ISSN: 0976-3031

Available Online at http://www.recentscientific.com

CODEN: IJRSFP (USA)

International Journal of Recent Scientific Research
Vol. 12, Issue, 09 (A), pp. 42957-42958, September, 2021

International Journal of Recent Scientific Research

DOI: 10.24327/IJRSR

Research Article

THE CERVICAL BLOOD FLOW PARAMETERS WITH THE BEST CORRELATION FROM ARTERIAL BLOOD PRESSURE IN HYPERTENSION CASES

Alexandre A Vetcher., Kirill V.Zhukov., Bagrat A.Gasparuan and Alexander Y. Shishonin

Institute of Biochemical Technology and Nanotechnology
of Peoples' Friendship University of Russia

DOI: http://dx.doi.org/10.24327/ijrsr.2021.1209.6184

ARTICLE INFO

Article History:

Received 4th June, 2021
Received in revised form 25th July, 2021
Accepted 23rd August, 2021
Published online 28th September, 2021

Keywords:

Arterial hypertension, arterial blood flow, Cervical Vertebrate correction

ABSTRACT

A data on BP and VA of 33 subjects treated for hypertension were plotted and analyzed. After confirmation of the existence of a correlation by correlational analysis, the least square method was applied to define parameters of linear regression. It appears that there is a strong correlation between BP and VA of the shape of linear regression. The obtained data confirms, that in cases of arterial hypertension (AHT) we could use data on BP to evaluate VA, or, vice versa, use VA data as an index of BP in cuffless BP-monitoring devices.

INTRODUCTION

Because hypertension is becoming the most widespread disease, which, according to WHO,[1] already affects 1.13 billion people, it is of great interest to link the various measurable parameters that can somehow characterize this disease. Finding a stable correlation, in this case, makes it possible to use an easily obtained parameter as an index (indicator) of the parameter, that is difficult to obtain. In our work, we have demonstrated the relationship between the average blood flow linear velocity (V_A), defined as

$V_A = (V_{AVS}+V_{AVD})/2$,
where V_{AVD} is the linear blood flow velocity of right (*dextra*) and V_{AVS} - left (*sinistra*) vertebral artery, and average arterial blood pressure P_A defined as
$P_A= (P_S+ P_D)/2$,
where-P_S – systolic, and P_D–diastolic arterial pressure.

V_A data obtained by triplex sonography [2,3] - on Mindray DC-40 (Mindray Medical, Shenzhen, China) (Figure, Panels A and B), we considered it as a difficult parameter to obtain, taking into account the costs of training qualified personnel, purchasing equipment and the cost of running a station to take measurements, while the P_A- as easily obtainable. To collect the data, we selected measurements of P_A and V_A for the random sample of 33 adult patients diagnosed with stage 1 arterial hypertension (AHT) (P_S ranging from 135 to 159 torr or/and P_D from 85 to 99 torr) before, after and on the intermediate stage of correction of Cervical Vertebrate according to [4].The sample characteristics are exhibited on Panel D of the Figure. The above-mentioned approach[4] causes stepwise a stable restoration of arterial pressure with a simultaneous restoration of blood flow.

The previous worldwide collected data, summarized in [5], proves that the relationship between pressure and flow in the case of arteries is quite far from Poiseuille law conditions, because

1. The section area is not round
2. The pressure is in constant periodic change
3. The laminar character of the flow is questionable
4. And some other multiple reasons.

Namely for this reason of great interest is to find essential connections with different measured factors. From Panel C of the Figure, with the negative correlation between P_A and V_A r=-0.82, it is logical to approximate their relationship as a linear regression. The attempt to apply the least square method gives linear approximation formula

$P_A = [-1.13\ V_A\ (cm/s) +152]\ (torr)$

Corresponding author:* **Alexandre A Vetcher
Institute of Biochemical Technology and Nanotechnology of Peoples' Friendship University of Russia

The obtained correlation formula is applicable in the necessity to perform *e.g.* reverse analysis of the P_A data of the patients with AHT and evaluate possible V_A.

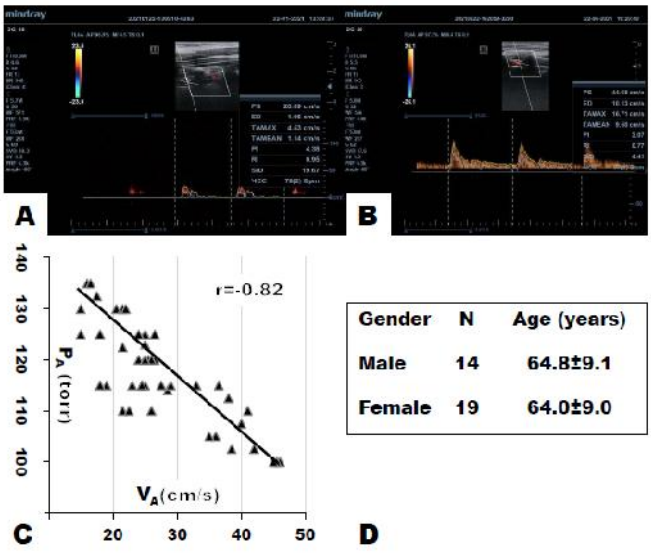

Figure Typical triplex sonography images of the *dextra* vertebral artery blood flow before and after treatment according to [4]. Panel **A** exhibits the typical sonogram of the flow through *dextra* vertebral artery before, while **B** – after the treatment of patient according to (4). Panel **C** demonstrates the dependence of P_A from V_A before and after the treatment for 33 patients with diagnosed arterial hypertension. The Random Sample parameters are shown on Panel **D**.

Limitations to this study include cohort size, retrospective design, and generalization of chosen protocol for the random sample selection. Studies are planned to further model the relationship between P_A and V_A with the increment of clinical and hemodynamic outcomes.

Sources of Funding

This paper has been supported by the RUDN University Strategic Academic Leadership Program (recipient A.A.V.).

Disclosures

None

References

1. https://www.who.int/health-topics/hypertension/#tab=tab_1
2. Du Y., Wang J., Jin L., Li C., Ma H., Dong S. Ultrasonographic assessment of anatomic relationship between the internal jugular vein and the common carotid artery in infants and children after ETT or LMA insertion: aprospective observational study. *Front Pediatr*. 2020; 8: 605762. doi: 10.3389/fped.2020.605762
3. Karadadaş S., Çorbacıoğlu S., Çevik Y., Dağar S., Emektar E. Assessment of the carotid artery Doppler flow time in patients with acute upper gastrointestinal bleeding. *Turk J Emerg Med*. 2020; 20: 35–41.doi: 10.4103/2452-2473.276387[*]
4. Shishonin A. Method for treating cervical osteochondrosis. *Russian Federation Federal Service for intellectual property, patents and trademarks.*[51] Int. Cl.7 A 61 H 1/00 [19] RU [11] 2 243 758[13] C2 [12] ABSTRACT OF INVENTION [21], [22] Application: 2003103416/14, 06.02.2003 [24] Effective date for property rights: 06.02.2003 [43] Application published: 10.08.2004 [45] Date of publication: 10.01.2005
5. Almeder C.A. Hydrodynamic modelling and simulation of human arterial blood flow. *PhD Thesis. Technical University of Wien.*1999; 112p

How to cite this article:

Alexandre A Vetcher *et al* .2021, The Cervical Blood Flow Parameters with the Best Correlation from Arterial Blood Pressure in Hypertension Cases. *Int J Recent Sci Res.* 12(09), pp. 42957-42958. DOI: http://dx.doi.org/10.24327/ijrsr.2021.1209.6184

****