5)	0.899
Filipino	1.0 (0.7-1.6)	0.752
Hawaiian	1.1 (0.8-1.6)	0.552
Samoan	1.6 (1.0-2.6)	0.033
Male	1	0.066
Female	0.8 (0.7-1.0)	0.066
Less Than 60	1	0.001
60-69	0.8 (0.6-1.0)	0.168
70-79	1.1 (0.8-1.4)	0.549
Greater Than 80	1.4 (1.1-1.8)	0.009
Stage I	1	<.001
Stage II	1.6 (1.1-2.4)	0.007
Stage III	2.2 (1.6-3.1)	<.001
Stage IV	6.6 (5.0-8.8)	<.001
HER2 Negative	1	0.232
Positive	1.6 (0.7-3.3)	0.232
Positive LN = 0	1	<.001
1-2 LN	2.0 (1.4-2.9)	<.001
3-6 LN	1.8 (1.2-2.6)	0.005
7+ LN	2.9 (2.1-4.0)	<.001
Grade I	1	<.001
Grade II	1.3 (0.6-2.8)	0.531
Grade III	2.2 (1.0-4.6)	0.045
Intestinal Type	1	0.119
Diffuse Type	1.2 (0.9-1.6)	0.119
Uninsured/Medicaid	1	0.013
Medicare	.09 (0.6-1.2)	0.456
Private/Medicare Supp.	0.7 (0.5-1.0)	0.027
Income Quartile 1	1	0.044
2	1.1 (0.8-1.4)	0.544
3	1.4 (1.1-1.8)	0.017
4	1.0 (0.8-1.3)	0.902

Survival : All Patients *p<0.00005*



Covariate *(Ref.)*	OR	95% CI	P-Value	Covariate *(Ref.)*	OR	95% CI	P-Value
Ethnicity *(White)*				**Stage** *(I)*			
Japanese	0.76	0.5-1.1	0.120	II	1.35	0.9-2.0	0.123
Korean	0.81	0.5-1.3	0.382	III	2.07	1.4-3.0	0.000
Chinese	0.79	0.5-1.3	0.333	IV	6.25	4.5-8.7	0.000
Filipino	1.36	0.9-2.2	0.200				
Hawaiian	1.06	0.7-1.6	0.799	**Grade** *(I)*			
Samoan	1.62	0.9-3.0	0.123	II	1.55	0.7-3.6	0.310
				III	2.45	1.1-5.6	0.034
Sex *(Male)*							
Female	0.79	0.6-1.0	0.044	**Insurance** *(Uninsured/Medicaid)*			
Age *(<60)*				Medicare	1.44	0.9-2.4	0.165
60-69	0.60	0.4-0.9	0.005	Private/Supp.	1.08	0.7-1.8	0.746
70-79	1.01	0.7-1.4	0.956				
>80	1.84	1.3-2.6	0.001				

Survival: Resectable Patients *p<0.00005*



Covariate *(Ref.)*	OR	95% CI	P-Value
Ethnicity *(White)*			
Japanese	1.25	0.7-2.4	0.497
Korean	0.61	0.3-1.5	0.280
Chinese	1.11	0.5-2.7	0.821
Filipino	2.51	1.0-6.0	0.039
Hawaiian	1.47	0.6-3.6	0.396
Samoan	5.14	1.4-18.4	0.012
Age *(<60)*			
60-69	0.41	0.2-0.8	0.015
70-79	0.75	0.4-1.5	0.405
>80	1.35	0.6-2.8	0.425
Stage *(I)*			
II	1.77	0.8-3.7	0.128
III	3.56	1.5-8.7	0.005
LN Examined *(<15)*			
≥15	0.48	0.3-0.8	0.002
Positive LN *(0)*			
1-2	1.77	0.8-3.5	0.108
3-6	0.71	0.3-1.7	0.434
7+	1.41	0.6-3.5	0.453
Grade *(I)*			
II	4.12	0.5-32.3	0.178
III	6.69	0.9-51.7	0.069
Treatment *(None)*			
Neo/Adjuvant	0.57	0.3-1.0	0.050
Insurance *(Unins./Medicaid)*			
Medicare	6.36	1.8-22.4	0.004
Private/Supp.	3.28	1.0-10.9	0.053

Discussion:

- Filipino, Hawaiian, and Samoan patients are diagnosed with gastric cancer at a younger age when compared to Caucasians.
- Although the number of patients tested for HER2 expression was relatively low, there does appear to be an ethnic disparity. Continued study of the ethnic variability of HER2 expression is warranted
- When adjusted for sex, age, stage, and insurance status, ethnicity was not significantly associated with survival.
- However among patients with resectable cancers (stage I, II, or III) Samoan and Filipino ethnicities are independent predictors for worse survival, even when adjusted for cancer characteristics and insurance.
- Further study into possible causes, such as molecular characteristics of tumors, and differences in healthcare access and utilization, is warranted to determine the root of these disparities and to provide optimal patient care.

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