

## CASE REPORT

# Unusual case of spontaneous bilateral basal ganglia bleed

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**Abstract**

Hypertension is the most prevalent determinant condition embarking on the development of spontaneous intracerebral hemorrhage. Usually, the presentation is a unilateral hematoma. Spontaneous bilateral intracerebral hemorrhage is an outstandingly infrequent context, and not a lot of cases have been reported till date. Ensuing hypertension, trauma inflicted on the brain case is another common cause that out turn into the sequelae of bilateral intracerebral hemorrhage. Lately, a few cases of bilateral basal ganglia bleed have been revealed, as a repercussion of COVID-19 infection. Globally, <40 such cases have been reported. A 39-year-old man presented with complaints of acute onset of weakness of right half of the body. Additionally, facial deviation was noticed by his family members. He then sought medical help from a local healthcare center where CT scan of head was advised. Unexpectedly, the scan demonstrated bilateral intracerebral hemorrhage. He was then managed conservatively with oral medications and rehabilitation. The course of his hospital stay was uneventful and was eventually discharged after 9 days. He then presented to our institution for further evaluation. Thereupon, he had slurring of speech but was able to walk with minimal support. Simultaneous Bilateral Basal Ganglia Hemorrhage (SBBGH) is an exceptionally rare ailment. This genre of cerebrovascular accident embraces a comprehensive span of morbidity and mortality. In an acute setting, CT scan of head is the most relevant imaging modality. Nonetheless, MRI is the gold standard for definitive diagnosis and should be performed urgently to further typify and delineate the lesion.

**KEYWORDS**

bilateral basal ganglia bleed, computed tomography, computed tomography angiography, hypertension

## 1 | INTRODUCTION

In the developing countries, the leading cause of basal ganglia bleed has been ascribed to hypertension. Amidst these patients, the mode of presentation

is hemiplegia or features provocative of raised intracranial pressure. Most of them have either been diagnosed with hypertension not under medication or those who have refrained to anti-hypertensive medications prescribed.

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Venous sinus thrombosis, hemorrhagic diathesis, arteriovenous malformation, vasculitis, amyloid angiopathy, aneurysm, neoplasm, drug abuse, and angioma have been deemed answerable for multiple intracerebral hemorrhages.<sup>1</sup> Moreover, bilateral basal ganglia bleed has also been accredited to trauma, hyperglycemic hyperosmolar syndrome, diabetic ketoacidosis, methanol poisoning, migraine, anticoagulant use, lightning strike, and fungal infection to name a few.<sup>2–5</sup>

CT scan of the head demonstrates presence of hyperdense lesion in basal ganglia. DSA or CTA of Circle of Willis is inconclusive. We hereby report a case of simultaneous bilateral ICH with involvement of both the basal ganglia treated conservatively with an up to par outcome.

## 2 | CASE PRESENTATION

A 39-year-old male patient presented to our institution with a history of acute onset of weakness of the right side of the body, deviation of angle of the mouth to left side, generalized stiffness of the body, unable to speak, and urinary incontinence for which he was evaluated and managed conservatively in another center. His medical, surgical, and drug history were unremarkable. Family history was irrelevant and history of trauma was trivial.

On retrospective survey, when he presented to the ER in the other center, his pulse rate was 98 bpm, blood pressure was 200/100 mm of Hg, Glasgow coma scale (GCS) was E4 V2 M6, pupils were bilateral equal and reactive to light. Further neurological examination revealed a decreased sensation over right side of the body with motor power in the right upper and lower limbs was 0/5 and 5/5 in left upper and lower limbs. His deep tendon reflexes were absent on the right side but preserved on the left side. Similarly, the plantar reflex on the right side was extensor and flexor on the left.

Laboratory parameters were within normal limit. CT scan of head revealed hyperdense lesion involving bilateral basal ganglia suggestive of blood with volume of 28 cc in left and 13 cc in right (Figure 1). He was then admitted in an ICU and managed conservatively. Patient did not have any symptoms of COVID-19; however, as per the government protocol, PCR test was performed which was negative. There was gradual improvement in the condition of patient, he was then shifted to ward, and after 9 days of admission, he was discharged and he presented to our center for further management and advice.

When the patient presented to our center, his GCS was E4 V4 M6, Pupils: Bilateral 2 mm and reactive to light, Sensation was decreased over right half of the body. Motor



**FIGURE 1** CT head showing bilateral BG bleed immediately after CVA

power in the RUL/RLL was 4+/5 and in LUL/LLL was 5/5, deep tendon reflexes were decreased over right side.

CT head and CTA were repeated. CT head revealed resolving hematoma (Figure 2). CTA was negative for intracranial aneurysms, vascular malformations, vasospasm, or cerebral venous thrombosis (Figure 3).

When the patient presented to our facility 6 months following the first bleed, he was fully oriented to time, location, and person, with motor power 5/5 in all four limbs and very little slurring of speech and enhanced emotional drive. He is now able to carry out his daily tasks alone and has returned to his farm. We took another CT scan of the head, which revealed a resolving hematoma. (Figure 4).

## 3 | DISCUSSION

Contrary to a frequent presentation of unilateral BG bleed, finding a bilateral basal ganglia bleed is out of the ordinary. The etiopathogenesis in the circumstance of simultaneous bilateral basal ganglia hemorrhage remains unsettled. A handful of hypothesis has been postulated by different authors with reference to aforementioned context.

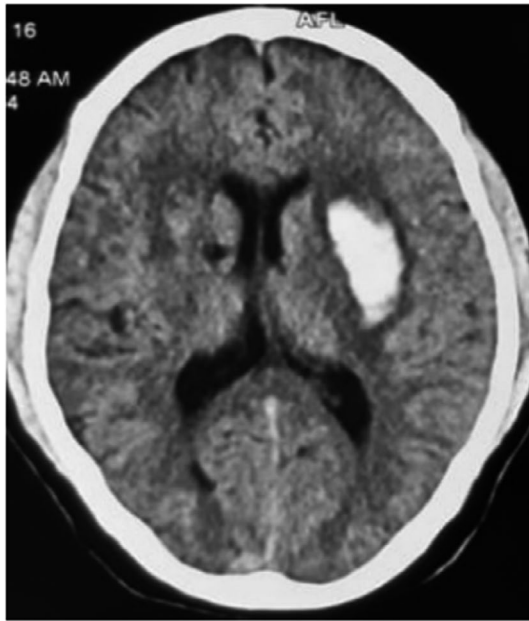


FIGURE 2 CT head after showing resolving hematoma 1 week of CVA

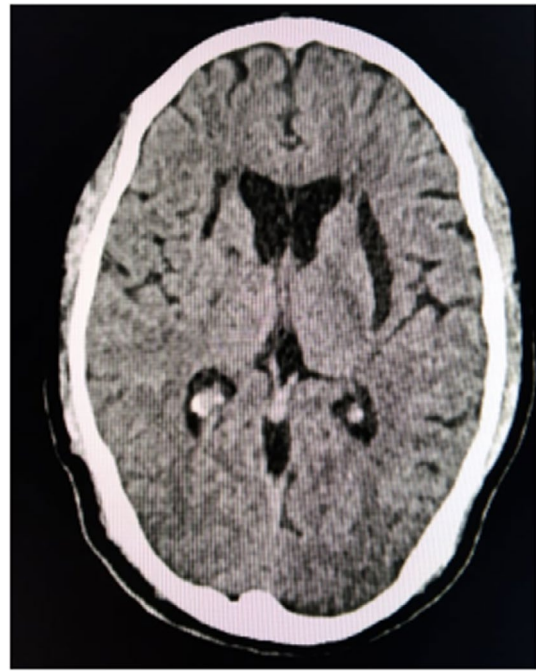


FIGURE 4 CT Head plain showing resolving hematoma



FIGURE 3 CT Angiogram of Circle of Willis

The most common plausible pathogenesis is the concurrent rupture of bilateral microaneurysms on lenticulostriate arteries by chance.<sup>6</sup> Other mechanisms predicate that the initial hemorrhage results in specific hemodynamic ambience, such as reflex increase in blood pressure, evoking rupture of a second microaneurysm on the

contralateral side in a brief time span, which seems more credible.<sup>6</sup>

Nonetheless, traumatic basal ganglia bleeding is uncommon, and bilateral basal ganglia hemorrhage after trauma is extremely rare. Concerning the trauma, two hypotheses have been put forward namely spontaneous or traumatic hemorrhage.<sup>7</sup>

Spontaneous hemorrhage occurs when the blood pressure hauls up impulsively due to emotional or physical strain and ruptures the lenticulostriate artery forming a hematoma. The genesis to this predicament being congenital vascular malformation, long-term hypertension and diabetes mellitus.<sup>7</sup>

Traumatic hemorrhage hypothesis surmises shearing force that cause the tear in the palladium branch of the anterior choroid artery. When a hefty coercion is imposed to the vertex, forehead, or occipital area directed towards the tentorium, there would be a reposition of the brain parenchyma through the tentorial notch with shredding and ripping of vessels by shearing forces, resulting in hemorrhages in the basal ganglia region. A few authority labels this as intermediary contusions.<sup>8</sup>

The basal ganglia and thalami are profoundly metabolic brain domains, making them susceptible to hypoxic-ischemic injury, toxic poisoning (carbon monoxide, methanol, and cyanide), metabolic anomalies (liver disease, Leigh disease, Wilson disease, hypoglycemia, and osmotic myelinolysis), and neurodegeneration.<sup>9</sup>

The bilateral basal ganglia or thalami can also be targeted by focal flavivirus infection, toxoplasmosis, and primary CNS lymphoma.<sup>9</sup>

Lately, with the emergence of global pandemic, the sinister being the SARS-CoV-2, it has been presumed that the ailment can be neurotropic via the trans cribriform or the hematogenous route.<sup>10</sup>

The doubt as to why COVID-19 would predispose to bilateral ganglia hemorrhage remains open and undecided. Even so, the virion has been reported to predispose to a vulnerable hypercoagulable state, increasing the likelihood of cerebrovascular accident and ischemic stroke.<sup>11</sup>

It is theorized that the etiopathology of COVID-19 whether by direct invasion or via systemic inflammatory responses, may contribute to bilateral basal ganglia hemorrhage and to ensuing neurological deficits.<sup>12</sup>

As outrageous it is to involve the bilateral basal ganglia, an impoverished outcome is always anticipated. Hereupon, debate comes to light whether or not to intervene the patient surgically. On account of destruction of crossing and non-crossing fibers, bilateral diaschisis phenomenon, severely disrupted and altered level of consciousness, quadriplegia and pseudobulbar palsy, compromised aftermath is contemplated.<sup>13</sup> While some professionals prefer an upfront evacuation of hematoma depending upon the volume, the others favor to lie in wait to undertake surgery immediately when there are signs of surge in intracranial pressure.

Fortunately, our patient achieved an admissible recovery. We found it compelling that the patient could circumvent surgical intervention in the face of voluminous hematoma with bilateral involvement. Into the bargain, his neurological function also rectified making him a self-sufficient being.

## 4 | CONCLUSION

Bilateral basal ganglia bleed is an unusual surgical context. The most common predisposing factors are hypertension and trauma. Different hypothesis has been put forward and postulated by gallant authorities, but the exact architecture of pathophysiology leading to its evolution is open to debate.

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### CONFLICT OF INTEREST

None of the authors have potential conflicts of interest to be disclosed.

### AUTHOR CONTRIBUTION

Jessica Kayastha wrote original draft and involved in conceptualization, review and editing. Pravesh Rajbhandari

and Basant Pant involved in supervision. Pritam Gurung, Bishal Shrestha and Sambardhan Dabadi were involved in review and editing.

### ETHICAL APPROVAL

Ethical approval of case report is not needed in accordance with the local ethical guideline.

### CONSENT

Written informed consent was obtained from the patient to include the clinical details.

### DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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