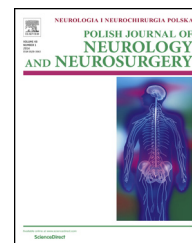


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Case report

Simultaneous bilateral hypertensive basal ganglia hemorrhage



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ABSTRACT

Context: Hypertension is the single most important risk factor for intracerebral hemorrhage (ICH) and often leads to solitary hematoma. Multiple spontaneous simultaneous ICH is not common, and bilateral hemorrhages occurred in symmetrical basal ganglia is extremely rare. Most reported cases accepted conservative treatment and suffered extremely poor outcome.

Case report: A 57-year-old male became unconscious when having supper and was transported to our emergency room immediately. Non-contrast CT brain scanning showed simultaneous bilateral hypertensive basal ganglia hemorrhage; he was treated by stereotactic aspiration and thrombolysis for both sides, with subsequent thrombolysis and clot aspiration through hematoma-indwelling catheter. The hematomas were almost totally cleared within a week. His condition improved gradually. Nearly 10 months after onset, he could chow and swallow food, controlling bowels and bladder all by himself, but need some help when feeding and using toilet.

Conclusion: Simultaneous bilateral hypertensive basal ganglia hemorrhage is a devastating cerebrovascular disease with significant high morbidity and mortality. Stereotactic aspiration and thrombolysis is a safe and effective way to clear hematomas within short time, thus reducing the neurological impairment from hematoma mass effect and secondary brain injury, improving prognosis.

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1. Introduction

Intracerebral hemorrhage (ICH) accounts for 10–20% of strokes. It is the leading cause of all strokes, second only to cerebral infarction [1]. Hypertension is the single most important risk

factor for ICH, often leading to solitary hematoma [2,3]. Hemorrhage in basal ganglia or thalamus due to hypertension accounts for 35–44% of cases of hypertensive ICH. The occurrence of multiple simultaneous ICH has been observed in 2% of all hemorrhagic strokes. However, multiple simultaneous ICH due to hypertension is uncommon [4]. Simultaneous

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hypertensive ICH in bilateral basal ganglia region has been rarely reported (see Table 1) [4–13]. Most reported cases accepted conservative treatment and got poor prognosis. We report a case with simultaneous hypertensive bilateral somewhat symmetrical hemorrhages within both basal ganglia treated by stereotactic aspiration surgery whose outcome was relatively good.

2. Case report

A 57-year-old male become unconscious when having supper, and was transported to our emergency room immediately. He had been suffering irregularly treated hypertension for 8 years, his medical history (diabetes mellitus, substance abuse, or trauma) is clear. The patient's pulse was 112 bpm and blood pressure was 195/102 mmHg; he had the Glasgow Coma Scale (GCS) of 5/15; pupils were 2 mm bilaterally, reacting to light; muscular spasticity was present and Babinski sign was positive bilaterally. Laboratory tests, including blood counts, bleeding and clotting times, PT, APTT, liver and renal function, were within normal range. Non-contrast CT brain scanning (Fig. 1A) revealed bilateral somewhat symmetrical hyperdense lesions within both basal ganglia (about 50 min after accident, right side 27.4 ml, left side 16.2 ml). Patient was intubated and put on mechanical ventilation, and admitted to

the Neurosurgical Intensive Care Unit. Bilateral Stereotactic CT guided aspiration was performed about 10 h after onset, leaving a hematoma-indwelling catheter each side. Intraoperative CT (Fig. 1B and C) revealed hematoma enlargement on the right side, and we firstly operated on the larger hematoma. Subsequent thrombolysis and clot aspiration were performed at the bedside with repeat CT scans to assess catheter placement and residual hematoma volume. His condition improved gradually, catheters were removed 7 days after surgery. A re-examination CT scan was performed on the 19th day post operation demonstrated complete resolution of both the hematomas (Fig. 1D). During the last follow-up, nearly 10 months after onset, the patient could chow and swallow food all by himself, the GCS score was 12/15, and muscle strength grades were 2, 4 and 3 for left limbs, right upper limb and right lower limb respectively. His GOSE (Extended Glasgow Outcome Scale) score was 4. The BI (Barthel Index) score was 30, as the patient got 10 points for controlling bowels and bladder, and 5 points for feeding and toilet use respectively.

3. Discussion

Simultaneous occurrence of multiple ICH in different arterial territories is not common, and simultaneous bilateral symmetrical basal ganglia hemorrhage due to hypertension is even

Table 1 – Cases of simultaneous bilateral hypertensive basal ganglia hemorrhage.

Author/year	Age/sex	BP history	Interval between onset and CT diagnosis	GCS at admission	Treatment	Outcome
Hickey et al., 1983 [5]	71, F	Long history	Patient was found on floor ^a	3	Conservative	Death at day 7
Kabuto et al., 1995 [6]	65, M	Long history, untreated	3 hours	3	Conservative	Death at day 4
Kohshi et al., 2000 [7]	76, F	Long history	2 h	NA	Conservative	Left hemiparesis but able to walk with a cane
Maurino et al., 2001 [8]	40, F	Hypertension history ^a	NA	NA	Conservative	Severe disability at month 3
Silliman et al., 2003 [9]	35, M	3 Years	8 h	5	Conservative	Death at day 10
Yen et al., 2005 [10]	49, M	Hypertension history ^a	Less than 6 h	3	Conservative	Death
Yen et al., 2005 [10]	64, M	Hypertension history ^a	Less than 6 h	6	Surgery for large hematoma	Death soon after surgery
Yen et al., 2005 [10]	55, M	Hypertension history ^a	Less than 6 h	3	Conservative	Death
Asimi et al., 2007 [13]	65, M	20 Years	NA	11	Conservative	Death at day 2
Terzi et al., 2010 [11]	63, M	3 Years	2 h	NA	Conservative	Be normal at day 45
Takeuchi et al., 2011 [4]	89, M	NA	Within a few hours	3	Conservative	Death
Takeuchi et al., 2011 [4]	59, M	Hypertension history ^a	Within a few hours	3	External drainage	Vegetable state
Takeuchi et al., 2011 [4]	57, M	Hypertension history ^a	Within a few hours	7	Hematoma evacuation	Severe disability at discharge
Baldawa et al., 2015 [12]	60, M	Long history	Within a few hours	NA	Conservative	Vegetable state at discharge
Our case	57, M	8 Years	50 Min	5	Stereotactic evacuation and thrombolysis	Upper severe disability

BP: blood pressure, GCS: Glasgow Coma Scale, NA: outcome was not stated.

^a Not specified.

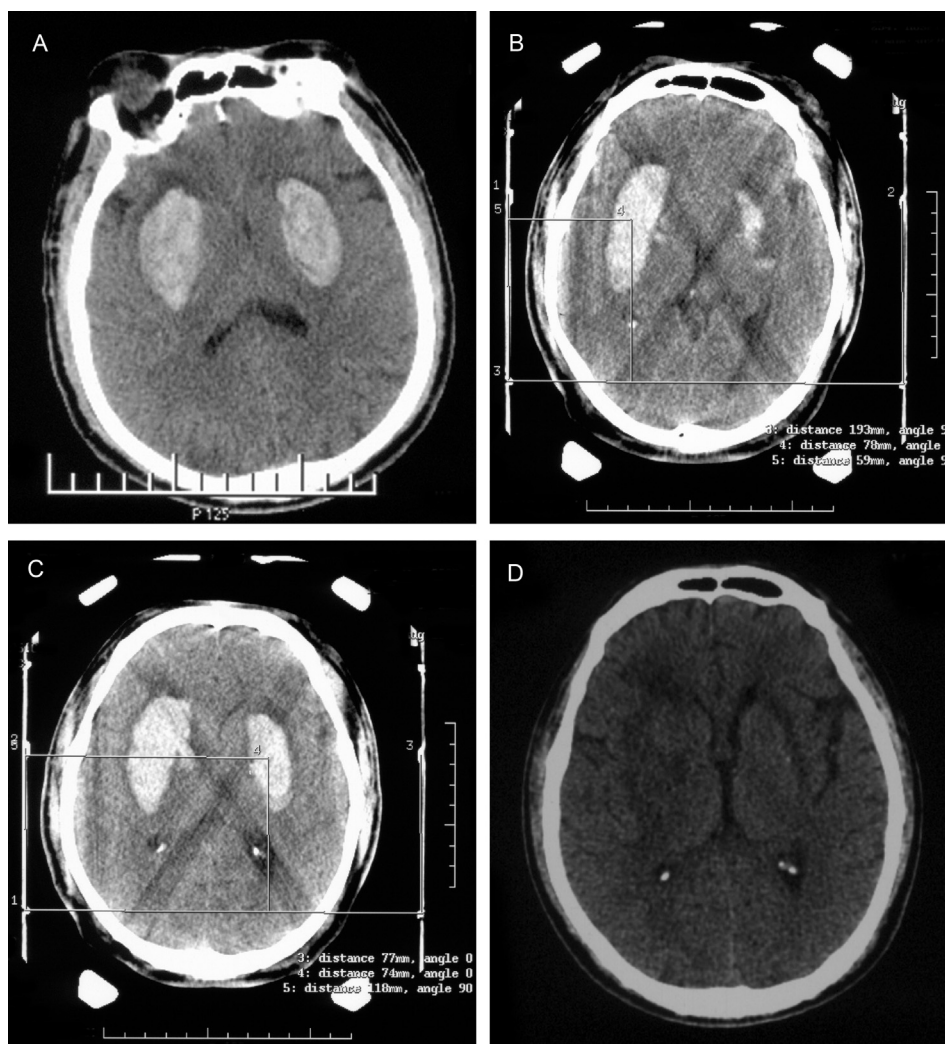


Fig. 1 – CT image of pre-, intra- and post-operation. (A) The initial non contrast CT brain scanning showed bilateral symmetrical basal ganglia hematoma without surrounding cytotoxic edema, indicated acute hemorrhage, the diameter was approximately 5.0 cm by 2.6 cm on the right side and 4.5 cm by 2.3 cm on the left side. (B, C) Orientation map of stereotactic aspiration surgery plan for the right and left side respectively, calculated by Leksell Sugiplan with intraoperative CT. (D) The 19th day post operation, reexamination CT shows hematomas almost disappeared completely, leaving encephalomalacia foci – Stroke Sacs.

rare. Hypertension can lead to the occurrence of recurrent ICH at same or different site [7,14]. The known causes of multiple intracerebral hemorrhages are hemorrhagic diathesis, cerebral amyloid angiopathy, vasculitis, sinus thrombosis, neoplasm, aneurysm, arteriovenous malformation, angioma and drug abuse [4]. Reported reasons for bilateral basal ganglia hemorrhages are trauma, methanol poisoning, diabetic ketoacidosis, hyperglycemic hyperosmolar syndrome, migraine, lightning strike, anticoagulant use and fungal infection [15–21]. The patient was diagnosed as hypertensive hemorrhage based on following reasons: long history of irregularly treated hypertension; hematoma located in putamen which is the frequent location for hypertensive intracerebral hemorrhage; and no causative factors except for hypertension were identified.

The mechanism of simultaneous occurrence of bilateral basal ganglia hemorrhage remains uncertain. One possible

mechanism is that simultaneous rupture of bilateral micro aneurysms on lenticulostriate arteries by chance; another more convincing mechanism is that the initial hemorrhage results in specific hemodynamic conditions, such as reflex increase in blood pressure, provoking rupture of a second micro aneurysm on the contralateral side in short time. Sorimachi et al. [22] reported that the number of micro bleeds is significantly higher in simultaneous multiple ICHs than in single ICH. Another recent study found that symmetrical hemorrhage occurred more frequently than expected ratios of hemorrhage occurring randomly in terms of location. These may support the hypothesis that patients may have symmetrically vulnerable vessels, subsequent rupture is more probable than coincidental rupture, and the time lag of subsequent rupture can be from a few seconds to several hours [23].

Spontaneous ICH has a high morbidity and mortality and places a huge significant economic burden on health care and social services. There is still controversy as evidenced by wide variation internationally in management of ICH. A recent systematic review and meta-analysis suggested an association of stereotactic evacuation with reduction in odds ratio for death and possible improvement in independent survival [24]. Bilateral ICH has higher morbidity and mortality, as we can see in Table 1, fifteen patients (including our case) with simultaneous bilateral hypertensive basal ganglia hematoma were summarized, our patient was the only one who was treated by bilateral stereotactic aspiration and thrombolysis. The right hematoma was larger (showed by intraoperative CT scan), which meant higher intracranial pressure and more serious brain damage, so we operated the right side first. Almost all of patients who suffered simultaneous bilateral basal ganglia hematoma had poorer outcome compared with solitary ICH. It is mainly due to destruction of crossing and non-crossing fibers, bilateral diaschisis phenomenon, severe disturbed consciousness, quadriplegia and pseudobulbar palsy [10]. Admission GCS score, hematoma distribution and total hematoma volume were prognostic factors identified by statistical analysis. Besides, hematoma size was also considered as prognostic factor in some studies [4,25].

Unlike those reported cases, our patient achieved a relative good outcome though suffering large hematoma volume, because the two hematomas were evacuated totally during short time through the minimal invasive surgery, thus reducing the neurological impairment from hematoma mass effect and secondary brain injury, and accelerating recovery.

Conflict of interest

None declared.

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Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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