

## Rare sequelae to some common neurological maladies: Balint's syndrome

Utkarsh Gupta<sup>1</sup>, Fariah Asha Haque<sup>2</sup>

### ABSTRACT

Balint's syndrome is a rare visuospatial disorder usually associated with bilateral and rarely unilateral parieto-occipital or just parietal lobe lesion and sometimes temporal lobe. It is characterized by triad of spatial disorder of attention/simultanagnosia, psychic paralysis of gaze/oculomotor apraxia, and optic ataxia. The most common etiologies for developing this syndrome are stroke, Alzheimer's disease, and brain trauma. A 70-year-old hypertensive male patient complained of difficulty in executing his day-to-day work. He gave history of sudden onset left-sided weakness of his body 8 months back which resolved in a period of 1 month. He complained some visual disturbances later on which he ignored. On examination, he had all the three features of Balint's syndrome as noted above. His plain computed tomography brain and skull revealed infarct in the right parieto-occipital region, lacunar infarcts in capsule-ganglionic region and multiple site of senile cortical atrophy. Radiological findings along with clinical findings and history mentioned above, the patient was diagnosed to have Balint's syndrome as a complication of brain injury in parieto-occipital area by stroke.

**Key words:** Oculomotor apraxia, optic ataxia, simultanagnosia, stroke

### Introduction

Balint's syndrome is a rare visuospatial disorder usually associated with bilateral and rarely unilateral parieto-occipital or just parietal lobe lesion and sometimes temporal lobe. It was first described by Reszo Balint in the year 1909 characterized by triad of (1) spatial disorder of attention/simultanagnosia, (2) psychic paralysis of gaze/oculomotor apraxia, and (3) optic ataxia [1]. The common etiologies for developing this syndrome are stroke, Alzheimer's disease, brain trauma, near drowning, postcardiac arrest, metastasis, eclampsia, posterior cortical atrophy (PCA), and few others [1,2]. Stroke, either ischemic or hemorrhagic, being the second most common cause of mortality worldwide resulting in approximately 6.7 million deaths annually [3,4] and Alzheimer's disease which is one of the leading causes of dementia and is a chronic neurodegenerative disease leading to other ailments such as short-term memory loss, mood swings, language difficulties, disorientation, and various behavioral issues which worsen with time [5,6], are most frequent to develop it.

Knowing the pathophysiology and the various interacting mechanism that lead to an invariable end-point of such impairment following these common neurological maladies can provide us with a window of much more refined management strategies. The more well-defined understanding

we have, the better outcome we can achieve for an individual. We herein present a case of Balint's syndrome in a hypertensive patient with unilateral affection of posterior parieto-occipital complex after suffering from stroke.

### Case Report

A 70-year-old male patient presented in our medicine outpatient department with complaints of difficulty in executing his day-to-day work such as approaching for glass of water, colliding with wall at few instances, and inability to focus his vision on what he wanted to see. He gave history of sudden onset weakness in the left side of his body 8 months back when he was trying to plough his farm land for which he was treated at a local hospital. His weakness resolved in a period of 1 month but he complained some visual disturbances which he ignored back then. At the time of admission in our hospital, he complained of being unable to do his daily work due to visual disturbances. On examination, the patient was able to read and identify individual/local alphabet or shapes, but he could not elicit global compound shapes. His global processing ability was impaired. On visuospatial analytical test, his visuospatial skills were impaired. These findings suggested the features of simultanagnosia. He was unable to reach out to various objects held by the examiner in various positions in spite of Grade 5 power in his active limb which suggested optic ataxia. The patient complained of involuntary fixation of his gaze and complained that he was unable to see as per his will which suggested of oculomotor apraxia.

He had a blood pressure of 160/110 mmHg and gave history of noncompliant anti-hypertensive treatment for the last

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## CASE REPORT

15 years. He did not show features of dementia or any history of brain trauma. On radiological examination [Figures 1 and 2], plain computed tomography brain and skull revealed infarct in the right parieto-occipital region, lacunar infarct in capsule-ganglionic region, and multiple site of senile cortical atrophy. Radiological findings along with clinical findings and history mentioned above, the patient was diagnosed to have Balint's syndrome as a complication of brain injury in parieto-occipital area by stroke.

### Discussion

Various causes have been listed that may result in the development of this rare visuospatial complication. Brain injury following strokes, neurodegenerative disease such as Alzheimer's, traumatic brain damage, and intracranial tumors are few of the common preceding events [7]. Regardless of etiologies, the area in brain which is usually affected remains to be superior parietal lobule (SPL) which is located in the parieto-occipital junction [2]. Studies have shown that there is more incidence of Balint's in stroke affecting bilaterally in parieto-occipital region [7]. Balint's occurring after neurodegenerative pathology as in Alzheimer's and PCA is also suggested by involvement of occipitoparietal complex with the magnocellular visual system following detailed visuospatial analysis [8].

Visuospatial skills involve visual processing, memory abilities, and spatial processing. Spatial processing involves abilities to search the visual field, recognize different form, position, and shapes after visual processing. These spatial skills when adjoined with visual perception and finally framing them mentally using memory and other complex processes in a two-dimensional or three-dimensional configuration constitute visuospatial skills [9]. The most recent studies support the involvement of posterior parietal

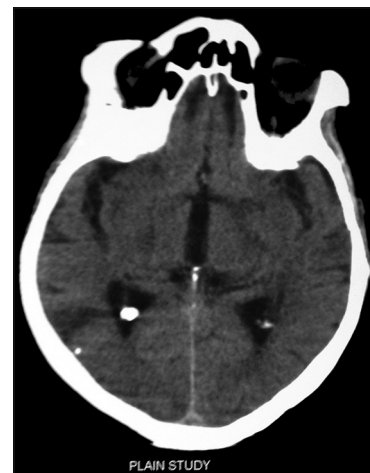
lobe and also the involvement of occipital lobe with it in many instances [10]. Aleman et. al. showed the primary involvement of posterior parietal lobe rather than occipital lobe after repeated transcranial magnetic stimulations [10]. Posterior parietal lobe receives input from visual system, auditory system and somatosensory system and output are majorly sent to frontal motor cortex. The intraparietal sulcus divides it into SPL (Brodmann area 7) and inferior parietal lobule (Brodmann area 39 and 40) [11,12]. Apart from Balint's syndrome, dysfunction of posterior parietal lobe leads to apraxia or hemineglect syndrome as well. These can be assessed and differentiated after doing proper visuospatial analysis by performing various tasks. Few of the commonly performed tests are Clock test, Hooper visual organization task, Rey-Osterrieth complex figure task, Judgement of line orientation task, mental rotation test, and spatial anatomy task [9,13]. It would be more appropriate to perform comprehensive neuropsychological examination to assess different aspects such as ocular motor, visuomotor, constructional praxis, visually guided reaching, manual dexterity, visual scanning along with visuospatial abilities to be absolutely sure about all the three components of syndrome and rule out the differentials.

### Conclusion

After proper radiological imaging and visuospatial analysis along with neuropsychological testing, Balint's syndrome can be diagnosed if the patient suffers an insult in the region of posterior parietal complex and surrounding region or parieto-occipital complex. Demonstrating simultanagnosia, psychic paralysis of gaze, and optic ataxia are the key. Further localization of specific sites by neuroradiological techniques, brain electrical activity mapping, and other novel techniques are matter of ongoing research for this syndrome.



**Figure 1** Computed tomography findings of Balint's syndrome 1



**Figure 2** Computed tomography findings of Balint's syndrome 2

## CASE REPORT

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## Authors' Contributions

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## Competing Interests

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