

The "CT Comma Sign" in Concurrent Extradural and Hyperacute Subdural Hematomas is Revisited

Sir,

Extradural hematoma (EDH) is the collection of blood between the inner skull table and dura, and appears as a biconvex-lens shape on imaging.^[1,2] In comparison to EDH, the subdural hematoma (SDH) is a collection of blood between the dura and arachnoid membrane and it has a biconcave-lens shape on imaging.^[1,3] In the acute stage, most of these hematomas present as hyperdense lesions on computerized tomography (CT) images.^[1-4] In rare circumstances, a patient can have acute extradural hematoma and subdural hematoma adjacent to each other on the same side with a characteristic imaging appearance.^[5,6]

A 26-year-old male patient sustained head injury in a road traffic accident and presented 6 hours after to the emergency department. The patient was unconscious from the time of injury and had multiple episodes of vomiting. There was no history of seizures or nasal/ear bleeds. His general and systemic examination was unremarkable. Neurologically, he had altered sensorium [Glasgow coma score (GCS)-E1V2M5]. Pupils were bilaterally equal and reactive to light. He moved all four limbs normally. He had multiple abrasions over face and scalp.

The non-contrast CT scan of the brain with bone windows showed a biconcave mild hyperdense collection extending all over the right fronto-temporo-parietal region and a hyperdense biconvex lesion just behind this collection over the right parieto-occipital region with associated small bi-frontal polar contusions [Figure 1]. There was significant mass effect and midline shift, but no fracture was noted. Blood

investigations including coagulation profile were normal. The patient underwent right fronto-temporo-parietal craniotomy.

At surgery, there was an extradural hematoma in the parieto-occipital region that was evacuated. The dura was tense and non-pulsatile. After the dura was opened, there was another hemorrhagic collection that was mixed with clots and CSF which was also evacuated. Following evacuation, the brain was lax and pulsatile. After achieving hemostasis, the wound was closed in layers. The patient improved significantly after surgery and the GCS was E4V4M6. Follow-up images showed complete evacuation of the hematomas [Figure 2]. There were no focal deficits.

There are only few case reports in the literature where concurrent extradural and SDHs have been reported.^[7-10] The underlying mechanisms described for these lesions are underlying fracture and associated extradural hematoma (coup injury) and acute SDH may be the manifestation of contrecoup injury (as we saw in the present case).^[5,6,11] Monsalve^[6] has discussed the appearance of such lesions in details and described the typical appearance as "CT comma sign." We need to remember that a classical "CT comma sign" will appear only when there is a left-sided lesion (EDH in the frontal region and SDH is posterior to the EDH);^[6] however, if the skull is imagined as a circle, then the comma rotates in a circle [Figure 1]. The author further suggested that when there is a finding of the "CT comma sign" the neurosurgeons and radiologists should be cautious as there may be two extra-axial hemorrhagic lesions, that is, extradural and SDHs.^[6] Surgical evacuation is the treatment of choice with good outcome for larger hematomas.^[6,12-15] The outcome is determined by

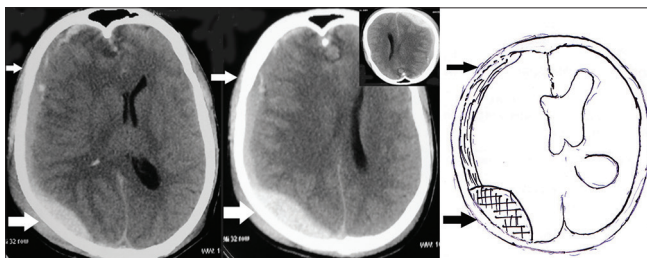


Figure 1: CT scan brain showing convexo-convex mild hyperdense collection extending all over the right fronto-temporo-parietal region and a hyperdense biconvex lesion over right parieto-occipital region and associated small bifrontal polar contusions (inset please note "CT comma sign"), right image showing schematic representation of the "CT coma sign" (upper arrow depicting SDH and lower arrow depicting EDH)

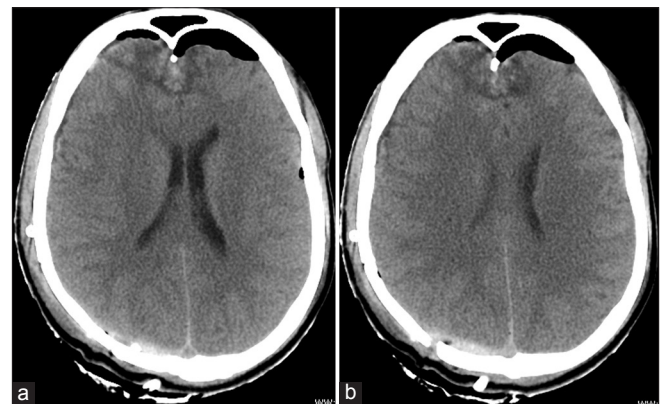


Figure 2: Follow-up CT scan showing complete evacuation of EDH and SDH

the neurological status at the time of presentation, size of hematoma and associated underlying brain injury (e.g. PCA infarct, etc.).^[5,13-16]

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References

1. Toyama Y, Kobayashi T, Nishiyama Y, Satoh K, Ohkawa M, Seki K. CT for acute stage of closed head injury. *Radiat Med* 2005;23:309-16.
2. Klufas RA, Hsu L, Patel MR, Schwartz RB. Unusual manifestations of head trauma. *AJR Am J Roentgenol* 1996;166:675-81.
3. Merino-deVillasante J, Taveras JM. Computerized tomography (CT) in acute head trauma. *AJR Am J Roentgenol* 1976;126:765-78.
4. Besenski N. Traumatic injuries: Imaging of head injuries. *Eur Radiol* 2002;12:1237-52.
5. Gupta R, Mohindra S, Verma SK. Traumatic ipsilateral acute extradural and subdural hematoma. *Indian J Neurotrauma* 2008;5:113-4.
6. Monsalve GA. The "CT comma sign" in head trauma: Concurrent epidural and subdural acute intracranial hematomas. *J Trauma Acute Care Surg* 2007;63:195-6.
7. Baratham G, Dennyson WG. Delayed traumatic intracerebral haemorrhage. *J Neurol Neurosurg Psychiatry* 1972;35:698-706.
8. Diaconis JN, Rao KC. CT in head trauma: A review. *J Comput Tomogr* 1980;4:261-70.
9. Mohindra S, Mukherjee KK, Gupta R, Chhabra R, Gupta SK, Khosla VK. Decompressive surgery for acute subdural haematoma leading to contralateral extradural haematoma: A report of two cases and review of literature. *Br J Neurosurg* 2005;19:490-4.
10. Yoshino Y, Aoki N, Oikawa A, Ohno K. Acute epidural hematoma developing during twist-drill craniostomy: A complication of percutaneous subdural tapping for the treatment of chronic subdural hematoma. *Surg Neurol* 2000;53:601-4.
11. Madhugiri VS, Arimappamagan A, Chandramouli BA. Traumatic epidural and subdural hematomas and extensive brain infarcts in a patient with pial arteriovenous malformation: Mechanisms underlying clinical and radiological findings. *Asian J Neurosurg* 2012;7:210-3.
12. Pickard JD, Bailey S, Sanderson H, Rees M, Garfield JS. Steps towards cost-benefit analysis of regional neurosurgical care. *BMJ* 1990;301:629-35.
13. Agrawal A, Agrawal C, Kumar A, Adhikari S. Outcome of traumatic extradural haematoma managed surgically: Our experience. *Niger J Orthop Trauma* 2007;6:74-6.
14. Agrawal A. Bilateral symmetrical parietal extradural hematoma. *J Surg Tech Case Rep* 2011;3:34-6.
15. Kapsalaki EZ, Machinis TG, Robinson JS 3rd, Newman B, Grigorian AA, Fountas KN. Spontaneous resolution of acute cranial subdural hematomas. *Clin Neurol Neurosurg* 2007;109:287-91.
16. Massaro F, Lanotte M, Faccani G, Triolo C. One hundred and twenty-seven cases of acute subdural haematoma operated on. *Acta Neurochir (Wien)* 1996;138:185-91.

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