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Coffee or Tea, Hot or Cold, Are not Associated With Risk of Barrett's Esophagus

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Abstract

Epidemiological data regarding coffee and tea consumption and risk of esophageal inflammation, Barrett's esophagus (BE), and adenocarcinoma are sparse and inconclusive. This study examined the association between consumption of tea or coffee with risk of BE. We conducted a cross-sectional study among United States veterans, comparing 310 patients with histologically confirmed BE with 1728 individuals with no endoscopic or histopathologic features of BE (controls). Odds ratios (ORs) and 95% confidence intervals (CIs) were calculated using logistic regression models. In univariate models, we found a statistically significant association between risk of BE and consumption of coffee (OR, 1.41; 95% CI, 1.06–1.87) or tea (OR, 1.34; 95% CI, 1.05–1.71). However, in multivariate analysis, in which models were adjusted for confounders including sex and race, we found no association between risk of BE and consumption of coffee (adjusted OR, 1.04; 95% CI, 0.76–1.42) or tea (adjusted OR, 1.11; 95% CI, 0.85–1.44). These data do not support an association between consumption of coffee or tea and risk of BE. It is unlikely that avoidance of coffee or tea will protect against BE.

Keywords

risk factors; epidemiology; EAC; caffeine; decaffeinated

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Barrett's esophagus (BE) is the precursor lesion for esophageal adenocarcinoma (EAC), a rapidly increasing cancer.[1] BE affects up to 15% of persons with frequent symptoms of gastroesophageal reflux disease (GERD) and 1%-2% of the general adult population.[2] In patients with nondysplastic BE, the annual risk of EAC is 0.12 to 0.40%.[3]

Caffeine from coffee and non-coffee beverages induces gastric acid secretion, decreases lower esophageal sphincter (LES) pressure and promotes reflux.[4,5] Data regarding associations between coffee, tea and EAC risk are mixed. Recently, a large, prospective study of >400,000 participants (142 EAC during follow up) reported no association between coffee and tea consumption and EAC.[6] A previous prospective study found an inverse association with coffee consumption.[7] No studies have examined the association with BE. Hence, we examined the associations between caffeinated and decaffeinated coffee and tea consumption and risk of BE. We hypothesize that consumption increases BE risk.

Methods

We performed a cross-sectional study to examine risk factors for BE. Patients scheduled for an elective esophagogastroduodenoscopy for upper gastrointestinal symptoms (40-80 years) or screening colonoscopy in seven primary care clinics (50-80 years) were recruited between February 15, 2008 and August 20, 2013. Primary care patients underwent the study endoscopy as an additional procedure at the same time as their scheduled colonoscopy. We excluded patients with prior gastroesophageal surgery or cancer; history of lung, colon or breast cancer; contraindication for biopsy; major liver disease (ascites or varices); or cognitive impairment. At least one biopsy was taken and BE diagnosed by intestinal columnar epithelium with goblet cells. Patients with endoscopically suspected

BE but without histologic evidence on biopsy were not included in this analysis

Prior to the study endoscopy, participants, with help from a trained research assistant, completed a computerized survey detailing their coffee and tea consumption (Supplementary Appendix). We calculated odds ratios (OR) and 95% confidence intervals (CIs) using unconditional logistic regression models. The adjusted model included terms for age, sex, race, waist-to-hip ratio, duration of GERD symptoms, smoking status, alcohol use, *Helicobacter pylori* infection, use of aspirin/NSAIDs, use of acid suppressants, and recruitment source. Statistical analyses were completed using SAS 9.4 (SAS Institute, Cary, NC). Tests were 2-sided, with statistical significance determined at α=.05.

Results

This study involved 310 cases and 1728 controls (466 primary care and 1262 endoscopy) (Table 1). Compared to controls, cases were older and more likely to be male, white, have abdominal obesity and GERD symptoms.

Cases were more likely than controls to drink coffee (77% vs 70%) and tea (58% vs 51%) (Table 2). In the unadjusted analysis, coffee (OR, 1.41; 95% CI, 1.06–1.87) and tea (OR, 1.34; 95% CI, 1.05–1.71) were statistically significantly associated with BE. BE risk increased linearly with increased frequency of caffeinated coffee (*P*-trend = .002) and risk

was highest for those drinking strong (OR, 1.69; 95% CI, 1.19–2.40) and hot or extremely hot coffee (OR, 1.47; 95% CI, 1.10–1.96). Risk of BE was associated with cold tea (OR, 1.45; 95% CI, 1.12–1.86), but not warm or hot or extremely hot tea.

However, in multivariate analysis, we found no significant association between coffee (adjusted OR, 1.04; 95% CI, 0.76–1.42) and tea (adjusted OR, 1.11; 95% CI, 0.85–1.44) consumption and BE. The associations were similar when we compared cases separately with endoscopy and colonoscopy controls.

Discussion

In this large and well-characterized study we found no association between coffee and tea consumption and BE. Coffee is hypothesized to increase the risk of BE and EAC by promoting reflux through decreased LES pressure and increased acidity. Although patients with GERD are often advised to avoid caffeine,[8] the current literature does not support an association between coffee and GERD.[9] Likewise, based on the findings of this study and in light of prior contradictory findings for EAC,[6,7] there does not appear to be an association between coffee and tea consumption and BE/EAC.

Although cases consumed more coffee and tea than controls, the associations with coffee and tea were almost entirely confounded by sex and race after additional adjustment. Men had higher consumption than women and Caucasians more than non-Caucasians, and these known BE risk factors explained the association.

Strengths of this study include the large sample size, use of a comprehensive questionnaire to collect detailed information on coffee and tea consumption as well as potential confounders, and the strict inclusion criteria. We limited the potential for recall and interviewer bias by conducting interviews prior to the study endoscopy. Assuming a real association does exist, it is possible that the null association here may be due to cases refraining from coffee/tea consumption after enduring prolonged reflux discomfort (or by medical advice). Endoscopy controls may also reduce their coffee/tea consumption due to underlying reflux, thus making them similar in that regard to BE cases. However, for comparisons with endoscopy controls, we observed a similar null finding, suggesting that coffee/tea avoidance by BE cases is unlikely to explain the lack of association. Because our study consisted mostly of older male veterans, our findings may not be generalizable to a wider population.

In conclusion, our findings do not support an association between coffee and tea consumption and BE. Currently, there are not enough data to support avoidance of caffeine to reduce the risk of GERD or BE. Additional studies are needed to confirm these findings, and whether coffee and tea impact risk of progression from BE to EAC needs to be investigated in cohorts of BE patients.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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Abbreviations used in this paper

BE	Barrett's esophagus
CI	confidence interval
EAC	esophageal adenocarcinoma
GERD	gastroesophageal reflux disease
LES	lower esophageal sphincter
OR	odds ratio

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Table 1

Characteristics of controls and BE cases

Variable	Controls (n=1728) n (%)	BE cases (n=310) n (%)	*P* value[a]
Age at time of study endoscopy, y			
Mean (SD)	60.0 (9.2)	61.6 (7.6)	.002
Sex			<.001
Male	1567 (90.7)	302 (97.4)	
Female	161 (6.3)	8 (2.6)	
Race			<.001
White	1058 (61.2)	273 (88.1)	
Black	617 (35.7)	32 (10.3)	
Other	53 (3.1)	5 (1.6)	
Waist-to-hip ratio			.001
Low (<0.85 or 0.9)	271 (16.1)	26 (8.4)	
High (>0.85 or 0.9)	1412 (83.9)	282 (91.6)	
Missing[a]	45	2	
GERD symptoms			<.001
No symptoms	914 (53.0)	116 (37.4)	
1-4 y	27 (1.6)	6 (1.9)	
5-9 y	55 (3.2)	7 (2.3)	
≥10 y	729 (42.3)	181 (58.4)	
Missing[a]	3	0	
PPI/H2RA use			<.001
No	751 (43.6)	79 (25.6)	
Yes	970 (56.4)	229 (74.4)	
Missing[a]	7	2	
Aspirin/NSAID use			.38
None	1570 (91.3)	282 (92.8)	
Less than daily	9 (0.5)	0 (0.0)	
At least daily	140 (8.1)	22 (7.2)	
Missing[a]	9	6	
H. pylori positive	560 (32.4)	62 (20.0)	<.001
Smoking status			.27
Never	479 (27.8)	73 (23.5)	
Former	738 (42.8)	137 (44.2)	
Current	506 (29.4)	100 (32.3)	
Missing[a]	5	0	
Alcohol drinking status			.69
Never drank	150 (8.7)	23 (7.4)	

Variable		Controls (n=1728) n (%)	BE cases (n=310) n (%)	*P* value[a]
	Former drinker	665 (38.6)	117 (37.9)	
	Current drinker	907 (52.7)	169 (54.7)	
	Missing[a]	6	1	

[a]Missing values were not included in the analyses.

Table 2

ORs and 95% CIs for associations between coffee and tea consumption and BE

		Controls (n=1728) N	BE (n=310) N	Crude OR (95% CI)	Adjusted OR[a] (95% CI)
Non-coffee drinker		510	71	Referent	Referent
Ever coffee drinkers		1218	239	1.41 (1.06-1.87)	1.04 (0.76-1.42)
Caffeinated (drinks/day)					
	0-<1	88	14	1.14 (0.62-2.12)	1.19 (0.62-2.28)
	1-<2	280	33	0.85 (0.55-1.31)	0.73 (0.46-1.17)
	2-<3	327	66	1.45 (1.01-2.08)	1.07 (0.72-1.59)
	3-<4	219	54	1.77 (1.20-2.61)	1.11 (0.72-1.70)
	≥4	130	38	2.10 (1.35-3.26)	1.22 (0.76-1.98)
	P-trend in coffee drinkers			0.002	0.30
Decaffeinated (drinks/day)					
	0-<1	27	3	0.80 (0.24-2.70)	0.74 (0.21-2.65)
	≥1	85	16	1.35 (0.75-2.44)	1.20 (0.63-2.30)
Coffee strength					
	Weak	53	8	1.08 (0.50-2.37)	0.77 (0.34-1.75)
	Medium	771	146	1.36 (1.00-1.85)	1.01 (0.72-1.41)
	Strong	324	76	1.69 (1.19-2.40)	1.18 (0.80-1.73)
Coffee temperature					
	Cold	6	2	2.39 (0.47-12.1)	1.63 (0.30-9.01)
	Warm	156	26	1.20 (0.74-1.94)	0.90 (0.54-1.50)
	Hot or extremely hot	1028	210	1.47 (1.10-1.96)	1.08 (0.79-1.49)
Non-tea drinker		850	130	Referent	Referent
Ever tea drinkers		878	180	1.34 (1.05-1.71)	1.11 (0.85-1.44)
Caffeinated tea (drinks/day)					
	0-<1	356	80	1.47 (1.08-1.99)	1.25 (0.90-1.73)
	1-<2	189	44	1.52 (1.05-2.22)	1.18 (0.79-1.76)
	≥2	149	28	1.23 (0.79-1.92)	0.88 (0.55-1.40)
	P-trend in tea drinkers			0.45	0.14
Decaffeinated tea					
	Ever	30	5	1.09 (0.42-2.86)	0.66 (0.23-1.87)
Green tea					
	Ever	85	13	1.00 (0.54-1.84)	1.10 (0.57-2.11)
Tea temperature					
	Cold	724	160	1.45 (1.12-1.86)	1.13 (0.86-1.48)
	Warm	24	1	0.27 (0.04-2.03)	0.45 (0.06-3.53)
	Hot or extremely hot	116	18	1.02 (0.60-1.72)	1.09 (0.62-1.91)

[a]Adjusted for age, sex, race, WHR, GERD symptoms, smoking, alcohol use, H pylori infection, use of aspirin/NSAIDs, PPIs/H2RAs, and recruitment source.