

DIAGNOSTIC OUTCOME OF PATIENTS PRESENTING WITH SEVERE THUNDERCLAP HEADACHE AT SAIDU TEACHING HOSPITAL

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ABSTRACT

Objective: To find out the frequency of patients attending Casualty department of a Teaching Hospital with sudden severe thunderclap headache, their diagnostic out-come and follow up.

Methodology: The study was conducted in Casualty and Medical, Departments of Saidu Teaching Hospital, Saidu Sharif, from January 2006 to December 2006. Out of 22,000 patients with different Medical problems attended Casualty department during study period of which 128 cases had acute severe thunderclap headache. Age range was 15 to 80 years with mean age of 46±10 years. Seventy eight patients (61%) were female and fifty (39%) were male. Protocol included proper clinical examination, basic laboratory investigations, admission to the General medical ward / Intensive care unit for observation, treatment and follow-up. CT scan of brain and or lumber puncture was performed in all the studied patients. The in-hospital follow up period was from two to fourteen days. The patients were reviewed one month later after discharge from hospital.

Results: Out of 120 patients twenty cases (15.6%) had Subarachnoid haemorrhage (SAH) seven patients (5.4%) had Cerebral infarction, five patients (3.9%) had an Intracerebral Haematoma. Five patients (3.9%) had aseptic meningitis. Two cases (1.5%) were reported as cerebral edema. One case (0.8%) had venous sinus thrombosis. As there was no specific finding on investigations and follow up of 88 cases (69%): these were labeled as idiopathic thunder-clap headache. Past history of not more than three similar episodes was present in 33 cases (25.78%). Out of these 33 cases, thirty belonged to the benign group of 88; other three cases had organic causes. Clinical diagnosis of Migraine was made in 37 cases out of these 88 cases.

Conclusion: Attack of severe thunderclap headache is not an un-common emergency. Attack due to Subarachnoid haemorrhage (SAH) or other serious underlying disease cannot be distinguished from non specific headaches on clinical grounds alone. It is recommended that all such patients be hospitalized and investigated properly with CT scan and or lumbar puncture to distinguish between benign and organic headaches.

KEYWORDS: Thunderclap headache, Sub-arachnoid haemorrhage, Benign headache.

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INTRODUCTION

Sudden onset of severe headache, classically described as thunderclap headache, is not an un- common medical emergency compelling patients to seek urgent treatment. Mostly simple and benign, this may represent life threaten-

ing condition like Subarachnoid haemorrhage (SAH), impending rupture of an aneurysm or an arterial dissection.¹ Thunderclap headache refers to a severe and explosive headache with peak intensity at onset—as sudden and as unexpected as a “clap of thunder”. The term was first used to describe this type of headache as a presentation of an un-ruptured cerebral aneurysm.² Since its introduction, the term has also been used to refer to an idiopathic benign recurrent headache disorder, a variant of migraine, and a presenting symptom of various sinister underlying causes including subarachnoid haemorrhage, cerebral venous sinus thrombosis and hypertensive encephalopathy.^{3,4}

Sudden severe headache is the most common symptom of a Subarachnoid haemorrhage. It may precede an imminent subarachnoid bleed in 10%-50% of patients or may be the sole manifestation of a SAH.^{5,6} Unfortunately, there are no characteristics of the headache which reliably distinguish between subarachnoid haemorrhage and idiopathic thunderclap headache and therefore a thorough diagnostic evaluation is mandatory.¹ Thunderclap headache is a clinical emergency which mandates a swift evaluation with investigations aimed at excluding a subarachnoid haemorrhage. Early CT has high sensitivity and specificity for detecting subarachnoid blood. However, when negative, a lumbar puncture is always required.^{5,6} The detection of xanthochromia by spectrophotometer is the most accurate test for subarachnoid haemorrhage with a sensitivity of more than 95% when a lumbar puncture is performed between 12 hours to two weeks after the event.^{7,8} In those patients with normal neurological, CT and CSF examinations, further imaging to search for an unruptured intracranial aneurysm is not warranted and may be misguided.⁹ In selected cases and when available, MR angiography will be the next investigation of choice.⁹ When appropriate investigations have excluded all potential secondary causes, a diagnosis of idiopathic thunderclap headache is appropriate.^{9,10}

The objective of our study was to find out the frequency of all such patients attending Casualty Department with the complaint of acute severe thunderclap headache, to record their diagnostic work-up and follow their out-come in relationship to the clinical presentation.

METHODOLOGY

This is a descriptive observational study, conducted in the Casualty and Medical Departments of Saidu Medical College and Teaching Hospital, Saidu Sharif, Swat. This Hospital has large catchment area that includes district of Swat and neighboring districts of Bunir, Malakand, Shangla and Kohistan (formerly known as Malakand division). The study period was from January 2006 to December 2006.

All consecutive patients presenting to the casualty department with sudden onset of severe Headache, described as thunder-clap were included in the study. Patients were excluded if they had experienced more than three similar episodes previously. Proper clinical/neurological examinations were done by Medical Officer and then verified by the Consultant. After proper clinical examination, basic laboratory investigations were performed. This included full blood count, ESR, Blood sugar, blood urea and Urineanalysis. All patients were admitted to the General medical ward / Intensive care unit for observation, treatment and follow-up. CT scan of brain and or lumbar puncture was performed in all the studied patients. CSF samples obtained were examined for pressure, naked eye appearance, and then sent to the laboratory. Test for Xanthochromia, Biochemical, microbiological and microscopic examinations were done on these samples. After discharge from hospital, all patients were reviewed at 4th week or earlier if needed. Data were expressed as mean (\pm SD). All values were reported as percentage of the total number of patients presenting with thunderclap headache. Final diagnostic outcome was reported in percentage.

RESULTS

A total of more than 87,000 patients attended the Casualty department during the study period. Among these; 22,543 patients had different Medical problems. Out of them 128 cases which is less than 1%, had acute severe thunderclap headache, fulfilling the study criteria and were included in the study. Age range was 15 to 80 years with mean age of 46 ± 10 years. Seventy eight (78) cases (61%) were female and 50 cases (39%) were male. The in-hospital follow up period was from two to 14 days. (Mean 7 ± 2). Post discharge review visit was four weeks later. Age distribution of patients is shown in Table-I and final diagnosis made in all cases is shown in Table-II. Past history of not more than three similar episodes was present in 33 cases (25.78%). Out of these 33 cases, 30 (91%) belonged to the benign group of 88 while three cases (9%) had organic causes. All three had similar less severe episodes only once within previous three months.

Clinical diagnosis of Migraine was made among 37 cases (42%) out of the 88 Cases. The attack occurred in peak of physical activity in 20 cases (15%). Of these 20 cases only four patients turned out with a positive CT scan indicating SAH. In forty six (36%) cases there was history of severe emotional outburst preceding severe headache and seven such cases turned out to have SAH. Symptoms and signs in positive group included: nausea, persistent vomiting, neck stiffness, occipital location and impaired consciousness. Location on top of head or temporal region, sharply localized pain, pressing quality of pain, previous history of similar episode were all in favour of non

Table-I: Age Distribution of patients (n=128)

Age range	No. (%)
25-30 years	18 (14)
31-45 years	38 (30)
46-60 years	50 (39)
65-80 years	22 (17)

specific headaches. At one month follow up, patients with confirmed diagnoses of organic causes (31%) had variable outcome, depending upon underlying disease. All patients labeled as Idiopathic thunderclap Headache (69%) were advised to report for follow-up to the Medical Out-patient department after a Month, or earlier if they had any symptoms, Only 56 patients out of these 88 cases (64%) came for follow-up. All of them had been quite well and no patient reported recurrence during one month period.

DISCUSSION

In this particular study, amongst the very large number of patients (22,543) attending the casualty department during the study period, relatively small fraction (less than 1%) had true thunderclap headache. Subsequent follow-up showed that only 31% of these had an underlying organic cause, mainly SAH in 15.6%. There are several studies in the literature on this subject from different parts of world. Comparing this international data, very few articles were found in Pakistani literature. Keyword of thunderclap headache did not reveal any study on Pak medi- net search.

A prospective study by Habib & Ahmad from Lahore¹⁵ was done to determine the outcome SAH. In this study maximum patients presented during 6th decade i.e., 38%. Male to female ratio was 6:2. Rashid et al in another study¹⁶ from Lahore showed that Intracranial aneurysms are commonest cause of spontane-

Table-II: Final diagnosis in study population (n=128)

Diagnosis	No. (%)
Subarachnoid Haemorrhage	20 cases (15.6)
Cerebral infarction	7 cases (5.4)
Intracerebral Haematoma	5 cases (3.9)
Aseptic meningitis	5 cases (3.9)
Cerebral edema	2 cases (1.5)
Venous sinus thrombosis	1 case (0.8)
Idiopathic thunderclap headache	88cases (69)

ous subarachnoid haemorrhage. The aim of their retrospective study was to see distribution of this disease over circle of Willis. They concluded that ACoA is the commonest aneurysm (80%), followed by MCA and PCA. The incidence of SAH has remained around 10% in many studies. In a meta-analysis of relevant studies, the pooled incidence rate was 10.5 per 100 000 person years.⁷ The average age of patients with SAH is substantially lower than for other types of stroke, peaking in the sixth decade.^{11,12} Gender, race and region have a marked influence on the incidence of SAH. Women have a 1.6 times higher risk than men¹⁰ and black people a 2.1 times (95%) higher risk than whites.¹³ There is a 3.6%-6% reported prevalence of unruptured intracranial aneurysms in the general population.¹⁷ This has sparked and fuelled the debate over whether the aneurysm in each case was an incidental finding or whether an unruptured saccular aneurysm can present with thunderclap headache and a normal CT scan, CSF and neurological examination.^{18,19}

In view of the fact that about 12% of patients with subarachnoid haemorrhage presented with the "worst headache of their life" and a normal neurological examination, this issue takes on singular importance. In one retrospective series, seven out of one hundred eleven patients with symptomatic unruptured saccular aneurysms were said to have presented with thunderclap headache.¹⁹ In another retrospective series, 562 patients presented with sudden severe headache, normal CT and "colourless" CSF. Cerebral aneurysms were found in 52 patients (9.3%).²⁰ Headache is the most common symptom of cerebral venous sinus thrombosis. Although its onset is usually sub acute over several days, thunderclap headache may be the presenting feature in up to 10% of patients with Cerebral venous sinus thrombosis (CVST).⁴ Overall, CT scan is interpreted as normal in about 25% of patients with CVST. This proportion reaches 50% or more in patients with isolated intracranial hypertension but is below 10% in patients with focal neurological

signs.²¹ Headache is also the earliest and most common clinical manifestation of symptomatic internal carotid artery dissection, occurring in up to 75% of patients.²² The mode of onset of headache is instantaneous and severe in about 13% of cases. Unless accompanied by ischaemic stroke, CT and lumbar puncture is unrevealing and MR angiography is fast becoming the imaging modality of choice in demonstrating the arterial dissection. A recent study of 28 consecutive patients with spontaneous intracranial hypotension (SIH) secondary to spinal CSF leaks found that four of the 28 patients (14%) presented with thunderclap headache.¹⁴

Finally, pituitary apoplexy has been reported to present with thunderclap headache in the absence of positive findings on clinical, CT, and/or CSF examinations.²³ From the available literature, it seems that idiopathic thunderclap headache may be associated with angiographic evidence of diffuse segmental vasospasm.^{16,18} It has been suggested that idiopathic thunderclap headache is simply a migraine variant and may be a harbinger for future migraine attacks.²⁴ In a retrospective study of 71 patients with thunderclap headache whose results on CT and lumbar puncture were negative, none of the patients had subarachnoid haemorrhage during an average follow up period of 3.3 years.²⁵ Furthermore, in four prospective studies, a total of 225 patients with thunderclap headache and negative CT and lumbar punctures were followed up for one year or more, and none of the patients had a subarachnoid haemorrhage or sudden death.¹⁹

By reviewing this data, and comparing it to our study, which is relatively small and the follow-up is incomplete, ours is perhaps the first study on the subject of thunderclap headache from Pakistan. It is also clear that our results are much more consistent with the studies from all over the world. As in other studies, the female gender is commonly affected by thunderclap headache. The ratio of male to female is 1:2 in our study. Also SAH is not the sole cause of thunderclap headache. As in other

studies, our study showed that 69% (88 cases) had no specific findings and only 15.6% (20 cases) had SAH. Other studies on thunderclap headache^{6,7,10}, have reported 11% cases having SAH. The 69% cases (88 in number) were considered as having Benign thunderclap Headache by normal physical, CT scan of brain and lumbar puncture examination. In our study, cases of cerebral infarction, intracerebral haemorrhage, aseptic meningitis, cerebral edema and venous sinus thrombosis also presented with thunderclap headache in a percentage of 5.4%, 3.9%, 3.9%, 1.5% and 0.8% respectively. These were diagnosed on basis of CT Scan of brain and lumbar puncture, 33% cases had past history of up to three similar episodes of thunderclap headache. The probability of intracranial aneurysm could not be excluded as 3.6% to 6% of the population has prevalence of it.¹⁷ We could not do highly specialized investigations due to the limitation of availability and cost. When appropriate investigations have excluded all potential secondary causes, a diagnosis of idiopathic thunderclap headache is appropriate. "Idiopathic thunderclap headache is a diagnosis of exclusion." This statement cannot be overemphasized because of the serious nature of the potential intracranial causes.

CONCLUSION

It is concluded that attack of severe thunderclap headache is not an uncommon condition seen by Medical House officers in the Casualty department. Attack due to SAH or other serious underlying disease cannot be distinguished from non specific headaches on clinical grounds alone. It is recommended that all such patients be hospitalized and investigated properly with CT scan and or lumbar puncture. If available, further specialized investigations should be planned in selected cases. Further long term follow up studies with large number of patients are needed on patients with diagnosis of Idiopathic thunderclap headache to know the natural history of this condition.

REFERENCES

1. Schwedt TJ, Matharu MS, Dodick DW. Thunderclap headache. (Review) *Lancet Neurol* 2006;5:621-31.
2. Day JW, Raskin NH. Thunderclap headache: Symptom of unruptured cerebral aneurysm. *Lancet* 1986;ii:1247-8.
3. Tang-Wai DF, Phan TG, Wijdicks EFM. Hypertensive encephalopathy presenting with thunderclap headache. *Headache* 2001;41:198-200.
4. de Bruijn SFTM, Stam J, Kappelle LJ for the CVST Study Group. Thunderclap headache as the first symptom of cerebral venous sinus thrombosis. *Lancet* 1996;348:1623-5.
5. Edlow JA, Caplan LR. Avoiding pitfalls in the diagnosis of Subarachnoid haemorrhage. *N Eng J Med* 2000;342:29-36.
6. van Gijn J, Rinkel GJ. Subarachnoid haemorrhage: Diagnosis, causes and management. *Brain* 2001;124:249-78.
7. Linn FH, Rinkel GJ, Algra A, van Gijn J. Incidence of subarachnoid hemorrhage: role of region, year, and rate of computed tomography: a meta-analysis. *Stroke* 1996;27:625-9.
8. Sidman R, Connolly E, Lemke T. Subarachnoid hemorrhage diagnosis: lumbar puncture is still needed when the computed tomography scan is normal. *Acad Emerg Med* 1996;3:827-31.
9. Davis SM, Donnan GA. Thunderclap Headache: CT and Lumbar Puncture But Occasionally more! *Stroke* 2008;39:1396.
10. Linn FH, Wijdicks EF. Causes and management of thunderclap headache; A comprehensive review. *Neurologist* 2003;8:279-28.
11. Dodick DW. Thunderclap headache. *J Neurol Neurosurg Psychiatry* 2002;72:6-11.
12. Chen SP, Fuh JL, Lirng JF, Chan FC Wang SJ. Recurrent primary thunderclap headache and benign CNS angiopathy. Spectra of the same disorder? *Neurology* 2006;67:2164-9.
13. Renard D. Cerebral vasospasm in idiopathic thunderclap headache. *Neurology* 2006;67:990.
14. Landblom AM, Fridriksson S, Boiview J, Hillman J, Johansson G, Johansson I. Sudden onset headache: a prospective study of features, incidence and causes. *Cephalgia* 2002;22:354-60.
15. Habib A, Ahmad M. Outcome of patients of Subarachnoid Hemorrhage due to ruptured anterior communicating artery aneurysm after surgical clipping. *Ann King Edward Med Coll* 2005;11(4):359-61.
16. Rashid U, Nisar S, Ayub A, Ghani MU. Diagnostic Value of Transcranial Doppler in the Vasospasm Secondary to Middle Cerebral Artery Aneurysmal Haemorrhage. *Pakistan J Neurol* 1997;3(2):59-60.
17. Raps EC, Rogers JD, Galetta SL. The clinical spectrum of unruptured intracranial aneurysms. *Arch Neurol* 1993;50:265-8.

18. Sturm JW, MacDonell R. Recurrent thunderclap headache associated with reversible intracerebral vasospasm causing stroke. *Cephalalgia* 2000;33:344-5.
19. Landtblom AM, Boivie J, Fridriksson S, Thunderclap headache: Final results from a prospective study of consecutive cases. *Acta Neurol Scand* 1996;167(suppl 94):23-4.
20. Longstreth WT Jr, Nelson LM, Koepsell TD, van Belle G. Clinical course of spontaneous subarachnoid hemorrhage: a population-based study in King County, Washington. *Neurology* 1993;43:712-8.
21. Rao KCVG, Knipp HC, Wagner EJ. CT findings in cerebral sinus and venous thrombosis. *Radiology* 1981;140:391-8.
22. Silbert PL, Mokri B, Schievink WI. Headache and neck pain in spontaneous internal carotid and vertebral artery dissections. *Neurology* 1995;45:1517-2.
23. Dodick DW, Wijdicks EFM. Pituitary apoplexy presenting as thunderclap headache. *Neurology* 1998;50:1510-11.
24. Harling DW, Peatfield RC, Van Hille PT. Thunderclap headache: is it migraine? *Cephalalgia* 1989;9:87-90.
25. Wijdicks EFM, Kerckhoff H, Van Gijn. Long term follow up of 71 patients with thunderclap headache mimicking subarachnoid hemorrhage. *Lancet* 1988;II:68-70.

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