

Multiple Brain Hematomas Possibly Associated to High Homocysteine Levels

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Abstract

Hypertension still accounts to be one of the major causes behind intracerebral bleeds in the young patients. The knowledge behind multiple bleeds in the brain of young patients (<40 age) is still to be further evaluated. Non-traumatic intracerebral hemorrhage often tags poor prognosis depending upon the site of the bleed vs the timely treatment measures. We present a case of a 19-year-old female presented with acute headache and photophobia. During initial assessment it was a startle approach signifying multiple small bleeds in the brain. Moreover, initial scans ruled out the possibility of subarachnoid hemorrhage and patient presenting as afebrile with no signs of meningism further executed the presence of any infections. Besides this, successfully demoting the homocysteine levels in the blood and regular monitoring of blood pressure levels the patient recovered clinically within the time span of 2 weeks with no new bleeds anywhere in the brain parenchyma and reduction in the previous hematoma size and oedema. High blood homocysteine levels of (33mcmol/L) is the possible culprit in the clinical scenario and needs further research.

Keywords: Hematoma, Blood-brain barrier, stroke, Intracerebral, Homocysteine

Introduction

Hypertension plays a second most important cause of bleed in the brain after arteriovenous malformation [1]. Spontaneous intra-cerebral hemorrhage in young patients accounts up to 10% of all stroke cases [2]. Etiological window for young patients is larger when compared to patients age >50 including vascular malformations, hypertension and drug abuse [3]. The goal to present this case was to understand the upcoming need to broaden the approach towards age-related stroke patients. We present an interesting case of stroke ICH in a young girl with no neurological deficit.

Clinical Case

We present this clinical scenario projecting a 19-year-old young teenage girl, BMI 22, nonsmoker, nonalcoholic with no history of drug abuse and covid-19 negative with complaint of sudden onset of acute progressive headache and sensation of vomiting. On examination she presented with clear lung fields, rhythmic heart sounds & normal bowel and bladder. Furthermore, her neurological examination revealed no clinical deficit in all four limbs with intact sensation and power 4/5 throughout, she was fully oriented with no cranial nerve involved. Although, there was a slight slurring of speech with no tongue-muscle wasting was seen. No additional findings such as abnormal body movements (seizure) or loss of consciousness was reported. Complimentary work-up: laboratory tests were planned under latest NICE guidelines with immediate brain magnetic resonance imaging (MRI) with magnetic resonance angiography (MRA).

With time, scans demonstrated multiple bleeds (Figure 1,2 & 3) in the right parietal and occipital lobes, largest measuring 4.9 x 3.9 x 4.4 cm in size. Largest hematoma is seen extending to the splenium of corpus callosum with mild oedema surrounding these hematomas. Additionally, MR angio neck and intracranial vessels appear grossly normal with normal venogram. Acute hematomas volume and locations predict 30-day mortality rate in such patients [4]. Hence, prompt treatment without any delay for the further investigations was initiated. Bloods demonstrated within limits hepatorenal parameters with unpredictably high homocysteine levels.

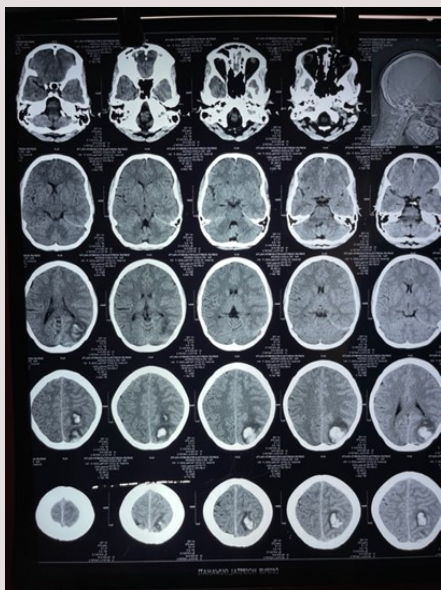


Fig 1: Demonstrates acute to sub-acute hematomas in right parietal & occipital lobes, in a 19-year-old female presenting with acute headache.

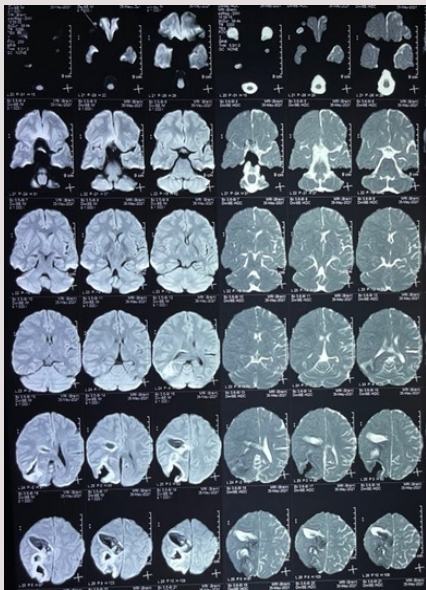


Fig 2: Demonstrates acute to sub-acute hematomas in right parietal & occipital lobes, in a 19-year-old female presenting with acute headache. Largest hematoma is seen extending to the splenium of corpus callosum with mild oedema surrounding the bleed.

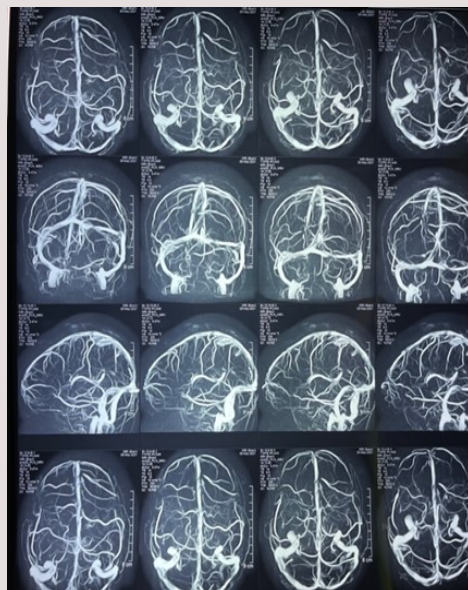


Fig 3: Demonstrates MR angio significantly showing intracranial vessels in normal parameters

Osmotic diuretics (mannitol) was the main stay of the treatment with careful watch on renal parameters. Moreover, her presenting blood pressure was in range of 160-100 to 180-120 mm of Hg. Keeping in view the age and stable renal parameters, combination of two anti-hypertensives namely angiotensin converting enzyme inhibitor (ACEi), ramipril 10 mg once a day with calcium channel blocker (CCB), nifedipine 20 mg. Numerous studies have demonstrated the above-mentioned anti-hypertensive combination [5]. In conjunction, 20 mg combination of atorvastatin with 160 mg fenofibrate was initiated. With the established benefit of statins appearing to be independent of baseline cholesterol, patients with normal cholesterol experience a similar degree of risk reduction as patients with elevated cholesterol in cerebrovascular accident scenarios [6]. One anti-epileptic agent (valprol) was added to the treatment protocol. To promptly lower the homocysteine levels folic acid and vitamin B12 treatment was initiated on immediate basis. In Next 15 days, with above-mentioned treatment results were towards better outcome with decrease in hematoma size as evidenced by decrease in the size of the bleed as compared to the previous brain scan (fig 4). Clinically, no fresh complaints of any headache and there was a drastic improvement in speech output. Following the tapering and finishing the course of mannitol the patient was successfully discharged with further advice and re-check-up in 4 weeks.

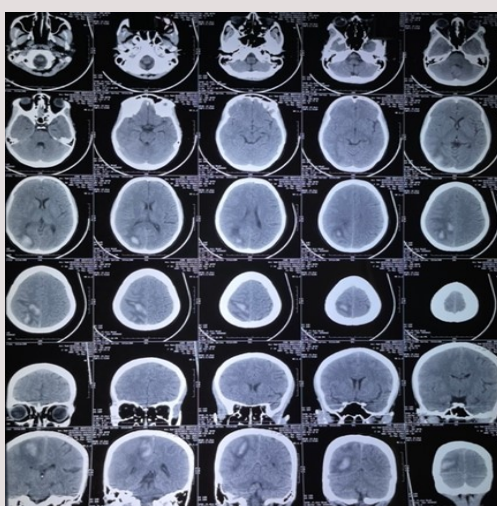


Fig 4: Demonstrates in comparison to the first MRI these CT images show significant resolution with a decrease in oedema and the size of the hematoma

Discussion & Results

Prompt treatment with fast investigations led to a better outcome in this patient, with minimal risk factors (ICH score 0) associated in this girl it was challenging to locate the culprit. There is a concerning debate from the past in relation to high levels of blood homocysteine associated with numerous brain bleeds. Homocysteine levels may play a dominant role in atherosclerosis which in turn can stand as an independent cause for ICH [7]. One study has already stated the pressing need to lower homocysteine levels for better outcome in both haemorrhagic and ischemic stroke [8]. In addition, homocysteine is known to enhance the release of arachidonic acid from platelets to produce reactive oxygen species (ROS) further aggravating calcium and lipid deposits along the vessel walls, conjointly, aggravating atherosclerosis [9]. In the present case these high serum levels of homocysteine may have been an important contributor but lowering the serum levels would further avoid any upcoming cerebral insults. Addition to high homocysteine levels jointly presence of hypertension further limits a successful outcome.

High blood pressure pre-or post-cerebral insult has been found to be associated with neurological deterioration, disability and death [10]. Notwithstanding, the optimal strategy to lower BP during the acute ICH is still debated. Two main conflicting perspectives are seen clinically, one, with acute hypertensive response could be protective and help in preserving the cerebral blood flow and would prevent the ischemic injury. On the other hand, raised BP levels increase the risk of oedema formation and promote hematoma enlargement [11]. Moreover, hypertension associated hematoma in young patients usually characterised as segmental in location and mainly due to result from vascular malformation. However, characteristically these haemorrhages are purely found basal ganglia [12].

Conclusion

In conclusion to this clinical scenario we believe that relative lowering of blood parameters such as homocysteine in the presence of treatment stalwarts it could add up to a successful outcome for ICH young patients. Moreover, 2 week later CT scan (fig 4) when compared to the scans of acute state demonstrates decrease in the bleed with reduction in the oedema. This opens a new conduit towards prompt treatment with maintain the blood pressure and lowering various blood parameters.

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