

Remote cerebellar haemorrhage: A case report

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Abstract

Intracranial haemorrhage after supra-tentorial craniotomies can occur in a typical pattern and location which may suggest the diagnosis of remote cerebellar haemorrhage (RCH) which is quite a rare occurrence. The 'Zebra Sign' refers to a pattern of hyperdensity indicative of blood and hypodensity indicative of normal cerebellar parenchyma in a curvilinear, stripe-like fashion along the cerebellar folia and is a characteristic imaging finding in RCH. RCH in general doesn't require surgical treatment, however in cases of significant hydrocephalus or progressive deterioration of consciousness surgical treatment may be warranted. The knowledge of this condition is important as it can pre-empt unnecessary further investigations and biopsy. Although imaging appearance may be striking, close imaging follow-up and clinical monitoring are often enough for the management of this entity.

Key words: Cerebellum; craniotomy; intracranial hemorrhages; postoperative complications

Introduction

Haemorrhage in the surgical bed of varying degrees is frequently seen and is not unexpected. Intracranial haemorrhage remote from site of surgery is very unusual. Intracranial haemorrhage can occur in a typical pattern and location which may suggest the diagnosis of remote cerebellar haemorrhage (RCH). This rare entity has been reported to occur typically after supratentorial craniotomies.^[1] The highest incidence has been reported after intracranial aneurysm clipping, tumour resection and lobectomies done for focal epilepsy in decreasing order of incidence.^[2] The overall incidence ranges from 0.08%^[3] to 0.6%.^[4] This phenomenon is not exclusive to intracranial surgeries and has been reported to occur after spinal surgeries, albeit, much less commonly.

Case History

A 55-year-old man presented with multiple episodes of seizures. Neurological evaluation did not reveal any localizing signs. The cranial nerve examination was unremarkable. Laboratory workup was normal. MRI subsequently performed showed a right basi-frontal mass. He underwent a right frontal craniotomy with tumour excision under general anaesthesia and tolerated the surgery well. Postoperatively, he recovered well without seizure episodes. A post op baseline MRI and CT was performed 2 days of surgery which showed small volume haemorrhage in the operative bed. In addition, a curvilinear "striped" area of intraparenchymal and extra-axial haemorrhage was seen in the right cerebellar hemisphere [Figure 1].

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Evaluation of medical drug history did not reveal the administration of anticoagulants. A diagnosis of RCH was made. When the postoperative MRI was compared with the preoperative MRI, no imaging signs of decrease in intracranial pressure were seen viz. A follow up plain CT scan of brain was performed 4 days later which revealed the cerebellar haemorrhage to be stable with temporal evolution. The management was conservative and the patient was subsequently discharged in 10 days.

Discussion

RCH is a rare postoperative complication occurring mostly after supratentorial surgeries and rarely after spinal surgeries. Brockmann *et al.* have described an imaging appearance (Zebra sign) on CT in patients with RCH. The 'Zebra Sign' refers to a pattern of hyperdensity indicative of blood and hypodensity indicative of normal cerebellar parenchyma in a curvilinear, stripe-like fashion along the cerebellar folia.^[5] In systematic review of RCH after supratentorial procedures by Sturiale *et al.*, a 'Zebra sign' was found in 64% of the cases, less commonly intracerebellar haemorrhage and mixed pattern has been noted as well.^[2] It was also noted that zebra sign tends to happen bilaterally and the mortality rate in patients with zebra pattern was less (about 1.5%) as compared as compared to overall mortality after RCH (11.5%).^[2] In our case the bleeding was in a streaky, curvilinear pattern and was unilateral.

Clinically, most cases of RCH are associated with impaired consciousness (around 44%) and cerebellar signs are reported to be present only in around 12% of the patients.^[2] In our case, the patient had impaired consciousness of varying degree in immediate post-operative period which improved in the week following the surgery.

The risk factors that are associated with RCH are impaired coagulation, hypertension and seizures, at least one of which is generally present in about one-third of the patients.^[2] Our

patient had a history of hypertension which was controlled with anti-hypertensive medications.

The exact pathophysiology of RCH has not been conclusively established, however, there seems to be a broad consensus amongst various authors about its venous origin. It is postulated that RCH is linked to an excessive intraoperative or postoperative CSF loss.^[1,4-12] Due to CSF loss, the cerebellum is displaced downwards which in turn may produce stretching and tearing of cerebellar veins.^[13] In our case the intraoperative CSF loss was not recorded as the ventricles were not breached and it was miniscule. When the postoperative MRI was compared with the preoperative MRI, there were no features of decreased intracranial tension with no change in the size or shape of ventricles [Figure 2] There was no presence of symmetric bilateral basal ganglia/thalamic hyperintensities either which have been reported as imaging sign postoperative intracranial hypotension.^[14] Another view is that there is a reduction of intracranial pressure when an intracranial mass is resected with consequent increase in transmural pressure of veins and venules.^[15]

RCH in general doesn't require surgical treatment and is treated conservatively. However in cases of significant hydrocephalus or progressive deterioration of consciousness surgical treatment may be warranted.

In conclusion, RCH is an often self-limiting and rare complication of supratentorial craniotomies as reported in this case. The most common imaging feature is the 'Zebra Sign', however other imaging manifestations might also be present. This condition has not been reported in Indian radiology literature. The knowledge of this condition is important as it can pre-empt unnecessary further investigations and biopsy. Although imaging appearance may be striking, close imaging follow-up and clinical monitoring is often enough for management of this entity.

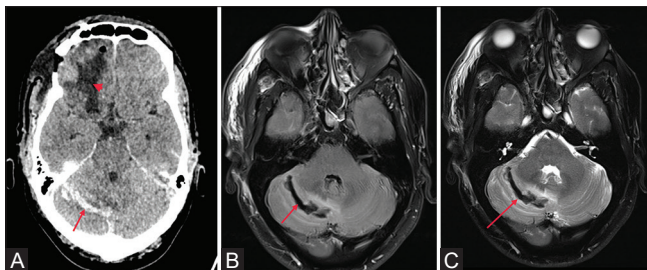


Figure 1 (A-C): (A) Axial CT scan of the brain illustrating the surgical bed for the tumour excision in the right frontal lobe (arrowhead) and the curvilinear, streaky haemorrhage in the right cerebellar hemisphere (arrow) distant to the excision site. (B) Axial MRI image of the brain in the FLAIR sequence depicting the cerebellar haemorrhage (arrow) in the similar fashion as seen in the CT. (C) T2 weighted axial MRI section of the brain depicting the cerebellar haemorrhage (arrow)

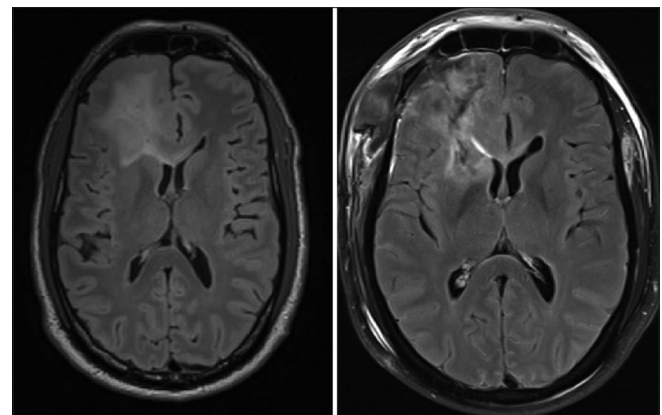


Figure 2: Preoperative FLAIR axial image (left) shows the mass lesion in the right frontal lobe. Postoperative FLAIR axial image (right) at the same level show postoperative changes in the surgical bed and no change in lateral ventricles

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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