1.a. Full Title: Demographic Distribution and Risk Factor Associations of Pharyngeal Carotids in the General Population.

b. Abbreviated Title (Length 26 characters): Pharyngeal Carotids

2. Writing Group:

Writing group members:
Ezekoli C. O.
Malhotra, S
Astor, B
Steinman, D. A
Wasserman, B. A

I, the first author, confirm that all the coauthors have given their approval for this manuscript proposal. C.E. [please confirm with your initials electronically or in writing]

First author:
Chukwudozie Ezekoli
Department of Radiology,
Johns Hopkins Hospital,
600 N Wolfe St, Baltimore, MD 21287,
Phone: (410) 502-3776
Fax: (410) 502-4928
E-mail: dozie@jhmi.edu

Corresponding/senior author (if different from first author correspondence will be sent to both the first author & the corresponding author):

Bruce Wasserman
Department of Radiology,
Johns Hopkins Hospital,
600 N Wolfe St, Baltimore, MD 21287,
Phone: (410)614-9200,
Fax: (410) 614-1213
E-mail: bwasser@jhmi.edu

3. Timeline:
Analysis to begin following publications committee approval. Manuscript anticipated in September 2006.
4. Rationale:

Variations in the course of the internal carotid artery have been extensively described in available literature. Reports of the prevalence of deviations from the normal course of the extracranial internal carotid artery (ICA) range from 10 to 40% \(^1\). One clinically important variation is the medial dislocation of the carotid artery into the retropharyngeal space at the level of the posterior pharynx known as a pharyngeal carotid. This usually occurs as a result of coiling, curving, kinking or tortousity of the ICA. \(^1,3,4\). A pharyngeal carotid lies in close approximation to the mucosa of the posterior pharyngeal wall and often presents as a pulsating submucosal mass in the posterior pharynx. Often described as a “do not touch” lesion, otolaryngologists and head and neck surgeons must be constantly aware of this variation as it could present significant risk of exsanguination if unwittingly biopsied or not recognized before pharyngeal or head and neck surgery. \(^2,5,6\)

Congenital factors, hypertension, atherosclerosis, and fibromuscular dysplasia have been postulated to be at least partly responsible for these variations. Coiling is believed to have embryological origins while curving is related to age related changes and kinking is associated with hypertension, atherosclerosis or fibromuscular dysplasia. \(^1,7,8\) Variations have been found more commonly on the left side and in females. \(^1,11,12\) Some authors have also suggested that the geometry of the vessel might be related to the risk and the progression of atherosclerosis. \(^9,10\) Other studies have suggested the variation in the ICA course is associated with cardiovascular disease risk factors. \(^11\) The advent of high resolution MRI angiography has made it possible to identify this variation non-invasively in the general population. While most studies have considered general variations in the course of the ICA, no studies have previously described the prevalence and distribution of pharyngeal carotids specifically.

The aims of this study are a) to determine the prevalence and demographics of pharyngeal carotids in a randomly selected population using MRI imaging and b) to identify possible cardiovascular risk factor associations of pharyngeal carotids.

5. Main Hypothesis/Study Questions:

This study of the prevalence and distribution of pharyngeal carotids will be exploratory in nature. We expect to detect differences in prevalence by age, sex and side. The presence of a pharyngeal carotid might be associated with increased blood pressure.
6. Design and analysis (study design, inclusion/exclusion, outcome and other variables of interest with specific reference to the time of their collection, summary of data analysis, and any anticipated methodologic limitations or challenges if present).

Data Variables:

Sample: Randomly selected ARIC study participants included in the ARIC Carotid MRI Study. The sample will be weighted to reflect the distribution in the general population

Independent variables to be used: Age, gender, ethnicity, systolic blood pressure, diastolic blood pressure, hypertension, antihypertensive medication use, body mass index, diabetes, smoking history, total cholesterol, LDL-c, HDL-c and carotid IMT

MRI variables: Pharyngeal carotid (Presence or absence)

Brief analysis plan and methods

Pharyngeal carotids will be defined as a carotid artery seen posterior to the pharyngeal mucosa and adjacent to the longus coli muscle in the neck on the 3D time of flight MR angiography. The prevalence and the distribution of pharyngeal carotids in this population will be determined according to age, sex and race. Side and bilaterality will also be determined. Associations of pharyngeal carotids with risk factors will be assessed using multiple logistic regressions.

Conclusion:

In this analysis, we expect to determine the prevalence of pharyngeal carotids and find age, gender and side related differences in the prevalence of pharyngeal carotids. The relationship between pharyngeal carotid arteries and established cardiovascular risk factors will also be explored.

References


12. Togay-Isikay C; Kim J; Betterman K; Andrews C; Meads D; Tesh P; Tegeler C; Oztuna D. Carotid artery tortuosity, kinking, coiling: stroke risk factor, marker, or curiosity? *Acta Neurol Belg.* 2005, 105, 2, 68-72

7.a. Will the data be used for non-CVD analysis in this manuscript? __ Yes __ No
b. If Yes, is the author aware that the file ICTDER02 must be used to exclude persons with a value RES_OTH = “CVD Research” for non-DNA analysis, and for DNA analysis RES_DNA = “CVD Research” would be used? __ Yes __ No

(This file ICTDER02 has been distributed to ARIC PIs, and contains the responses to consent updates related to stored sample use for research.)

8.a. Will the DNA data be used in this manuscript? __ Yes __ No
b. If yes, is the author aware that either DNA data distributed by the Coordinating Center must be used, or the file ICTDER02 must be used to exclude those with value RES_DNA = “No use/storage DNA”? __ Yes __ No

9. The lead author of this manuscript proposal has reviewed the list of existing ARIC Study manuscript proposals and has found no overlap between this proposal and previously approved manuscript proposals either published or still in active status. ARIC Investigators have access to the publications lists under the Study Members Area of the web site at: http://www.cscc.unc.edu/ARIC/search.php

__ X __ Yes _______ No

10. What are the most related manuscript proposals in ARIC (authors are encouraged to contact lead authors of these proposals for comments on the new proposal or collaboration)? None

11. a. Is this manuscript proposal associated with any ARIC ancillary studies or use any ancillary study data? __ Yes __ No
b. If yes, is the proposal
   __ A. primarily the result of an ancillary study (list number* __________)
   __ B. primarily based on ARIC data with ancillary data playing a minor role (usually control variables; list number(s)* __________ __________ __________)

*ancillary studies are listed by number at http://www.cscc.unc.edu/aric/forms/

12. Manuscript preparation is expected to be completed in one to three years. If a manuscript is not submitted for ARIC review at the end of the 3-years from the date of the approval, the manuscript proposal will expire.