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Case Report

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The Impact of Physiotherapy Intervention for Basal Ganglia Hematoma (BGH) Patient: A Case-Report

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Introduction

Basal Ganglia Hematoma (BGH) is defined by clot of blood its location within the basal ganglia, which encompasses the caudate nucleus, putamen, and globus pallidus, as well as in nearby structures such as the thalamus and internal capsule. This condition is often linked to deep cerebral contusions and the classification of brain gray matter injuries as intermediary contusions, intraventricular hemorrhages, and extra-axial hematomas. BGH frequently arises spontaneously in individuals with hypertension and is seldom attributed to traumatic events. It is associated with a poor prognosis and significant injury severity [1]. Basal ganglia hematoma (BGH) is recognized as one of the most lethal conditions, primarily resulting from hypertension, along with infrequent vascular abnormalities such as arteriovenous malformations, moyamoya disease, and aneurysms. Among these vascular anomalies, ruptures of distal middle cerebral artery (MCA) aneurysms are particularly uncommon, representing merely 2% to 6% of all MCA aneurysms. Hematomas in the basal ganglia that arise from the rupture of distal MCA aneurysms are exceedingly rare and are typically managed through craniotomy. [2]. According to Varshney reported that the projected global lifetime risk of experiencing a stroke rose from 22.8% in 1990 to 24.9% in 2016 [3]. It is noted that 13% to 20% of all initial strokes are classified as intracranial hemorrhages. Furthermore, around 60% of all hemorrhages caused by hypertension within the brain take place in the basal ganglia.

According to Zhang indicated that intracerebral hemorrhage (ICH) is a significant contributor to morbidity and mortality on a global scale [4]. It ranks as the second most prevalent type of stroke, representing 13–20% of initial stroke occurrences. Among the various types of ICH, basal ganglia hemorrhage is particularly common and poses a serious risk to life, potentially leading to numerous complications such as hematoma enlargement, severe compression of the brainstem, acute hydrocephalus, elevated intracranial pressure, seizures, fever, and infections. According to Healthline (2024) reviewed that strokes affecting the basal ganglia are frequently of the hemorrhagic type. A review conducted in 2022 revealed that 50% of individuals globally survived one year following a hemorrhagic stroke, while 41% continued to live after five years. In contrast, ischemic strokes generally present a more positive prognosis compared to their hemorrhagic counterparts. Bilateral basal ganglia hemorrhages (BBGHs) are exceptionally uncommon and have not been extensively researched. Given the deep-seated location and high metabolic activity of the basal ganglia, BBGHs may result from coup-contrecoup contusions following closed-head trauma, hypertensive emergencies, cerebral venous thrombosis, viral infections, or exposure to toxic substances [5]. Intracerebral hemorrhage frequently occurs in individuals experiencing a stroke, with the basal ganglia being the most prevalent site of occurrence. Hypertension is typically the underlying cause. In contrast, hemorrhage in the basal ganglia due to trauma is relatively rare, and instances of bilateral hemorrhage in this region following trauma are exceedingly uncommon [6]. This condition is predominantly observed in older adults, especially those aged 60 and above, and it is more frequently seen in men than in women. Key risk factors include hypertension and diabetes mellitus. Additionally, certain lifestyle choices, such as smoking and heavy alcohol use, have been linked to a higher risk of developing this condition. Symptoms can vary, but unilateral weakness is often a typical presentation. Other individuals may also experience headaches, nausea, vomiting, and a diminished mental state [7].

In contrast to conservative management, surgical intervention may offer greater advantages for patients suffering from a deep-seated intracerebral hematoma. Various safe and effective surgical methods for the removal of brain hematomas include

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craniotomy, stereotactic aspiration, burr-hole drainage, and neuro-endoscopic surgery. Nevertheless, certain studies have indicated that craniotomy does not yield a significant benefit. Additionally, other research has shown that both stereotactic aspiration and endoscopic evacuation do not lead to improved outcomes compared to conservative treatment [8].

Rehabilitation is essential for patients who have experienced basal ganglia hemorrhage, as they may present with cognitive deficits that can improve over time. Nevertheless, the patient continued to demonstrate significant neurological challenges, including right hemiplegia, ataxia in both the left upper and lower limbs, and dysarthria. The rehabilitation program included physical therapy focused on exercises aimed at enhancing balance during sitting and standing, as well as improving overall mobility. Additionally, the patient engaged in exercise therapy and cognitive rehabilitation, while home modifications were implemented to facilitate independent living under family supervision. Thus, rehabilitation remains crucial, along with providing active guidance to family members of patients facing severe neurological impairments [9].

The PNF technique focuses on instructing movement in a rhythmic fashion, which aids in patient relaxation, enhances coordination, and normalizes movement patterns. It includes both passive and active-assisted exercises for the upper and lower limbs, as well as stretching and strengthening routines targeting the hamstrings, calves, shoulders, and muscles of the upper body, trunk, and lower body. Additionally, it incorporates activities such as standing with a narrow base of support, tandem walking, utilizing a balance board to enhance balance and coordination, and teaching essential activities of daily living (ADLs) [10].

Presentation of Case

Patient "X" aged 75 years old woman. On this admission, the patient complained of weakness in his right side with lower extremities, tremor, flaccid tone, sleep apnea, slurred speech, swelling and mild pain in her right side and difficulties in balance and coordination, difficulties gross motor function, transitional movement when she can't walk. The disease started 2 years ago with weakness in right side with the extremities, walking difficulties, and fatigue. The following year, the patient was hospitalized in Shaheed Suhrawardy Hospital and the she went to National Institute of Health Science at the Department of Neurology, where she diagnosed this condition Basal Ganglia Hematoma. After completing her conservative treatment, then Doctors referred to CRP for her rehabilitation. When she came to CRP-Mirpur she filled up all the procedure from MDT to monitoring. During monitoring he showed her medical reports which includes EMG of chronic neurogenic lesions of moderate to a severe degree, mainly affected basal ganglia lesion in parts of Brainstem. From monitoring patient was advised to admit in Stroke Rehabilitation Unit (SRU). Patient was admitted in 15th January, 2025. On the 1st day her subjective and objective assessment was done and Physiotherapist continued her treatment according to clinical features or her problems.

Patient Information

Includes her personal, familial and social history such as- name, age, sex, address, phone no, date of admission, date of incidence etc.

Name- "X" Age- 75 years Sex- Female
Address- Narayanganj Sadar, Narayanganj
Date of admission- 15th January, 2025 Date of incidence- About 2 years ago

1. **Primary concerns and symptoms of the patient:**

About 2 years ago patient felt weakness, mild pain on her both upper and lower limb. She also gradually she lost his balance of sitting, standing and walking. After that her family members came to her and observed her condition for few years and the her went to consultant and takes various medicines. Then her taken to Shaheed Suhrawardy Hospital & consultant referred her National Institute of Neuroscience hospital to concern a neurologist. Dr. checked the patient and advised to admit him. She was admitted to the hospital for 15 days and continued her conservative treatment. After completing his conservative management, doctor referred her to CRP for rehabilitation. So, she came to CRP-Mirpur for better management

2. **Medical, family, and psycho-social history including relevant genetic information**

Patient with a past medical history of hypertension and Vit-D deficiency also present. The patient reported that her balance, coordination and gait had worsened in the last few years, now she moved total support or need wheelchair. Family members told that sometimes nausea, vomiting also present.

3. **Describe significant physical examination (PE) and important clinical findings**

A left-sided basal ganglia hematoma typically leads to right-sided hemiparesis, resulting in weakness or paralysis of the right arm, leg, and face. Patients may exhibit right-sided sensory deficits, including numbness or tingling. Due to the involvement of motor pathways, dysarthria (difficulty speaking) and dysphagia (difficulty swallowing) can occur, often affecting articulation and the ability to swallow safely. After neurological examination may reveal right-sided hyperreflexia or abnormal reflexes, reflecting the disruption of motor control from the left basal ganglia. The patient can't able to sit to stand independently & don't perform the gait.

Table 1: Gross Motor Functional Activities (according to FIM scale)

Rolling	Minimum assistance (4)
Bridging	Maximum assistance (2)
Lying to Sitting	Maximum assistance (2)
Sitting to Standing	Total assistance (1)

Table 2: Upper limb and Lower limb function

Assessment area	**Upper limb**		**Lower limb**	
Side	**Right**	**Left**	**Right**	**Left**
Muscle tone	Ash. Mod. 3	Ash. Mod. 0	Ash. Mod. 3	Ash. Mod. 0
Balance	Poor	Good	Poor	Good
Coordination	Poor	Good	Poor	Good
Sensation	Impaired	Intact	Impaired	Intact
Proprioception	Poor	Good	Poor	Good
Selective movement	Poor	Good	Poor	Good

Table 3: Berg Balance Scale

SL NO.	Item Description Score (0-4)	Initial	Discharge
1	Sitting to Standing	1	2
2	Standing unsupported	1	2
3	Sitting unsupported	2	3
4	Standing to Sitting	1	2
5	Transfers	0	2
6	Standing with Eye closed	0	1
7	Standing with feet together	0	1
8	Reaching forward with outstretched arm	1	2
9	Retrieving object from floor	0	1
10	Turning to look behind	0	2
11	Turning 360 degree	0	1
12	Placing alternate foot on stool	0	1
13	Standing with foot in front	0	1
14	Standing on one foot	0	1
	Total	6	22

Total score maximum=56

For this patient interpretation is **(21-40) walking with assistance**

For this patient interpretation is (0-20) total assistance

4. Diagnostic testing (laboratory testing, imaging)

The results of the first lab tests showed that the levels of normal complete blood count (CBC), Vit-D test, CT scan of the brain and complete metabolic profile were all noteworthy. The primary diagnostic test for a basal ganglia hematoma is a non-contrast head CT scan that provide the Subacute hematoma of Left Basal ganglia region and corona radiata and mild cerebral atrophy also present. Angiography, though less commonly used, can be helpful in identifying vascular abnormalities like aneurysms or arteriovenous malformations that might contribute to the hemorrhage.

5. Diagnostic challenges (such as access to testing, financial, or cultural)

Limited availability of Angiography and CT scan of brain and genetic testing facilities, particularly in rural or underserved areas, can impede timely diagnosis. Financial burdens associated with the high costs of diagnostic tests, compounded by insurance limitations and additional expenses for travel to distant testing centers, may hinder access to care. Cultural factors, including stigma surrounding paralysis of the right side, genetic diseases and language barriers, can contribute to delays in seeking medical evaluation and reluctance to pursue testing.

6. Differential Diagnosis (including other diagnoses considered)

The differential diagnosis of a basal ganglia hematoma includes several conditions that can present with similar neurological findings. Ischemic stroke can lead to motor deficits like hemiparesis, especially if it affects the basal ganglia, though it typically presents without hemorrhage on imaging. Brain tumors, particularly gliomas, may cause focal neurological symptoms and increased intracranial pressure, mimicking the signs of a hematoma. Infections such as brain abscesses or encephalitis may present with neurological deficits, fever, and altered mental status, but imaging will show signs of infection rather than hemorrhage. Multiple system atrophy (MSA), a neurodegenerative disorder, may cause basal ganglia dysfunction, presenting with rigidity and bradykinesia, though there is no hemorrhage on imaging.

7. **Prognosis**

The prognosis of a basal ganglia hematoma depends on factors like the size of the hemorrhage, the patient's age, and the rapidity of medical intervention. Smaller hematomas with prompt treatment may lead to a better recovery, though larger hematomas often result in significant neurological deficits or long-term disability. Mortality rates can be high, especially with deep, extensive hemorrhages, and patients may experience varying degrees of cognitive, motor, and speech impairments even with aggressive management.

8. Types of therapeutic intervention

- Physiotherapy
- Occupational Therapy
- Speech Therapy
- Counseling

9. Administration of therapeutic intervention Problem List

- Rigidity both right upper limb & lower limb
- Decrease muscle power in right both upper limb & lower limb
- Poor pelvic & trunk control
- Poor gross & transitional movement
- Poor sitting balance
- Poor standing balance
- Poor balance & coordination
- Sometimes tremor also presents
- Abnormal gait pattern.

Goal

Hopefully patient will be able to walk with minimum support in indoor environment within 6 weeks In Sha Allah.

Table 4: Aim of treatment with treatment plan

Aim	Treatment plan	Doses	References
Try to reduce pain	Positioning, Soft tissue release, Joint mobilization.	60 mins, 3 sets, 3 repetitions weeks	Mahdy et al., 2016
Try to normalize ROM	Stretching, Active and passive dynamic range of motion exercise.	10-20 mins, 3 sessions/ week, 3 sec hold.	Gomez-Cuaresma et al., 2021
Try to improve muscle power	Strengthening of Gluteal, Quadriceps and lower limb muscle	20-60 mins, 4 sets 7-10 repetitions/ day	Choi et al., 2024

Try to improve pelvic & trunk control	Core stability, Pelvic tilting exercise and Trunk control exercise	15 to 60 minutes per session, for 3 to 6 sessions per Week	Gamble et al., 2021
Try to improve balance & coordination	Balance & coordination specific exercise and Joint Proprioception exercise	60 mins, 3 sets 10 repetitions/ day	Anandan et al., 2020
Try to corrected gait pattern	Gait training and Assistive device used	40 mins per day/ 3 times per week	Tomida et al., 2019

10. Changes in therapeutic intervention

Her gait training was re- assessed after getting used walking frame. Firstly, she was not comfortable with the walking frame but after some treatment session she was used to with the walking frame, she was able to move one place to another place. During continue she was improved and better from initial to discharge.

11. Important follow-up diagnostic and other test results

As her condition was improving day by day so her was not advised to do further laboratory test only her vitals were checked regularly (Specially blood pressure) and her vitals were also normal.

12. Adverse and unanticipated events

During the treatment time no adverse or unanticipated events has been occurred with the patient.

Discussion

The study on Basal Ganglia Hematoma (BGH) disease provides a multifaceted view of the clinical manifestations, diagnostic challenges, therapeutic approaches, and longitudinal outcomes in an individual patient, offering invaluable insights into this complex neurogenetic disorder. By meticulously documenting the patient's medical history, genetic profile, symptomatology, and response to treatment, the case study serves as a rich educational resource for healthcare professionals, facilitating better recognition, diagnosis, and management of Basal Ganglia Hematoma (BGH). Basal ganglia hematoma (BGH) is recognized as one of the most lethal conditions, primarily resulting from hypertension, along with infrequent vascular abnormalities such as arteriovenous malformations, moyamoya disease, and aneurysms when ruptures of distal middle cerebral artery [2]. The physiotherapists tackle the challenges posed by BGH, improving mobility, reducing muscle weakness, and lowering the likelihood of secondary complications. the rehabilitation program included physical therapy focused on exercises aimed at enhancing balance during sitting and standing, as well as improving overall mobility [9]. The Physiotherapist includes both passive and active-assisted exercises for the upper and lower limbs, as well as stretching, strengthening, balance & coordination exercise that routines targeting the hamstrings, calves, shoulders, and muscles of the upper body, trunk, and lower body movement as a result that provide reduce pain, improved balance, transitional movement and functional independent that lead to quality of life [10].

This study provides that stretching, strengthening exercise, task specific program, balance & proprioceptive exercise, practice gait pattern and home-based exercise, most of the psychological and family support combination approach that improving functional mobility and overall health following a basal ganglia stroke should focus on the most effective interventions for improving functional mobility, interventions to improve exercise tolerance, and interventions to improve cognition. Uncovering these three could potentially improve outcomes of the physical therapy management following a basal ganglia stroke and make it more efficient and cost-effective for future patients [11].

Conclusion

The impact of physiotherapy rehabilitation on patients with Basal Ganglia Hematoma (BGH) is a clear indication of a progressive disorder. Through specialized interventions, physiotherapists tackle the challenges posed by BGH, improving mobility, reducing muscle weakness, and lowering the likelihood of secondary complications. The focus on alleviating pain, enhancing balance, and correcting gait patterns leads to significant physical improvements, positively affecting the quality of life for those affected by BGH. In addition to these physical benefits, physiotherapists also provide essential emotional and psychological support, promoting flexibility and a renewed sense of independence. The careful integration of assistive devices allows individuals with BGH to perform daily activities with increased ease. As a cornerstone in the management of BGH, physiotherapy rehabilitation serves as a source of hope, empowering patients to face the difficulties of their condition through a comprehensive and tailored approach, ultimately improving not only their physical abilities but also their overall well-being and capacity to lead fulfilling lives.

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