Associations of Dietary Fiber and Fat Intake with Barrett's Esophagus and Stages of Progression to Esophageal Adenocarcinoma

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Background

- The incidence of esophageal adenocarcinoma (EAC) has increased dramatically over the past half century. Changes in dietary patterns over this time may partially account for this trend.
- Prior studies have found inverse associations between fiber intake and both Barrett's esophagus (BE) and EAC, whereas studies of fat intake have reported increased risk or no.
- Little is known as to whether fiber or fat intake contribute to neoplastic progression in BE patients.
- In this study we aim to assess:
  - Association of dietary fat and fiber intake with BE and EAC.
  - Distribution of dietary fat and fiber with progression from BE to EAC

Methods and Materials

- Multi-center case-control study of patients with and without BE (without and with dysplasia or EAC)
- Demographic, anthropometric, and clinical data collected
- BE subjects categorized by worst degree of histology ever.
- Dietary intake captured using NCI DHQII, a validated 12-month food frequency questionnaire
  - Assessed total energy (kcal/d), energy-adjusted fat (%kcal) and fiber intake (grams/1000 kcal)
- Groups compared using Fisher's exact test for categorical variables and Wilcoxon ranks-sum test for continuous variables
- Multivariable logistic regression analyses performed to assess associations of energy adjusted fat and fiber intake with BE and with advanced neoplasia (high grade dysplasia or EAC).
  - Model 1) fat and fiber intake
  - Model 2) Model 1 and EAC risk factors (age, sex, BMI, smoking history, family history)
  - Model 3) Model 2 and aspirin and statin use
  - Model 4) reduced parsimonious model (final model: age, sex, family history).

Results

- We enrolled 162 subjects; 108 subjects (37 non-BE, 71 BE; 21 with advanced neoplasia) completed the questionnaire and were analyzed.

Table 1. Characteristics of the study participants (n=108). Shown are n (%) or median (IQR).

	Entire Sample (N=108)	Barrett's Esophagus (n=71)	Controls (n=37)	p-Value
Age	67 (57-76)	73 (63-77)	55 (41-64)	**<0.001**
Sex, male	70/108 (65 %)	54/71 (76 %)	16/37 (43 %)	**0.001**
BMI	30 (26- 34)	30 (27- 33)	28 (25- 35)	0.69
Total Energy Intake (Kcal)	1670 (1248-2035)	1634 (1137-2006)	1714 (1351-2281)	0.24
White race	106/108 (98 %)	70/71 (99 %)	36/37 (97 %)	0.58
GERD	87/108 (81 %)	65/71 (92 %)	22/37 (59 %)	**<0.001**
PPIs	88/108 (81 %)	71/71 (100 %)	17/37 (46 %)	**<0.001**
Aspirin	30/108 (28 %)	26/71 (37 %)	4/37 (11 %)	**0.007**
Statins	48/108 (44 %)	38/71 (54 %)	10/37 (27 %)	**0.001**
Family hx BE/EAC	22/108 (20 %)	18/71 (25 %)	4/37 (11 %)	0.13
Ever smoker	56/108 (52 %)	46/71 (65 %)	10/37 (27 %)	**0.0002**

Table 2: Histology In patients with Barrett's esophagus (n=71)

Histology	N (%)
No dysplasia	37 (52 %)
Indefinite	2 (3 %)
LGD	8 (11 %)
HGD	15 (21 %)
EAC	6 (8 %)

Note: Missing pathology reports from 4 participants. *LGD- Low grade dysplasia, **HGD- High Grade dysplasia, *** EAC- Esophageal Adenocarcinoma.

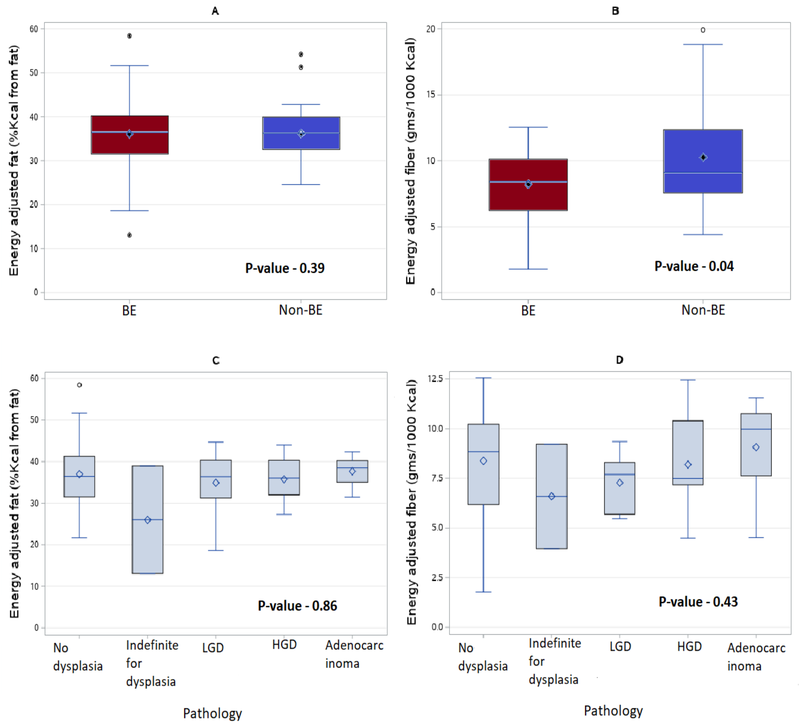

Figure 1. Comparisons of energy-adjusted intake of A) fat and B) fiber between BE and non-BE subjects. Comparisons of energy-adjusted intake of C) fat and D) fiber across stages of progression to EAC.

Conclusions

- Increased dietary fiber intake was associated with decreased odds of BE.
- There was no association between fiber intake and stages of progression to EAC.
- There was no association between fat intake and BE or stages of progression to EAC
- The study sample size may have resulted in limited power to detect smaller but clinically meaningful associations between diet and progression from BE to EAC.
- Future larger studies are warranted to elucidate the mechanisms by which fiber may protect against the development of BE.

Disclosures

- No conflicts of interests to report.

Table 3. Multivariable logistic regression models for associations between energy-adjusted and fiber intake with BE (vs. no BE) and with advanced neoplasia (HGD/EAC vs. ND/IND/LGD). (ORs per unit increase)

		Model 1	Model 2	Model 3	Model 4
BE	**Fat**	1.01 (0.95- 1.08)	1.03 (0.95- 1.08)	1.03 (0.94- 1.11)	1.03 (0.95- 1.11)
	Fiber	**0.81 (0.70- 0.93)**	**0.82 90.67- 0.99)**	**0.82 (0.67-1.00)**	**0.80 (0.66- 0.97)**
Advanced neoplasia	**Fat**	1.00 (0.93- 1.08	1.00 (0.92- 1.09)	1.02 (0.93- 1.12)	1.01 (0.98- 1.09)
	Fiber	0.94 (0.75- 1.18)	0.85 (0.65- 1.1)	0.87 (0.65- 1.16)	0.96 (0.75- 1.24)