UTHealth Houston
School of Dentistry

Carotid artery calcification (CAC) prevalence detected via Panorex among UTHealth SOD Patients

Allyson Doan, Ryan Vahdani DDS, Hae Doh DDS, Erin Potts DDS, Sally Sheng DDS, Brooke Ellis, Darby L Johnson, Sarah O'Connor, Amanda Pham Department of General Practice and Dental Public Health, University of Texas Health Science Center at Houston, School of Dentistry, Houston, Texas, USA

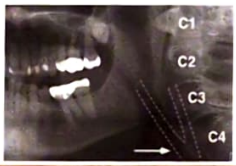
INTRODUCTION

Cerebrovascular incidents (strokes) and atherosclerosis account for a great number of mortality and morbidity each year. Strokes are the second leading cause of death worldwide, and 50% of survivors are left chronically disabled (1). There is a need for cost-effective prevention and early detection for these diseases. Previous studies involving dental panoramic images have shown presence of CAC in 4.8% of the general adult population over 30 years old, whereas this study aims to differentiate presence of CACs per ethnicity (2). Previous studies comparing racial groups indicate a lower prevalence of CAC in African Americans (61%) than in whites (77%) (4), yet there is a disproportionately higher rate of CVD mortality (5). As dental professionals we seek to improve overall health through improving oral health, but also to keep in mind our unique capacity for incidental findings such as atherosclerotic disease/CACs. Early diagnosis of CACs on dental panoramic images may potentially reduce morbidity and mortality of patients by referral to physician.

METHODS

Retrospective study utilizing images of 125 UTSD patients taken from 06/01/2019 to 06/01/2024 extracted from the Axium electronic health record database of patients aged 45 years or older enrolled in University of Texas Health – Houston School of Dentistry who have undergone panoramic images from 2008 to 2023 were included. Panoramic images and EHRs of these patients will be assessed for the following:

- Presence of CAC
  - labeled following the plaque-RADS classification system of severity/extension from 0 (not present) to 4 (vessel-outlining calcification)
- Gender, age, cardiac risk factors
  - Risk factors: age, gender, race, history of diabetes, kidney disease, stroke/myocardial infarction, ischemic attacks, peripheral artery disease, deep vein thrombosis, cardiovascular disease, history of bypass surgery, use of medications including the most common antihypertensives, blood thinners, diabetes medications, diuretics, and antihyperlipidemics
- Documented diagnosis of CAC in EHR
- Documentation of subsequent referral to physician
- Statistical analysis: Pearson's chi-square (gender and CAC prevalence), Fisher's exact test (ethnicity and CAC prevalence), T-test(risk factors and ethnicity), ANOVA (ethnicity, gender, BMI)



SCHEMATICS

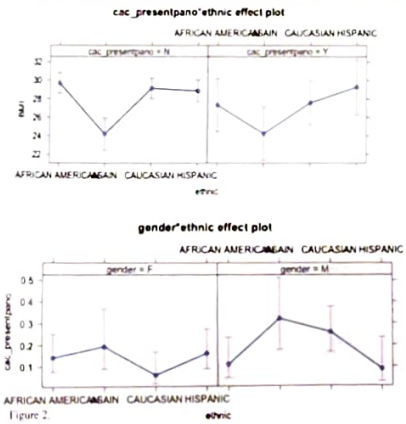


Figure 2.

RESULTS

CAC Classification	African American Prevalence
1	7
2	7
3	0
4	0

African American With CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	14	13	1	11	3	1	13
Female	9						
Male	5						

African American Without CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	95	76	19	71	20	5	90
Female	54						
Male	41						
Total	109	89	20	82	23	6	103

CAC Classification	Non-Hispanic White Prevalence
1	4
2	10
3	4
4	2

Non-Hispanic White American With CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	20	13	8	16	4	0	20
Female	3						
Male	17						

Non-Hispanic White American Without CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	96	65	23	74	20	7	89
Female	47						
Male	49						
Total	116	78	31	90	24	7	109

CAC Classification	Hispanic Prevalence
1	8
2	2
3	3
4	0

Hispanic With CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	13	8	2	9	2	0	13
Female	10						
Male	3						

Hispanic Without CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	84	45	20	52	13	1	81
Female	52						
Male	32						
Total	97	53	22	61	15	1	94

CAC Classification	Asian-American Prevalence
1	9
2	3
3	0
4	3

Asian-American With CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	15	12	3	11	3	0	15
Female	6						
Male	9						

Asian-American Without CAC Present		Cardiac Risk Factor With	Without	Metabolic Risk Factor With	Without	Renal Risk Factor With	Without
Total	44	26	17	26	13	0	43
Female	25						
Male	19						
Total	59	38	20	37	16	0	58

CONCLUSION

There was no statistically significant relationship between CAC presence and ethnicity.
There was however, a **statistically significant association between Caucasians and CAC Grade 1 presence *(p=0.01773)***.

Further studies are called for more inclusive studies to further assess CAC presence in the general and geriatric population. The investigators recommend more attentive referral to address these conditions when identified.

ACKNOWLEDGEMENTS

The authors thank the UTSD Student Research Program for support of the study and Dr. Nathaniel Holland III, Ph.D. for the statistical analyses

REFERENCES