

Research Article

Comparison of Serum Probrain Natriuretic Peptide (ProBNP) Levels in Migraineurs and Hypertensive Migraineur Patients

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Abstract | Migraine being one of the common and disabling causes of headaches, has been described by World Health Organization as close to quadriplegia and dementia. Among the headache complaint visitors in the emergency department, the most common are those suffering from migraine. ⁽¹⁾ A linear correlation has been found between rising serum pro BNP levels and Cardiovascular pathologies especially those involving left ventricular dysfunction which may depict a probable association between migraine and CVD. To compare the levels of serum pro Brain natriuretic peptide (pro BNP) between migraineurs and hypertensive migraineurs. It was a cross sectional comparative study in which serum pro BNP levels were measured in migraine patients and hypertensive patients with migraine. A blood sample of 3 cc was drawn from the median cubital vein after securing aseptic measures. The blood sample was allowed to clot for 30 minutes and serum was separated. The serum was then centrifuged and pro BNP levels were estimated by ELISA using Human pro BNP kit. Patients' history and recorded blood pressure was documented on a questionnaire. The results were analyzed using SPSS 21. One way ANOVA and Independent sample T test were applied to compare the proBNP levels. A P-value of < 0.05 was taken as significant. Serum pro BNP levels were raised in migraine patients and also in hypertensive patients with migraine (p-value 0.00). Serum pro BNP levels were found to be raised in both migraineurs and hypertensive migraineurs but the increase was not equal.

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Introduction

Migraine is one of the commonest primary headaches syndromes. ^{(2), (3)} Migraine is a severe form of headache associated with recurrent painful attacks and photophobia, phonophobia, nausea and vomiting. ⁽³⁾

The prevalence of migraine is 12-18% in the general population. The age group mostly affected lies between 20-35 years. ^{(3), (4)}

Any factor causing stretch of the cardiac atria or ventricles results in the release of serum pro BNP from the cardiac myocytes by paracrine effect or neurohormonal stimulus. ^{(5), (6)}

Migraine has recently been associated with a broad range of cardiovascular diseases including angina, myocardial infarction, changes in peripheral vasculature which increase the susceptibility to atherosclerotic changes, ischemic heart diseases and hypertension. ^{(7), (8)} Among the shared comorbidities, Hypertension

has been seen to be associated with migraine along with Hyperlipidemia and Diabetes.⁽⁹⁾

As both Migraine and Hypertension are prevalent among the general population, this study was done to compare the levels of serum proBNP between migraine patients and hypertensive patients with migraine in order to find out a potential association between the two morbidities.

Materials and Methods

The study was carried out in Physiology department of Shaikh Zayed Postgraduate Medical Institute, Lahore General hospital and Sharif Medical city hospital after taking due permission from the respective head of departments.

The study was conducted on male and female patients between the ages of 20 to 45 years after taking an informed written consent.

The study included 64 patients with 35 migraine patients (fulfilling the diagnostic criteria for migraine)⁽¹⁰⁾ and 29 patients who had diagnosed Hypertension and migraine using 95% confidence level and 80% power of test. Convenient, non-probability sampling technique was used to conduct the study.

Volunteers/subjects apparently healthy and physically fit having no evidence of significant cardiovascular or any other illness associated with increasing levels of proBNP were excluded from the study.⁽¹¹⁾

Table 1: Descriptive statistics for blood pressure in hypertensive migraineurs.

Blood pressure (mmHg)	Minimum	Maximum	Mean±Standard Deviation
Systolic	130	180	144.48±17.026
Diastolic	90	150	99.66±13.491

Detailed history and examination was done. Mercury sphygmomanometer was used to measure the blood pressure and the readings were taken in millimeters of mercury. All the data was recorded on a questionnaire. A blood sample of 3 cc was drawn from median cubital vein under aseptic conditions. The sample was centrifuged and proBNP levels were estimated in serum by ELISA using Human pro BNP kit.

SPSS 21 was used to analyze the collected data. Data for blood pressure and serum proBNP was described by using Mean ± Standard deviation. Serum proBNP levels were compared between patients by applying One Way Anova and Independent Sample t- test. A P-value < 0.05 was taken as significant.

Results and Discussion

The study was conducted on 64 male and female patients. There were 35 migraine patients and 29 patients with diagnosed hypertension and migraine.

Blood pressure was measured in hypertensive migraineurs manually by using mercury sphygmomanometer. The maximum systolic blood pressure measured was 180 mmHg and minimum was 130 mmHg. The maximum diastolic blood pressure measured was 150 mmHg and minimum was 90 mmHg. (Table 1).

The normal range of serum proBNP is 0.5-30pg/ml or up to 20 pg/ml (1 pg/ml= 1 ng /L).^{(12), (13)} In our study it was seen that there was an unequal increase in serum proBNP levels in migraineurs and hypertensive migraineurs (p-value 0.00) Mean±SD serum proBNP levels were 32.0±11.5 ng/L in migraineurs and 66.04±10.06 ng/L in hypertensive migraineurs (Table 2). So the results showed that the rise in Serum pro BNP level was more in hypertensive migraineurs than the migraineurs. Independent sample T test was applied to compare the levels of pro BNP by gender. It was seen that in migraineurs the mean pro BNP levels were 32.04 ng/L and 31.98 ng/L in males and females respectively. There was no significant difference (p-value 0.990) and serum pro BNP levels were equally raised in male and female migraineurs (Table 3). In hypertensive migraineurs the mean pro BNP level in males was 64.34ng/L and in females was 66.57 ng/L. (Table 3). Again there was no significant difference in the increasing levels of pro BNP levels in hypertensive migraineurs by Gender (p-value 0.617) (Table 3).

Table 2: Comparison of serum pro BNP levels in migraineurs and hypertensive migraineurs.

Groups	Serum proBNP(ng/L)	P-value
Migraineurs	32 ± 11.5	0.000*
Hypertensive Migraineurs	66.04 ± 10.0	

*p-value < 0.05= significant

Table 3: Serum proBNP in migraineurs and hypertensive migraineurs by gender.

Groups	Gender	Mean Serum ProBNP (ng/L)	p-value
Migraineurs	Males	32.04	0.990
	Females	31.98	
Hypertensive Migraineurs	Males	64.34	0.671
	Females	66.57	

*p-value < 0.05= significant

Migraine has been linked in the recent past to a broad range of CVD. (12) The cardiovascular pathologies that possibly increase in the presence of migraine include high blood pressure. The risk of Hypertension has been seen to be twice as high in migraineur patients. (13), (14)

Our study compared the levels of serum proBNP in age and gender matched migraineurs and diagnosed hypertensive migraineur patients.

In hypertensive migraineurs the maximum diastolic blood pressure recorded was 150 mmHg. Serum proBNP level increase in left ventricular dysfunction indicated by a high diastolic blood pressure value found in our study coinciding with the previous studies. (15), (16), (17) So the results of our study reinforce the findings of the previous studies indicating increased levels of proBNP in left ventricular stress.

As pointed out earlier by Uzar et al and Sharma et al that serum proBNP levels are raised in migraineurs as compared to the normal healthy individuals (18), (19), our study also shows serum proBNP levels are raised in migraine patients again supporting the past studies.

Our study indicates that Serum proBNP levels are increased in migraineurs than the normal range and the levels are even higher in hypertensive migraineur patients. So there is an unequal rise in serum proBNP levels in both set of patients indicating a supportive association between migraine and high blood pressure.

Conclusion

There is very limited knowledge available on the subject of migraine and association of migraine and cardiovascular pathologies like hypertension particularly among the South Asian population. (14) As both the

diseases have a high prevalence among the general population, a positive association can have beneficial impact on the general population.

The results of our study show that levels of serum proBNP are raised in both migraineurs and hypertensive migraineurs although levels were unequally raised. So this suggests that there is a positive association between migraine and hypertension and serum proBNP can be used as a useful preclinical tool for determining hypertension in migraineurs.

However, it was a small scale study and more large scale studies should be conducted so that further authenticated results could be obtained regarding a potential association between migraine and hypertension.

Authors Contribution

Sana Qanber Abbasi: Main researcher and main author.

Ejaz Ahmed: Research supervisor and proof reading.

Rabia Sattar: Research assistance and proof reading.

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