Remote Cerebellar Hemorrhage after Removal of Large Convexity Meningioma

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Abstract

Remote cerebellar hemorrhage is a rare postoperative complication. It can occur after infratentorial or supratentorial craniotomies, later being more common. Remote cerebellar hemorrhage is considered to be a self-limited and benign condition. The exact pathophysiology of remote cerebellar hemorrhage remains unclear, but reports have suggested an association with excessive loss of cerebrospinal fluid.

We report a case of remote cerebellar hemorrhage after supratentorial craniotomy for large convexity meningioma without excessive loss of cerebrospinal fluid.

Key words: Cerebrospinal fluid, Craniotomy, Meningioma, Neurosurgery, Remote cerebellar hemorrhage

Introduction

Remote cerebellar hemorrhage (RCH) is characterized as bleed in the cerebellum after a surgery has been performed distant from the site of bleeding. RCH is usually seen to occur between 30 to 60 years of age, however it has been detailed in patients as young as 10 years and as old as 83 years.[1]

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RCH has been reported in the literature after various neurosurgical procedures like clipping of aneurysm, cranial tumor resection, lobectomies and hematoma evacuation. Though it occurred mostly after frontal or frontotemporal craniotomies, there is no evidence to relate it to any specific type of surgery.[2]

The so-called "Zebra sign" pattern, which is characterized by streaks in the cerebellum indicating the spreading of blood in the cerebellar sulcus and which can typically be seen in computed tomography (CT)images, usually occurs in cases of remote cerebellar hemorrhage.[3] RCH is a very rare complication that occurs after infra or supratentorial surgeries.[4]

In this case report, we describe a rare entity of RCH secondary to supratentorial craniotomy for large frontal convexity meningioma.

Case Presentation

A 55 years old lady with hypertension and type II diabetes mellitus presented with chronic intermittent headache and recently developed forgetfulness and irrelevant talking. She did not have any neurological deficits and her fundoscopy examination was normal. On further evaluation, magnetic resonance imaging (MRI) brain showed large 7.5 x 6.0 x 5.8 cm homogenously enhancing, extra-cranial, right anterior convexity meningioma extending to anterior cranial base with mass effect (Figure 1).

Routine lab investigations including coagulation profile were within normal limit. The patient underwent right fronto-temporal craniotomy, following standard principle gross total removal of tumor was achieved.

The intraoperative course was uneventful, there was no excessive loss of CSF, no opening of cisterns or ventricle and no brain swelling. Complete hemostasis was achieved before closure over an extradural free drain.

In the immediate post-operative period about one hour after surgery, the patient suffered from decreased level of consciousness (GCS E1V1M1), weakly reactive pupils. Immediate CT scan was negative for operative site hemorrhage but showed remote cerebellar hemorrhage with classical "Zebra sign" pattern (Figure 2). There was no hydrocephalus, basal cisterns and posterior fossa did not have significant compression.

She was managed conservatively with close observation of GCS, pupillary reaction and followed with serial CT scan to observe progression of RCH. On serial scans, there was no increase in hemorrhage, no perilesional edema and normal ventricular size (Figure 3).

After her gradual recovery she was discharged and transferred to rehabilitation center with full consciousness (GCS E4V5M6), Glasgow outcome scale (GOS) of 5 and complete resolution of RCH in follow-up CT scan (Figure 3C).

At 6 months follow up in the outpatient department, she had mild weakness of left limbs (MRC grade 4/5), ataxic gait and slurred speech.

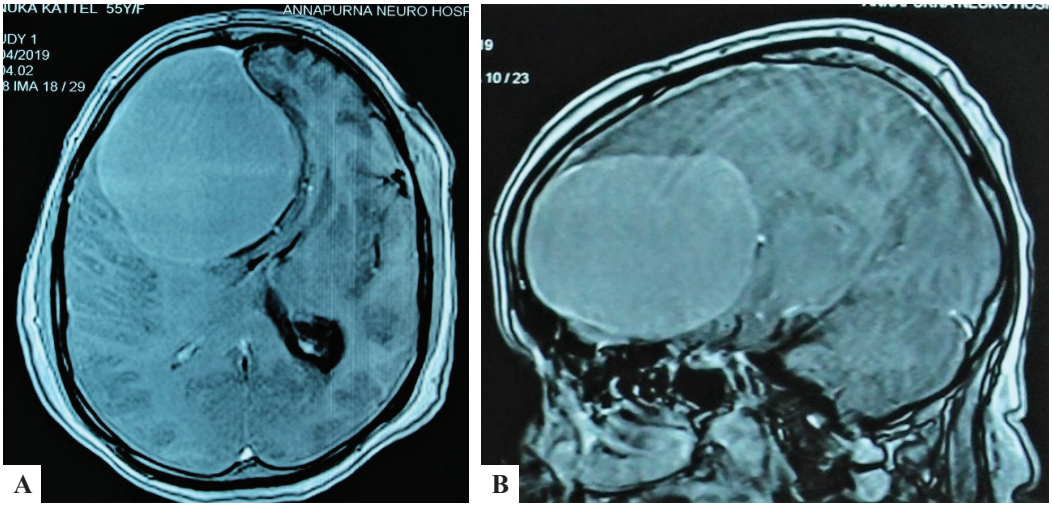

Figure 1: Preoperative MRI showing (1A) large right frontal convexity meningioma in axial view with mass effect and (1B) the sagittal view

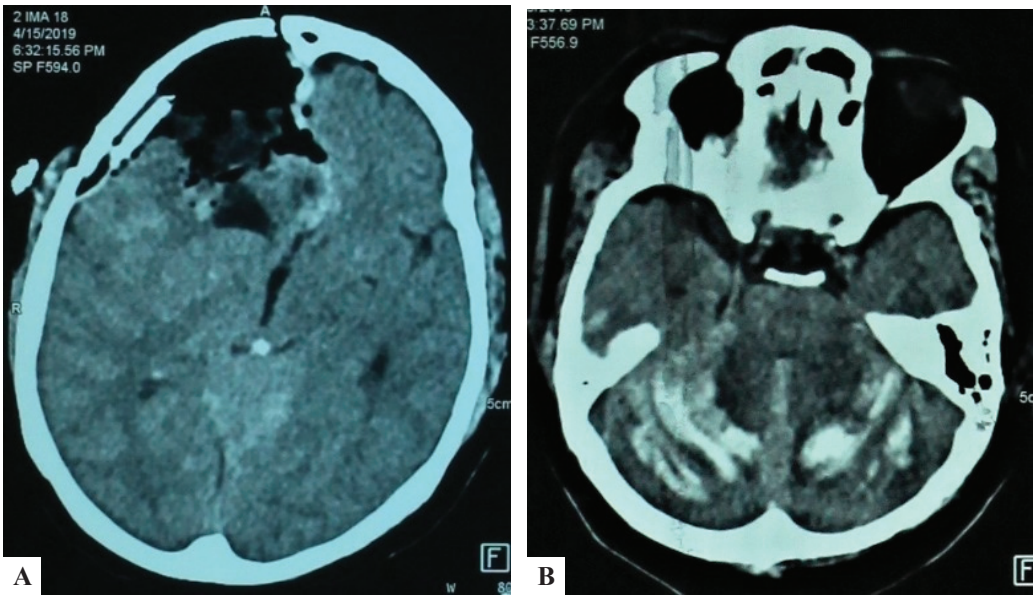

Figure 2: Immediate post-operative CT scan (A) no hematoma in operative site, no hydrocephalus (B)bilateral cerebellar hemorrhage with classical "Zebra sign"

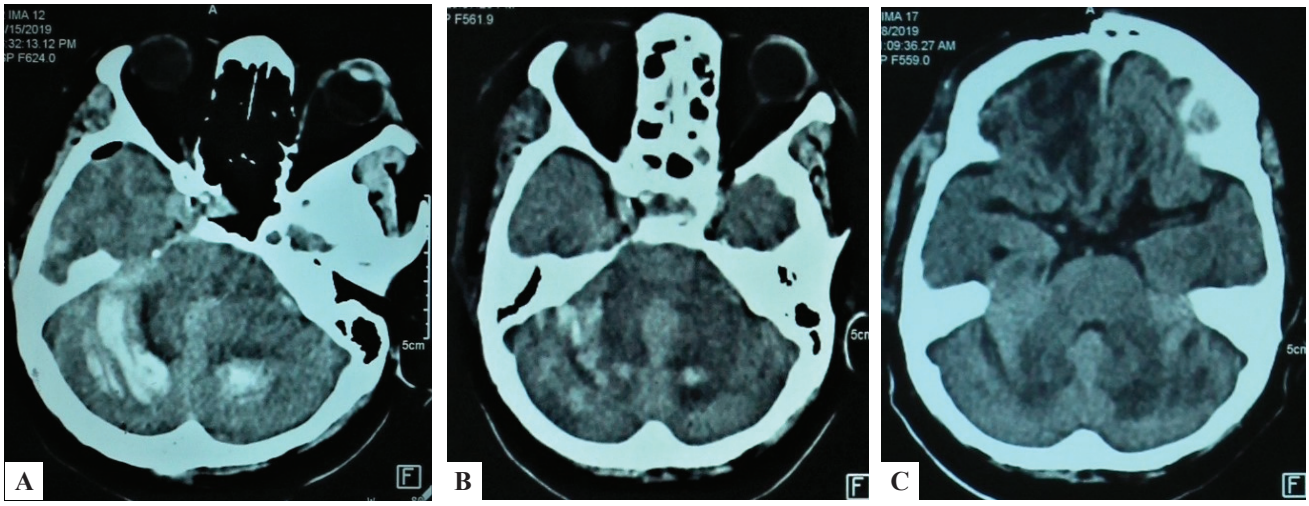

Figure 3: Serial follow up post-operative CT scans showing resolution of RCH on 3rd day (A), 5th day (B) and at discharge(C)

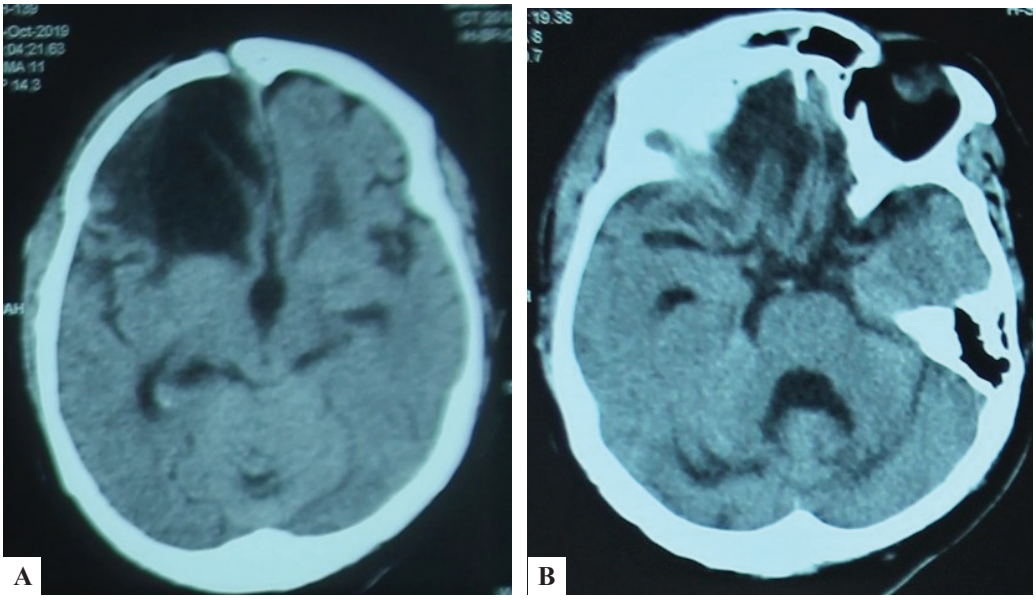

Figure 4: Follow up CT scan at 6 months showing resolution of RCH and gliotic changes over operative site

Discussion

A remote site hemorrhage (RSH) is an intracranial bleeding that occurs in a location away from the primary site of operation which can occur both in supratentorial region, infratentorial region, or even in both regions simultaneously.[4] Various known risk factors are coagulopathies and anticoagulant therapy, alcohol abuse and vasculopathies.[5,6,7] Remote cerebellar hemorrhage after supratentorial surgery is a known but very rare complication with an incidence ranging from 0.08% to 0.6%.[4,8] Not only after supratentorial surgeries, this complication has also been reported after spinal procedures.[9,10]

Though the precise pathogenesis of RSH is unknown, CSF hypovolemia due to over drainage seen during decompression has been put forward as the theory of RSH. Bridging veins of the posterior fossa are transiently occluded by caudal displacement of cerebellum which leads to venous engorgement and consequently results in hemorrhagic venous infarction.[11]

Konig et al[12] and Yoshida et al[13] proposed that RCH is also related to the postoperative amount of CSF drainage. Negative suction used postoperatively may over drain CSF leading to downward displacement of the cerebellum, causing tearing of the superior cerebellar vein and tributaries.

In this case, removal of large tumor could cause a rapid decrease in intracranial pressure leading to compensatory acute engorgement of venous sinus and supra-cerebellar bridging veins resulting in cerebellar hemorrhagic venous infarction.[14]

There is no standard management guidelines or protocol regarding RCH. Most cases are asymptomatic or exhibit a benign course, however it can lead to major morbidity[11] and even death if failed to recognize on time.[15] Bishokarma et al reported case fatality after surgery for craniopharyngioma due to RCH.[16]

Site and size of the bleed have an important prognostic value. If hemorrhage is large enough with significant mass effect, obstructive hydrocephalus, surgical intervention might be beneficial.[15] Smaller bleeds with little or no mass effect, however, seems to be self-limiting and does not require any intervention. Close monitoring in intensive care unit and follow-up CT scan is helpful in assessing the natural evolution of the bleed.[2]

Conclusion

Though rare, RCH after any supratentorial craniotomies is possible. We would like to stress the possibility of RCH after removal of a supratentorial tumor even without excessive loss of CSF, especially in cases with a large tumor. Precautions like over drainage of CSF, opening of ventricle intraoperatively, gradual decompression to maintain intracranial pressure could prevent from this complication. Although it is reported as benign or self-limited, RCH could be a significant cause of morbidity and mortality if failed to take proper measures both pre and post operatively.

Conflict of Interest: None
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