



# Kluver-Bucy Syndrome Following Herpes Simplex Encephalitis

## *Herpes Simpleks Ensefaliti Sonrası Gelişen Kluver-Bucy Sendromu Olgusu*

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### Abstract

Kluver-Bucy syndrome (KBS) is characterized by visual agnosia, hypersexuality, emotional behavior changes, hyperorality, hypermetamorphosis, and cognitive dysfunction. The syndrome is often seen in pathologic states that destroy the anterior and medial temporal lobes, often bilaterally. Herpes simplex encephalitis (HSE) is the leading infectious cause of KBS owing to its frequent involvement of the temporal lobes. HSE is also the most common cause of KBS in general. In this paper, we present a rare case of KBS after HSE.

**Keywords:** Kluver-Bucy syndrome, herpes simplex encephalitis, hyperorality, hypermetamorphosis

### Öz

Kluver-Bucy sendromu (KBS) görsel agnozi, hiperseksüalite, emosyonel davranış değişiklikleri, hiperoralite, hipermetamorföz ve bellek bozuklukları ile karakterizedir. Sendrom anterior ve mediyal temporal lobları, sıklıkla bilateral olarak etkileyen patolojik tablolarda görülür. Herpes simpleks ensefaliti (HSE), özellikle temporal lobları etkilediğinden en fazla KBS'ye neden olan enfeksiyondür. Ayrıca tüm diğer nedenler arasında da, KBS'nin en sık nedeni olarak rapor edilmiştir. Bu yazıda nadir görülmesi nedeni ile HSE sonrası gelişen KBS olgusu sunulmuştur.

**Anahtar Kelimeler:** Kluver-Bucy sendromu, herpes simpleks ensefaliti, hiperoralite, hipermetamorföz

### Introduction

Kluver-Bucy syndrome (KBS) is characterized by psychic blindness or visual agnosia, hypersexuality, emotional behavioral changes, especially placidity (decreased motor and verbal reaction against conditions that cause fear and anger), hyperorality, and hypermetamorphosis (increased interest in every object that enters the visual field) (1,2). KBS was first described in monkeys with bitemporal brain lesions as an experimental neurobehavioral syndrome in 1937 (1). KBS was first described in a patient who had bilateral temporal lobectomy for epilepsy surgery in 1955 (3). Herpes simplex encephalitis (HSE), Pick's disease, Alzheimer's disease, cerebrovascular disease, head trauma, anoxic-ischemic encephalopathy, epilepsy, juvenile neuronal lipofuscinosis, Huntington's disease, acute intermittent porphyria, tuberculous meningitis, toxoplasmosis, and shigellosis are counted as the

causes of KBS (4,5). The common pathology of these causes is bilateral destruction or dysfunction of mesial temporal lobes, but there are case reports showing that unilateral damage (left temporal lobectomy or damage of the right amygdala) can also cause similar symptoms (6,7). We report a patient who presented with KBS following HSE, which is rare.

### Case Report

A 26-year-old female admitted to our neurology emergency service with numbness of the left side of her face, which started 3 days ago, headache, which was added 2 days ago, behavior changes (putting stockings in the washing machine, messing with trash), speaking meaninglessly, and olfactory hallucinations. She had a tonsillectomy operation 4 days ago. There were no features in her history. Her vital signs were as follows: fever, 38.8 °C; heart rate,

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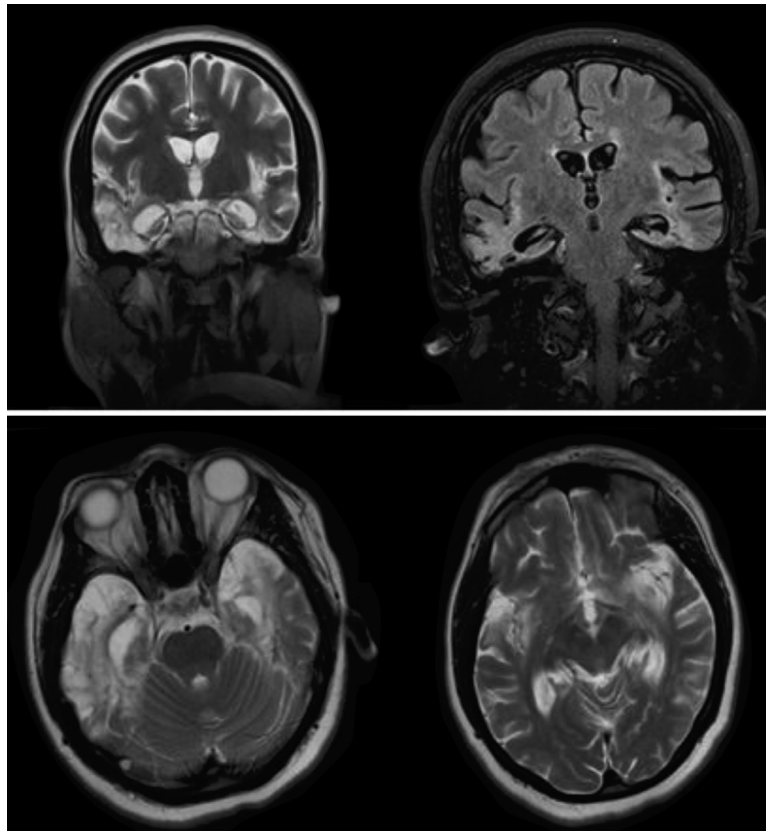
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88/min; blood pressure, 110/70 mmHg; respiratory rate, 16/min. There were no features in a physical examination. In a neurologic examination, she was awake but cooperation was limited. She could follow simple orders but not complex ones. Orientation to place, time and person was disrupted and the content of speech was meaningless. Examination of motor, sensorial, cerebellar, and extrapyramidal systems were normal. Routine blood tests were normal except mild leukocytosis ( $10,600/\text{mm}^3$ ) in a hemogram. Cranial computed tomography (CT) showed no acute lesions. Cranial magnetic resonance imaging (MRI) showed hyperintense signal changes and blurring of sulci in bilateral temporal lobes extending to the right occipital and frontal lobes, involving bilateral insular cortices in T2- and fluid attenuated inversion recovery-weighted imaging. Also, cranial MRI showed focal hyperintensity suggesting blood products in the right insular cortex in T1-weighted imaging. Patchy diffusion restriction in the mentioned areas (widely in right temporal lobe, bilateral insular cortices, and left mesial temporal lobe) were seen in diffusion-weighted images. HSE was considered as a pre-diagnosis.

In the cerebrospinal fluid (CSF), 570 lymphocytes/ $\text{mm}^3$  and 870 erythrocytes/ $\text{mm}^3$  were counted. CSF protein was 81.2 mg/dL, glucose: 41 mg/dL (simultaneous blood glucose: 74 mg/dL), chlorine: 120 mmol/L, potassium: 2.4 mmol/L, and sodium: 142 mmol/L. In Gram staining, 5-6 lymphocytes were seen in every field but no microorganisms were detected. In Ehrlich Ziehl Neelsen staining, no acid-resistant bacteria were seen. Acyclovir

30 mg/kg/d and ceftriaxone 4 g/d were initiated. On the second day of hospitalization, she had a generalized tonic clonic seizure and electroencephalography (EEG) showed bioelectrical slowing in anterior parts of hemispheres and neuronal hyperexcitability in the left frontotemporal area. Levetiracetam 1000 mg/d was added. CSF HSV DNA type 1 and polymerase chain reaction were positive. Other infection parameters were normal. On the 16<sup>th</sup> day of hospitalization, she displayed excessive eating, searching for food in other patients' rooms, eating "non-food" things such as foil paper and paper towels, irritability, agitation, and hypersexuality. She was diagnosed as having KBS. Carbamazepine 400 mg/d and quetiapine 300 mg/d were initiated and doses were increased up to 800 mg/d and 400 mg/d in two weeks, respectively. The irritability and hypersexuality were improved with treatment but hyperorality persisted and after consulting with psychiatry, amisulpride 200 mg/d and biperiden hydrochloride 2 mg/d were added. The patient gained a lot of weight in this period. Low-density lipoprotein and total cholesterol levels were 143 and 216 mg/dL, respectively, and statin treatment was initiated. At the end of 21 days, acyclovir treatment was ended. At the 6-month follow-up, cranial MRI, hyperintensities suggestive of a cystic encephalomalacic area and surrounding gliosis, which caused parenchymal loss in the bilateral temporal lobes involving parahippocampal gyri and extending to bilateral insular cortices were observed (Figure 1). A neuropsychiatric test performed at 6<sup>th</sup> month showed severe verbal and non-verbal impairment



**Figure 1.** Hyperintensities suggestive of cystic encephalomalacic area and surrounding gliosis, which caused parenchymal loss in bilateral temporal lobes, involving parahippocampal gyri and extending to bilateral insular cortices in cranial magnetic resonance imaging

in recording, learning, and recalling processes, visual-spatial dysfunction, and findings of impairment of frontal circuits. Seizures ceased and antiepileptic treatment was terminated after 3 months. A neuropsychiatric test performed 1 year after the first one showed mild improvement in simple attention and findings associated with the frontal circuits. In the third year follow-up, a neurologic examination was normal and a neuropsychiatric test showed mild improvement in sustained attention and findings associated with the frontal circuits.

## Discussion

HSE accounts for 20% of all cases of sporadic encephalitis (8). Its annual incidence rate is 1/250,000-500,000 (9). Diagnosis is based on typical CSF and cranial MRI findings and also clinical, serologic, and EEG parameters (9). HSE causes personality changes, cognitive decline, aphasia, seizures, and focal weakness by impairing frontal and temporal lobes (10). HSE can impair both hemispheres, as in our patient (11). HSE can cause severe impairment and can be potentially fatal unless it is untreated or treated late with antiviral drugs (acyclovir) (12). Acyclovir is given at a dosage of 30 mg/kg/d, divided into 3 doses per day for 14-21 days. Its mortality rate is 70% if left untreated. Following acyclovir treatment, the mortality rate is 28%, but morbidity is still high (9).

HSE is an infection that results in KBS if temporal lobes are impaired. Also, it is reported as the most common cause of KBS among all other causes (5). A patient with KBS caused by HSE was first reported in 1975 (13). This syndrome is characterized by visual agnosia (unable to recognize known objects), hypermetamorphosis, putting objects in the mouth, tactile exploratory behaviors, hypersexuality, placidity (decreased motor and verbal reaction against conditions that cause fear and anger), and memory disturbances. KBS can be complete or incomplete and the latter type is more common (2). Our patient had all features of KBS except psychic blindness or visual agnosia and was considered as having incomplete KBS. KBS occurs in pathologic processes involving bilateral anterior and medial temporal lobes, and in our patient, bilateral medial temporal lobes were impaired.

Treatment of the behavior changes in KBS is challenging. Patients with KBS have bulimia and have a strong instinct to put "non-food" items into the mouth. They should be followed up carefully to avoid obesity due to bulimia (14). Our patient had obesity and hyperlipidemia due to over-eating. Carbamazepine is found useful in treatment of all behavior changes, primarily hypersexuality (15). Haloperidol and anticholinergics are the other medications that can be used in the treatment of behavior changes (5). The hypersexuality and emotional behavior changes in our patient were improved in a short time with carbamazepine, quetiapine, and amisulpride.

As a result, patients with KBS can present with severe cognitive and behavioral disturbances and recovery takes a long time. In

our patient, behavioral changes recovered rapidly and completely, but recovery of cognitive problems was limited and took a long time. KBS should be kept in mind in the differential diagnosis of patients who present with visual agnosia, hypersexuality, emotional behavioral changes, hyperorality or hypermetamorphosis.

## Ethics

**Informed Consent:** It was not taken.

**Peer-review:** Internally peer-reviewed.

## Authorship Contributions

Surgical and Medical Practices: H.D.A., Concept: B.T., Design: E.S., Data Collection or Processing: S.Ş., Analysis or Interpretation: S.Ş., Literature Search: B.T., Writing: K.M.

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