

Relationship of headache to hypertension

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Objective

To assess the prevalence of hypertension in adult patients presenting with headache.

Patients and Methods

A total of 972 patients with headache were examined and blood pressure was measured by standard mercury sphygmomanometer in all patients at the private clinic of the author from January 2002 to December 2003. They were labeled as hypertensive and normotensive according to JNC-7 guidelines. Based on the history, headache was diagnosed according to International Headache Society (IHS) guidelines and was clinically divided as migrainous and (non-migrainous) tension headache. Hypertension was also graded accordingly as Stage-I and Stage-II.

Results

Of the 972 patients, 261 patients were clinically diagnosed as having migraine and 711 patients as having (non-migrainous) tension headache. The total number of hypertensive patients were 195 (20.06%) and normotensive patients were 777 (79.94%). There were 112 (11.52%) patients with stage-I and 83 (8.53%) patients with stage-II hypertension. Of patients with migraine only, 11 (1.13%) had Stage-I while 4 (0.41%) had Stage-II hypertension. Of patients with tension

headaches, Stage-I in 101 patients (10.39%) while Stage-II hypertension was found in 79 (8.13) patients. Two hundred and forty six (25.31%) migraineurs and 531 (54.63%) non-migraineurs had normal blood pressure. Five hundred and thirty one patients had no hypertension and were labeled as normal. Prehypertension was not taken into account, and none of the patient fell into this group. The total Odds ratio for hypertension in headache was 0.1799 (95% CI 0.104-0.3112). For hypertension the sensitivity of (non-migrainous) tension headache is 92% and a specificity of 32%. This is only 68% and 7% for migrainous headache.

Conclusion

The risk of hypertension is more significant in (non-migrainous) tension headache as compared to migrainous headache. The non-migrainous tension headache is associated more with severe hypertension. Large number of patients with headache were normotensive in both the groups and headache should not be thus considered as a very important symptom of hypertension as the myth prevails in our society. (Rawal Med J 2012;37:264-267).

Keywords

Headache, hypertension, migraine, tension headache.

INTRODUCTION

As early as in 1913 Janeway proposed an association between hypertension and headache.¹ Further studies were done and it led to more confusion as conflicting results were obtained. Lack to controlled trials gave rise to the myth that headache and hypertension go hand in hand. This association has been greatly emphasized in old and some new papers.²⁻¹⁰ In the era of evidence based

medicine, medicine has evolved into an ever changing phenomenon and older studies are usually ignored but in the case of hypertension the older studies are important as in those times the prevalence of hypertension was higher and the awareness much lower. This led to many clinical features of hypertension which actually should not have evolved as a very important clinical feature, headache being one of them. In those times, there

was no good classification of hypertension and with JNC-7 guidelines¹¹ and JNC-8 in the offing; we now have a much better understanding of hypertension. Similar is the case of headache or cephalgia which only recently has been classified justifiably.¹²

The association or dissociation of such a common disease can now be scientifically studied and discussed which would end the decades old misconceptions and anecdotes.

Many hypertensive patients complain of headache and in many a headaches, hypertension can be found. The papers published are usually from the neurological clinics, out-patient departments or wards and thus they do not represent the actual problem in the community. The aim of this study was to assess the prevalence of hypertension in adult patients presenting with headache in a community setting.

PATIENTS AND METHODS

The study was carried out at the private clinic of the author from January 2002 to December 2003 and a total of 972 patients with headache were examined and blood pressure was measured by standard mercury sphygmomanometer in all patients according to JNC-7 guidelines.¹¹ Based on the history and according to IHS guidelines¹² headache was clinically divided as migrainous and (non-migrainous) tension headache. For simplicity, the various sub classification of headache were not included. Hypertension was classified according to JNC 7 classification and all patients above 140mm of Hg systolic and 90 mm of Hg diastolic were labeled as hypertensive. Pre-hypertension was not taken into account and in fact none of the patient fell into this group. Hypertension was also graded accordingly as Stage-I and Stage-II. Data was analyzed using SPSS v 15.

RESULTS

Of the 972 patients, 261 patients were diagnosed as having migraine and 711 patients as having (non-migrainous) tension headache. The total number of hypertensive patients were 195 (20.06%) and normotensive patients were 777 (79.94%).

Table 1. Prevalance of hypertension in patients presenting with headache (n=972).

Headache	Migranous	Non-migranous	Total Headache
Total	261 (26.85%)	711 (73.15%)	972 (100%)
Stage-I Hypertension	11(1.13%)	101 (10.39%)	112 (11.52%)
Stage-II Hypertension	04(0.41%)	79(8.13%)	83 (8.53%)
Total Hypertensive Patients	15 (1.54%)	180 (18.53%)	195 (20.06%)
Normotensive patients	246 (25.31%)	531 (54.63%)	777 (79.94%)

Stage-I(systolic blood pressure 140-159 mm of Hg or diastolic blood pressure 90-99 mm of Hg).

Stage-II(systolic blood pressure ?160 mm of Hg or diastolic blood pressure ?100 mm of Hg). ? Total Odds Ratio: 0.1799 (95% CI= from 0.104 to 0.3112

There were 112 (11.52%) patients with stage-I and 83 (8.53%) patients with stage-II hypertension. Of the patients diagnosed as migraine only 11 (1.13%) patients had Stage-I hypertension, while 4 (0.41%) had Stage-II hypertension. Of the patients diagnosed as (non-migrainous) tension headaches, 101 (10.39%) had Stage-I hypertension, while 79 (8.13) patients had Stage-II hypertension.

Table 2. Hypertension in (non-migrainous) tension-type headache.

Statistics	Estimated Value	95% Confidence Interval	
		Lower limit	Upper limit
Prevalence	0.799383	0.772514	0.823846
Sensitivity	0.316602	0.284244	0.350801
Specificity	0.923077	0.873924	0.954799
For any particular test result, the probability that it will be:			
Positive	0.268519	0.241113	0.29778
Negative	0.731481	0.70222	0.758887
For any particular positive test result, the probability that it is:			
True Positive	0.942529	0.905049	0.966328
False Positive	0.057471	0.033672	0.094951
For any particular negative test result, the probability that it is:			
True Negative	0.253165	0.221918	0.287123
False Negative	0.746835	0.712877	0.778082
Likelihood Ratios: [C]=Conventional, [W]= weighted by prevalence			
Positive [C]	4.11583	2.503728	6.765932
Negative [C]	0.740347	0.705159	0.777292
Positive [W]	16.4	10.024844	26.829344
Negative [W]	2.95	2.803524	3.104129

Two hundred and forty six (25.31%) migraineurs and 531 (54.63%) non-migraneurs had normal blood pressure. Five hundred and thirty one patients had no hypertension (Table 1).

Table 3. Hypertension in migranous headache.

Statistics	Estimated Value	95% Confidence Interval	
		Lower limit	Upper limit
Prevalence	0.200617	0.176154	0.227486
Sensitivity	0.076923	0.045201	0.126076
Specificity	0.683398	0.649199	0.715756
For any particular test result, the probability that it will be:			
Positive	0.268519	0.241113	0.29778
Negative	0.731481	0.70222	0.758887
For any particular positive test result, the probability that it is:			
True Positive	0.057471	0.033672	0.094951
False Positive	0.942529	0.905049	0.966328
For any particular negative test result, the probability that it is:			
True Negative	0.746835	0.712877	0.778082
False Negative	0.253165	0.221918	0.287123
Likelihood Ratios: [C]=Conventional, [W]=weighted by prevalence			
Positive [C]	0.242964	0.147799	0.399404
Negative [C]	1.350717	1.295569	1.408213
Positive [W]	0.060976	0.037273	0.099752
Negative [W]	0.338983	0.298499	0.384957

The total Odds ratio for hypertension in headache was 0.1799 (95% CI 0.104-0.3112). For hypertension the sensitivity of (non-migrainous) tension headache is 92% and a specificity of 32%. This is only 68% and 7% for migrainous headache. The detailed statistical analysis is given in Table 2 and Table 3

DISCUSSION

Headache and hypertension are both very common conditions and may co-exist and usually by chance. Headache usually leads the patient to seek medical help and invariably their blood pressure would be checked. This probably has led to the myth and misconception that hypertension causes headache. To answer the question of whether headache is more common when the blood pressure is higher, we must look at population surveys. Meager population

surveys have been done as usually headache patients present to offices and hypertensive patients may or may not seek medical advice if they are symptom free and less so for occasional headache which they think is because of tiredness, depression, lack of sleep, overwork and so on.

Our study did not find a very strong association and especially migraine had a very weak association especially with stage-II hypertension. It was small enough (0.41%) to be insignificant statistically and can easily be ignored. The prevalence of hypertension (cumulative for stage-I and II) in our study was 20%. It was slightly more for stage-I (11%) than stage-II (8%). The difference, however, is insignificant taking into account the number of patients studied. Non-migrainous patients (18%) had a much higher prevalence of hypertension when compared to migrainous patients (1.54%). Bulpitt reported in a reverse study where headache was sought in patients presenting with hypertension and 31% of patients with untreated severe hypertension complained of headache compared with 15% of treated hypertensive patients.²

In a similar study, Cooper, in a sample of 11,710 hypertensive patients, concluded that headache was a common symptom related to high blood pressure levels.³ In an important population-based study from Sweden, Rasmussen observed that women with migraine showed significantly higher diastolic blood pressure than those without migraine.⁴ In sharp contrast, in another population-based study, Walters found no differences in systolic and diastolic blood pressure levels when individuals with headache were compared with individuals who had not had a headache in the previous year.⁵ Stewart concluded that once people become aware of their hypertension diagnosis, the frequency of reported headache increases.⁶

Using data from the United States Health Examination Survey of Adults (196062), Weiss observed no differences in the prevalence of headache among 6,672 normotensive and hypertensive people who were not aware of their blood pressure status.⁷ In a Brazilian study, Benseñor, using 24-hour ambulatory blood pressure monitoring, did not demonstrate any difference in blood pressure levels between women with and without chronic daily headache.⁸

Hansson concluded that the incidence of headache

can be reduced by antihypertensive treatment.⁹ It is, however, interesting that beta blockers are useful in migrainous headache. This fact has been validated more recently by a Meta analysis of 94 randomized controlled trials which showed significant improvement in headache after the use of antihypertensive medications.¹⁰ In a study from Italy, medication overuse headache was associated with hypertension.¹³ In our study, this association was weaker than (non-migrainous) tension type headache. We found the association of headache with hypertension was in 20% of cases. The Italian study quotes it around 28%. Our association of 1.54% of migraineurs against 18% of non migraineurs may have a bias as it may be by chance that more patients with non-migrainous headache (almost 2.5 times) attended the clinic than the migrainous patients. Similarly, this study may not be extrapolated to the general population due to "Berkson bias" as the selection may not be a true representative of the population but may be more representative of a group with disabling headaches presenting to a clinic.

In another Brazilian study, Wiehe evaluated the association between headache and hypertension in a sample of 1,174 individuals aged over 17 years over their lifetimes or in the last year and reported that it was not associated with hypertension.¹⁴ A study of 22685 patients interestingly showed an inverse relationship between headache and hypertension with higher systolic blood pressure presenting less frequently as headaches than low systolic blood pressures.¹⁵

CONCLUSION

Enough data has arrived to conclude that headache and hypertension are not really associated. The use of the International Headache Society (IHS) criteria to classify headaches allows the physician to make a correct diagnosis of the headache. Similarly, correct diagnosis of hypertension and its stages is made with the guidance of JNC-7 guidelines. One must be wary of white coat hypertension and ambulatory BP monitoring may be required in such cases and patients should never be labeled as "hypertensive headaches." Keeping all this in mind, the association of hypertension and headache is complex and need large, controlled multicentre randomized trials to define the real association.

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