

CASE REPORT

Postoperative cerebellar hemorrhage after frontal lobe surgery

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INTRODUCTION

Remote cerebellar hemorrhage (RCH) is very unique in that it can occur after surgery on a distant area of the brain and could also happen after surgeries not relating to the brain. It is an uncommon phenomenon and the pathogenesis is still unclear. This report discusses our first case of such an incidence in our neurosurgical unit along with a short review of the literature.

CASE REPORT

A 41-year old male was presented to the Emergency Department as a case of generalized tonic clonic seizure. The Glasgow Coma Score (GCS) was 15/15 with minimal right side weakness (4.5/5). Imaging of the brain showed a large (5.0 × 4.5 × 4 cm) intra-axial left frontal tumor with extension in the frontal horn of the ventricle and with mild degree of surrounding edema. No anomalies were identified in the posterior fossa (Figure 1).

Preoperatively, full history and examination were of a rather healthy male of no comorbidities and all of the investigations including the coagulation profile were within normal values.

For the surgery, the patient was in supine position, head turned 30 degrees to the right without jugular compression. A standard left frontal basal craniotomy was developed and the tumor completely excised under neuro-navigation and using microsurgical technique and the ultrasonic aspirator for tumor removal. The frontal horn of the ventricle was opened to remove the intra-ventricular extension of the tumor and cerebrospinal fluid (CSF) leakage occurred which was expected in the circumstances. The postoperative histopathological finding was of grade III oligodendroglioma.

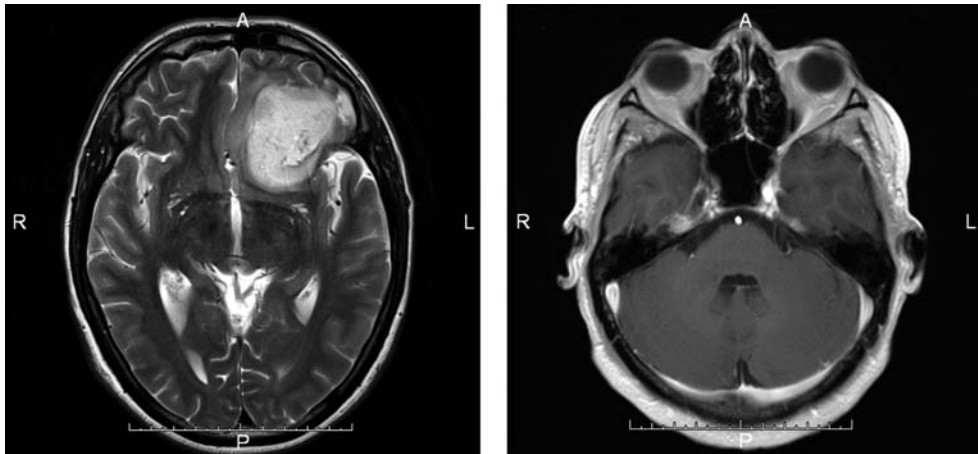


Figure 1. Left: MRI T2 weighted axial image showing the left frontal tumor. Right: MRI T1 weighted with gadolinium image showing a normal posterior fossa.

After an uneventful surgery and anesthesia and while the patient was in the post-anesthesia care unit, he developed a generalized tonic clonic seizure, the GCS dropped to 10/15 and the pupillary reaction was brisk to light and equal. A second attack of seizure required elective intubation and ventilation. No major hemodynamic changes recorded by the Post Anesthesia Care Unit (PACU) i.e. hypertensive or hypotensive episodes during and post the seizure attacks. An immediate CT head (Figure 2) showed no supratentorial complications but to our surprise there was an incidental finding of irregular hemorrhagic foci in the cerebellar hemispheres bilaterally with parenchymal extension to cerebellar foli. Another CT head including CT angiography six hours later confirmed the same findings that of the first one with no further changes. This CT was also unremarkable for any vascular abnormality in the posterior circulation.

The patient was admitted to the Surgical Intensive Care Unit (SICU) for ventilatory support, further care and investigation. All of the investigation was repeated in the SICU (as per their protocol) and did not show any

significant deviation of normal values including coagulation profile and platelets count.

No surgical intervention was suggested. Weaning of the ventilator concluded 48 h later, the GCS was 15/15 and the patient was transferred to the high dependency unit for further care. The patient made a full recovery and the neurological examination was unremarkable at discharge 10 days after the surgery. Especially, no deficit was identified secondary to the cerebellar hemorrhage. A CT head performed the day prior to discharge showed a normal postoperative status in the frontal lobe and almost complete resolution of the cerebellar hemorrhage (Figure 3)

DISCUSSION

Such RCH was first described in 1981. The incidence of cerebellar hemorrhage after supratentorial craniotomy is in the range of 0.6–4.9%.^{1–6} Hemorrhage is often characterized by a typical, streaky bleeding pattern due to blood spreading in the upper cerebellar vermis and

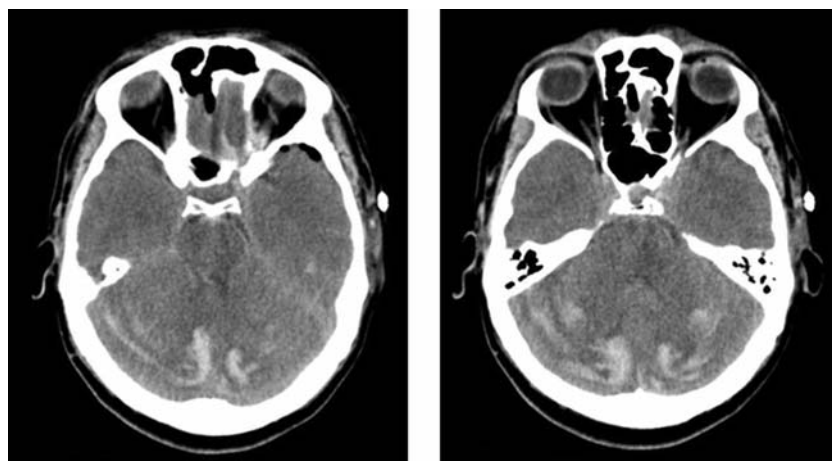


Figure 2. Immediate postoperative and post seizures CT head without contrast showing bilateral hemorrhagic foci in the posterior fossa remote from the surgical site.

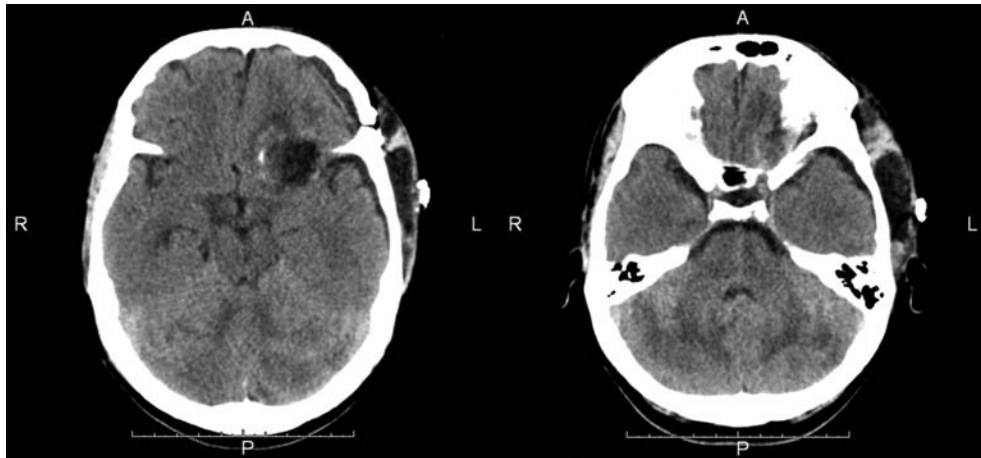


Figure 3. Left: Normal postoperative changes in the left frontal lobe. Right: Spontaneous resolution of the cerebellar hemorrhage.

foliae, radiologically called "Zebra sign".¹ This is exactly what our patient presented.

Theoretically, the most probable reasons behind RCH could be the following:

1. Venous rupture when the supratentorial mass was excised and the intracranial pressure falls.
2. Tearing of superior vermician veins due to the mechanical shifting of the cerebellum which results from intraoperative and or postoperative CSF withdrawal.
3. Transtentorial pressure gradient between the supratentorial and infratentorial venous system due to withdrawal of CSF.

From the above possible causes we can see that the common denominator is a simple mechanical pressure gradient change due to a CSF leakage or massive drain as the cause lies behind the hemorrhage⁵ and it is argued that the origin of bleeding is venous and not arterial. Our case had significant intraoperative CSF leakage secondary to the necessary opening of the ventricle and a large frontal mass was excised. In this particular case, we think that both CSF leakage and excision of a large mass together probably explain the RCH discovered in the immediate post operative period.

RCH has been reported after spine surgery⁷ and after excision of a Pancoast tumor with the development of tension pneumocephalus.⁸ In the last two reports the dura was torn during the procedure which indicates CSF leakage.

Patients with RCH are frequently asymptomatic and sometimes the hemorrhage may be discovered incidentally with no need for any further intervention³ or may range from headache to severe deterioration of conscious level, motor deficit to even delay emergence from anesthesia. Generally, these symptoms would emerge within 48 h after surgery. The scarcity and possible under reporting of such a condition and its symptoms, that may mimic other medical conditions, has led to great confusion in the early diagnosis.

The outcome has been found good in 50% but there is a mortality of 10–15% depending on the volume of hemorrhage and early diagnosis and management of the case.¹ The general recommendations are of prophylactic measure: avoiding CSF leakage through mending dural tear, carefully watching ventricular drains, and the use of Valsalva maneuver to detect possible leakage are sound and recommended practices.

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