

# KERNOHAN'S NOTCH PHENOMENON IN AN ACUTE COMPONENTED CHRONIC SUBDURAL HEMATOMA PATIENT: A CASE REPORT

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## ABSTRACT

Kernohan's notch phenomenon is a rare examination finding in cases diagnosed as an intracranial space-occupying lesion. The localization of the space-occupying lesion in this clinical status, which is considered as a sign of herniation, is on the opposite side of the predicted side. The most typical finding is motor deficit and mydriasis on the same side as the space-occupying lesion. A 61-year-old female patient was evaluated in the emergency department due to sudden loss of consciousness. Her neurological examination revealed anisocoria and right hemiparesis findings, including mydriasis in the right pupil. Cranial computed tomography examination revealed a large, acute component combined with chronic subdural hematoma in the right frontoparietal region and midline shift. Clinical and radiological findings were evaluated as Kernohan's Notch Sign phenomenon. The patient, who was operated on urgently, was discharged on the 7th postoperative day without any neurological deficits.

**Keywords:** Kernohan's notch phenomenon, subdural hematoma, chronic subdural hematoma, acute subdural hematoma

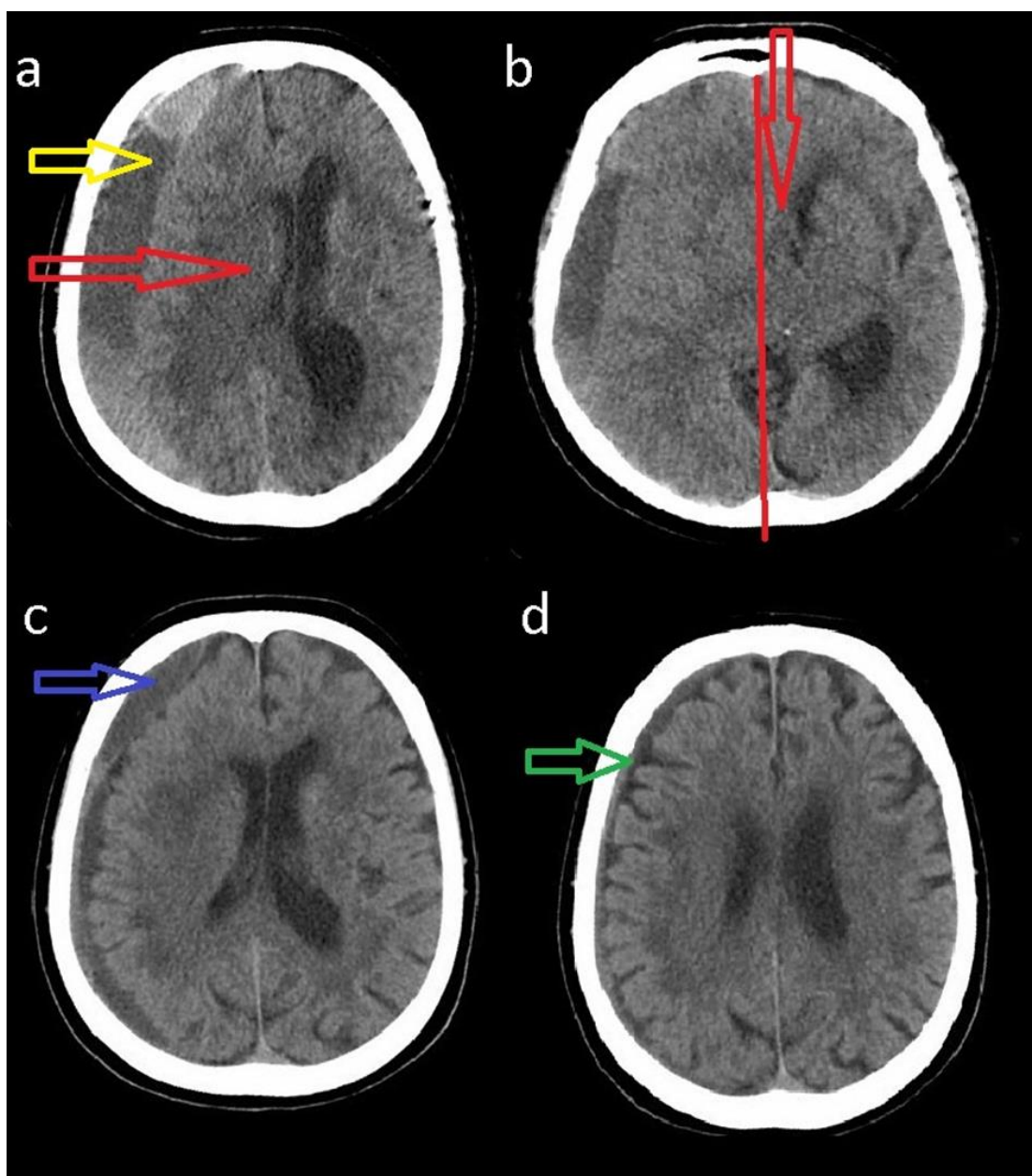
## Introduction

As a result of intracranial space-occupying lesions affecting the motor cortex, symptoms of motor deficits are typically expected to develop on the opposite side. This is due to the fact that the fibers of the corticospinal tract cross at the level of the medulla oblongata. If there is evidence of herniation, mydriasis is seen on the same side as the space-occupying lesion because the nervus oculomotorius is under compression on the same side. Large-volume subdural hematomas can lead to herniation findings. It is very rare to encounter rapid herniation findings in chronic subdural hematoma cases. In cases diagnosed as chronic subdural hematoma accompanied by acute hematoma, rapid increase in intracranial pressure may occur.

Kernohan Notch's Sign Phenomenon is a clinical status that occurs when supratentorial space-occupying lesions leave the contralateral corticospinal tract under compression.<sup>1-3</sup> In cases with this situation, the space-occupying lesion is on the same side as the neurological deficits, contrary to expectations. It develops when the hemispheric lesion compresses the contralateral crus cerebri in the tentorial notch. This phenomenon has been described in the literature mostly in cases diagnosed with acute subdural and epidural hematoma.<sup>1-3</sup> This study presented a case in which chronic subdural hematoma and acute components were seen together.

## Case Report

A 61-year-old female patient was evaluated in the emergency department due to sudden loss of consciousness after a few days of headache and dizziness. In the neurological examination of the unconscious patient, Glasgow Coma Score: 7/15, right pupillary mydriatic anisocoria was detected. Emergency cranial computed tomography (CT) examination of the patient with signs of right hemiparesis revealed a wide, chronic subdural hematoma with an acute component causing a midline shift in the right frontoparietal area (Figure 1a,b). The patient was operated on urgently. The patient, who was operated on with the double burrhole method, was followed up in the intensive care unit in the postoperative period. In the patient who was transferred to the service on the 1st postoperative day, anisocoria and right hemiparesis findings were completely resolved on the 3rd day. In the control cranial tomography evaluations, it was determined that the midline shift was decreased. The patient was discharged without any deficit on the 7th postoperative day. In the CT examination of the 13th postoperative day, the midline shift completely disappeared, and a minimal hemorrhagic fluid collection consistent with a chronic subdural hematoma was detected in the subdural space (Figure 1c,d).



**Figure 1.** Chronic subdural hematoma with acute component (yellow arrow) in the right frontoparietal region caused midline shift, (red arrow) (a); midline (red vertical line) and midline shift (red arrow) (b); residual chronic subdural hematoma (blue arrow) on postoperative third day (c); minimal residual chronic subdural hematoma (green arrow) without midline shift on the 13th postoperative day (d).

## Discussion

Acute subdural hematomas are intracranial hemorrhage that mortality and morbidity.<sup>4, 5</sup> In the pathogenesis of chronic subdural hematoma, it is generally accepted that slow-progressing extra-axial hemorrhage occurs due to rupture of the bridging veins due to cerebral atrophy.<sup>6, 7</sup> The clinical findings show slow progression with the slow course of bleeding in these cases. The longest-lasting and most frequently detected symptom until the diagnosis is dizziness. The addition of the acute component to the chronic form of bleeding may suddenly increase the intracranial pressure and cause rapid progression of clinical findings. Therefore, sudden neurological deterioration is common in chronic subdural hematoma with an acute component.

Kernohan's notch phenomenon, on the other hand, is a rare clinical finding that occurs after supratentorial space-

occupying lesions compress the crus cerebri in the tentorial notch with midline shift.<sup>2, 3, 8</sup> Contrary to what was predicted before the radiological diagnosis, the space-occupying lesion is located ipsilateral to the side with neurological deficits. Most cases in which Kernohan notch's phenomenon is described in the literature are cases diagnosed with acute bleeding types such as epidural hematoma and acute subdural hematoma cases. In chronic subdural hematomas, midline shift is detected late in the hemorrhage due to cerebral atrophy.<sup>6, 7</sup> Due to the slow course and long duration of the symptoms, a significant portion of the cases are diagnosed as chronic subdural hematoma until the midline shift occurs.<sup>6</sup> In cases of chronic subdural hematoma with an acute component, sudden neurological deterioration may be expected due to the sudden increase in hematoma volume, even if the symptoms have a slow course. It is known that intracranial dynamics cause a prolongation of the tolerance process

until the diagnosis is made in cases diagnosed with chronic subdural hematoma.

It is known that the treatment results of the cases with Kernohan's Notch phenomenon detected are poor.<sup>2, 3, 8</sup> Poor clinical outcomes are directly related to the presence of radiological herniation findings such as midline shift. In addition, cases with this finding are highly associated with traumatic intracranial hemorrhages when evaluated according to the type of bleeding. Mortality is expected to be high in traumatic intracranial hemorrhages. The case we present in our study is a different type of case with no history of trauma in etiology and in which acute subdural hematoma is accompanied by chronic subdural hematoma. Unlike the cases described in the literature, it is an example of a case in which clinical improvement occurs relatively quickly.

Kernohan's notch phenomenon is a more common clinical picture in acute intracranial hemorrhages with radiological midline shift.<sup>2, 3</sup> Etiological causes are often life-threatening in acute intracranial hemorrhages. This finding is remarkable in a case of chronic subdural hematoma with an acute component. With early surgical intervention, mortality and morbidity rates can be reduced.

## Conclusion

The Kernohan's notch phenomenon is a clinical finding seen in cases with acute increased intracranial pressure. The space-occupying lesion is detected on the opposite side of the projected area. Because it is one of the herniation findings, it requires medical intervention in the early period.

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## Conflict of Interest

There's no conflict of interest.

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