

August 5, 2013

Dear Editor-in-chief,

Please find enclosed the revised manuscript in Word format. I thank the editorial board of the World Journal of Cardiology for giving me the opportunity to resubmit my manuscript "Circle of Willis atherosclerosis, Alzheimer's disease and the Dean number" for publication in the World Journal of Cardiology. I thank the reviewers for their helpful suggestions. I feel that these have improved my manuscript and have detailed a summary of the changes below and tracked all changes in the manuscript.

Title: Circle of Willis atherosclerosis, Alzheimer's disease and the Dean number

Author: Rovshan M Ismailov, MD MPH PhD

Name of Journal: *World Journal of Gastroenterology*

ESPS Manuscript NO: 4156

The manuscript has been improved according to the suggestions of reviewers:

1. Format has been updated
2. Revision has been made according to the suggestions of the reviewer 1.

An interesting short review on the association of atherosclerosis and Alzheimer's disease. For clarity would recommend adding a diagram/picture of the circle of Willis and possible drawing of a curved vessel with a demonstration of how the Dean number is calculated. Very little is mentioned on blood viscosity and nothing on shear stress or non-Newtonian fluids. A short paragraph describing these hemorheology factors may further enlightened the reader.

I am thankful for those comments. The following text and figure were added (on page 3 and 4) as follows:

“The Circle of Willis is a complex geometrical structure which has several areas with different curvature as well as various branching angles of vessels composing the circle. On the other hand, there are multiple anatomical variations of the Circle of Willis[3]. When a fluid runs through branching pipes a change of the fluid direction happens and similarly, when blood flows through the branching area in the Circle of Willis it changes direction. In general, taking into account that blood flow in the cardiovascular system is mostly laminar and the fact that branching areas of many arterial bifurcations have various angles, several hemodynamic factors (i.e. Reynolds number, radius of curvature of internal wall at branching area, diameters of bifurcating vessels etc.) should be taken into account[4]. One of them is the degree of curvature or the Dean number (Di). The Dean number indicates the influence of curvature on the resistance to blood flow[4,5]. If flow is laminar, then the Dean number is determined as:

$$D = 0.5 \operatorname{Re} \left(\left(\frac{R}{r} \right)^{1/2} \right)$$

Where Re indicates Reynolds number, R is a radius of the vessel, r is a radius of the curvature [4](Figure 1).

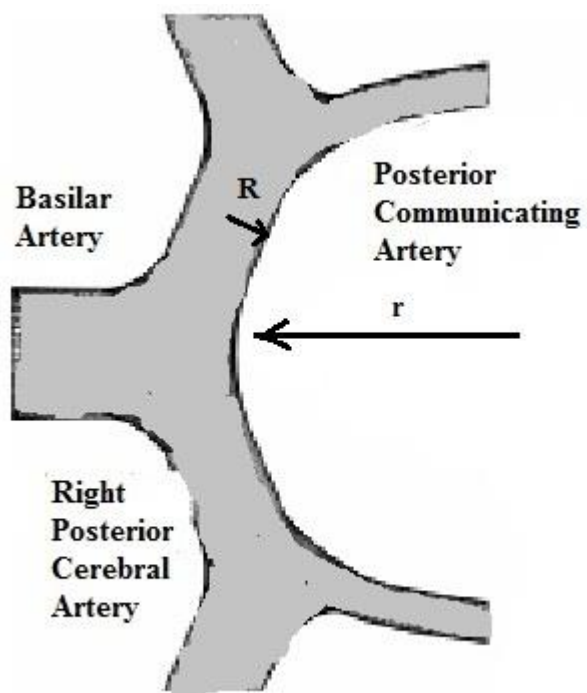


Figure 1. The Circle of Willis: the values of curvature (R and r)."

3. Reviewer 2. I am currently engaged in some studies related to this topic, hence my interest to see it published...

I am thankful for those comments.

4. References and typesetting were corrected

Thank you again for publishing our manuscript in the *World Journal of Gastroenterology*.

Sincerely yours,

Rovshan M Ismailov, MD MPH PhD
Rovshan M Ismailov M.D., M.P.H., Ph.D.



The leading research scientist

Institute of Mathematics, National University of Uzbekistan

Address for correspondence:

Rovshan M Ismailov MD MPH PhD

29 Dormon street, Tashkent, Uzbekistan 100125

* E-mail: rovshani@yahoo.com

Phone: 998-90-3224463 Fax:998-71-1627557