



Alimentary Tract

African American ethnicity is not associated with development of Barrett's oesophagus after erosive oesophagitis



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ABSTRACT

Background: Barrett's oesophagus is the primary risk factor for oesophageal adenocarcinoma; erosive oesophagitis is considered an intermediate step with Barrett's oesophagus development potential upon healing. Barrett's oesophagus occurs in 9–19% following erosive oesophagitis but minimal data exists in African Americans. The study aim was to determine if ethnicity is associated with Barrett's oesophagus formation following erosive oesophagitis.

Methods: Retrospective review of endoscopies from September 2007 to December 2012 was performed. Inclusion criteria were erosive oesophagitis on index endoscopy, repeat endoscopy ≥ 6 weeks later and non-Hispanic white or African American ethnicity. Barrett's oesophagus frequency following erosive oesophagitis by ethnicity was compared.

Results: A total of 14,303 patients underwent endoscopy during the study period; 1636 had erosive oesophagitis. Repeat endoscopy was performed on 125 non-Hispanic white or African American patients ≥ 6 weeks from the index procedure. Barrett's oesophagus occurred in 8% of non-Hispanic whites while no African American developed it on repeat endoscopy following erosive oesophagitis ($p = 0.029$). No significant difference was seen between ethnic groups in any clinical parameter assessed.

Conclusions: African American ethnicity appears to result in decreased Barrett's oesophagus formation following erosive oesophagitis. Further investigation to demonstrate factors resulting in decreased Barrett's oesophagus formation among African Americans should be performed.

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1. Introduction

Barrett's oesophagus (BE) is a metaplastic alteration of the distal oesophageal epithelium to specialized intestinal epithelium (SIM), which is present in up to 1.6% of the general population and 5–13% of patients having endoscopy for reflux symptoms [1,2]. BE is associated with a 0.12–0.5% yearly risk of progression to oesophageal adenocarcinoma (EAC) which is an aggressive cancer whose incidence has increased 8-fold from 1973 to 2008 in the United States [3–8]. Barrett's oesophagus is a metaplastic change, following injury caused by reflux of acid and bile, in which one

kind of fully differentiated cell replaces another [9]. Principal risk factors for BE development include duration of gastroesophageal reflux disease (GERD), hiatal hernia, male sex, family history of BE, obesity and cigarette smoking while CagA+ *Helicobacter pylori* colonization, regular aspirin or nonsteroidal anti-inflammatory drug use as well as African American race are associated with decreased risk [10–21].

Erosive oesophagitis (EE) is a probable intermediate step, representing reflux related oesophageal injury allowing for progression toward metaplasia. Three studies have addressed whether BE develops following healing of EE directly [22–24]. The frequency of BE occurring upon healing of EE ranged from 9 to 19% in these investigations. However, the overwhelming majority of patients in these studies were non-Hispanic white or did not have race/ethnicity reported, limiting any comparison between ethnic groups. The ethnic distribution of patients undergoing upper endoscopy (EGD) at the University of Florida/Jacksonville is as follows: 57% non-Hispanic white, 37% African American and 6% other

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(Hispanic/Asian/Unknown) which is higher than the proportion of AA in the Jacksonville metropolitan area (62% non-Hispanic white, 30% African American and 8% other per 2010 United States Census). We therefore decided to conduct a retrospective study to assess if variation occurs in BE formation following EE between non-Hispanic white and African American.

2. Patients and methods

2.1. Patient selection and data collection

All EGDs performed at the University of Florida College of Medicine-Jacksonville (UFCOM-J) endoscopy laboratory from September 1st, 2007 and December 31st, 2012 were reviewed for the present investigation. Any patient, at least 18 years old, who had erosive oesophagitis on index endoscopy, follow-up endoscopy at minimum of 6 weeks later and ethnicity of either non-Hispanic white or African American was eligible for the investigation. Exclusion criteria were patients with known BE, upper gastrointestinal malignancy or head and neck cancer at index endoscopy. Data collected from the UFCOM-J endoscopy database and electronic medical record included age, gender, body mass index (BMI), dates of index and repeat EGD, presence of oesophagitis and grade (LA classification) if present, hiatal hernia if present, medication use (aspirin, NSAID, proton pump inhibitor (PPI) or statin), length of BE as well as presence of dysplasia and grade (low, indeterminate or high) if present.

2.2. Definitions and grading of oesophagitis

Index endoscopy was defined as the first endoscopic examination performed for any indication or symptom. BE was defined as the presence of salmon-coloured mucosa extending from the oesophago-gastric junction (EGJ) with biopsy confirmation of SIM. Short-segment BE (SSBE) was defined as segments of SIM measuring <3 cm, whereas segments ≥ 3 cm were considered long-segment BE (LSBE). EE was graded on the basis of the endoscopic description using the Los Angeles classification (grade A, one (or more) mucosal break no longer than 5 mm that does not extend between the tops of 2 mucosal folds; grade B, one (or more) mucosal break more than 5 mm long that does not extend between the tops of 2 mucosal folds; grade C, one (or more) mucosal break that is continuous between the tops of 2 mucosal folds but which involves less than 75% of the circumference and grade D, one (or more) mucosal break which involves at least 75% of the oesophageal circumference) [25]. In the majority of examinations, the EE grade was recorded as assigned at the time of the endoscopy by the performing endoscopist. In the rare cases where no grade was mentioned, the investigators assigned a grade based on the endoscopic description and photos of the number and extent of oesophageal erosions, if present. The investigation was approved by the UFCOM-J Institutional Review Board.

2.3. Statistical analysis

Continuous data was compared as mean \pm SD, prevalence data was recorded as a number and percent of the total group. Student's *t*-test or Chi squared test were used for comparisons between African Americans and non-Hispanic whites as appropriate. Differences between ethnic groups were considered significant if $p < 0.05$. Data analysis was performed using the IBM SPSS statistics statistical analysis program (version 22, IBM Corporation, Armonk, NY).

3. Results

A total of 14,303 patients underwent EGD during the 5 year study period; 1636 were reported to have oesophagitis. One hundred twenty five (7.6% of those with oesophagitis) had repeat EGD at least 6 weeks from the index procedure and were either non-Hispanic white or African American comprising the study group. Mean patient age of the overall group was 55 ± 12.3 years and 49.6% were male. Demographic information is presented in Table 1. Gender distribution and BMI were similar between ethnic groups; African Americans were older than non-Hispanic whites ($p = 0.012$, Table 1). A trend was present in index oesophagitis severity distribution, using the LA classification grade, between both ethnic groups (African American: LA A 35%, LA B 22%, LA C 13%, LA D 30%; non-Hispanic whites: LA A 17%, LA B 25%, LA C 28%, LA D 30%, $p = 0.056$). On sub-analysis, significant differences were seen between African Americans and non-Hispanic whites regarding the presence of erosive oesophagitis grades 1 and 3 only on index endoscopy (Supplementary Table S1).

BE was present in 8% ($n = 6$) of the non-Hispanic white group while no African American had BE on repeat EGD ($p = 0.029$). No difference was seen between ethnic groups regarding time to repeat endoscopy (African Americans: 295 ± 242 days vs non-Hispanic whites: 236 ± 163 days, $p = 0.106$). The clinical characteristics of patients who developed BE following EE compared to those that did not are listed in Table 2. No difference was noted between the non-BE and BE developed following EE groups regarding presence of reflux symptoms, presence of oesophagitis or grade, hiatal hernia frequency and medication use (aspirin, NSAID, PPI or statin). Also, no difference was noted between ethnic groups regarding presence of reflux symptoms, presence of oesophagitis or grade, hiatal hernia frequency and medication use (Table 3).

4. Discussion

The present study of BE occurrence following EE detected at an index endoscopy between African American and non-Hispanic white patients is the first to compare directly such a rate between ethnic groups at a centre caring for a large proportion of African Americans in the United States. It was designed to assess development of a metaplastic oesophageal mucosal change following healing of reflux related mucosal injury in both African American and non-Hispanic white patients seen at a tertiary care centre in the Jacksonville, Florida metropolitan area to test the hypothesis that

Table 1
Demographic information.

	Non-Hispanic white ($n = 71$)	African American ($n = 54$)	<i>p</i> value
Age ^a (mean \pm SD)	52.5 \pm 12.1	58.1 \pm 11.8	0.012
Males <i>N</i> (%)	34 (47.8%)	27 (50%)	0.725
BMI index endoscopy ^a (mean \pm SD)	28.1 \pm 7.6	28.7 \pm 9.1	0.689
BMI repeat endoscopy ^a (mean \pm SD)	27.9 \pm 7.3	27.8 \pm 8.4	0.968

BMI: body mass index.

^a *T*-test independent samples.

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