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Management of the Cerebellar Hematoma after Posterior Cranial Fossa Trauma: A Case Report and Literature Review

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ABSTRACT

Introduction: Traumatic cerebellar hematomas are also known as hemorrhagic contusions and are less frequent than those of non-traumatic origin. The anatomical complexity of this area can be incalculable or disastrous; they can be isolated hemorrhages, solitary, or associated with a subdural hematoma. Cerebellar hematomas can be acute or delayed, the latter sometimes being termed a delayed traumatic intracerebellar hematoma.

Case Description: A 76-year-old woman presented to the emergency department several hours after being found unconscious. On initial examination, she had an occipital abrasion without fracture. Her Glasgow Coma Scale (GCS) score was 7 (E4, V4, M6), with asymmetrical but reactive pupils suggestive of focal neurologic deficits. During her physical examination show, Motor strength was 3/5 to the left, and there were no cranial nerve impairments. a CT scan was done, and we observe a left cortical stroke with hemorrhage and right hemiparesis (motor strength 4/5).

Conclusion: After performing a suboccipital craniotomy with the aim of evacuating the hematoma from the posterior cranial fossa that compressed the cerebellar anatomical structures, which previously caused the right hemiparesis, an emergency confirmation and treatment were greatly facilitated by CT imaging, underscoring its importance in managing posterior fossa trauma.

Keyword: Case report, trauma of posterior fossa, subdural hematoma, hemiparesia, computed tomography

1. Introduction

Traumatic cerebellar hematomas are also known as hemorrhagic contusions and are less frequent than those of non-traumatic origin. The anatomical complexity of this area can be incalculable or disastrous; they can be isolated hemorrhages, solitary, or associated with a subdural hematoma. Cerebellar hematomas can be acute or delayed, the latter sometimes being termed a delayed traumatic intracerebellar hematoma [1].

Despite being rare, posterior fossa traumatic hematomas are known for their significant morbidity and mortality as well as their irregular frequency. These instances can occasionally coexist with spontaneous hematomas associated with hypertension. Because of the posterior cranial fossa's limited anatomical space,

even small volumetric changes can raise intracranial pressure and cause cerebral and cerebellar herniation, which raises the risk.Traumatic hematomas in the posterior fossa have an incidence of 3.7% among intracranial hematomas and make up fewer than 1% of head trauma cases [2,3]

Although traumatic epidural hematomas (EDHs) in the posterior cerebral fossa are extremely uncommon, they have a greater death rate than those in the supratentorial areas. Patients who were in a coma at the time of the trauma and those who had mild to severe trauma at admission are the two groups into which acute subdural hematomas in this region can be divided [4].

Recovery is feasible for patients with a Glasgow Coma Scale (GCS) score of 8 or above, although the prognosis for comatose patients exhibiting evidence of a mass effect in the posterior fossa is typically poor. Surgical excision can be required for hematomas less than 1 cm [5].

2. Case Presentation

A 76-year-old woman arrived at the emergency room a few hours after she was discovered unresponsive. She had an occipital abrasion without a fracture at the time of initial assessment. She scored 7 on the Glasgow Coma Scale (GCS) (E4, V4, M6), and her reactive but asymmetrical pupils suggested localized neurologic abnormalities. Her physical examination revealed no cranial nerve abnormalities and a motor strength of 3/5 to the left. After a CT scan, we found evidence of a left cerebral stroke, right hemiparesis (motor strength 4/5), and bleeding. Previous medical history consisted of: Type 2 diabetes that is insulin-dependent (HbA1c goal <7.5%) Proliferative retinopathy in diabetics severe, partially managed, long-lasting mixed-course bronchial asthma. With ventricular bleeding and a localized subarachnoid hemorrhage, the patient was diagnosed with a hemorrhagic stroke that affected both cerebellar hemispheres in the posterior cranial fossa. The patient had a suboccipital craniotomy to remove the cerebellar hematoma in the posterior cerebral fossa following an emergency neurosurgical consultation.After a week, the patient's condition stabilized and she presented with a reebliding. A possible reintervention was decided to remove the cerebellar hemorrage on the posterior fossa but t was pushing the cerebellopontine angles structures, but the after the all effots for the patient, the patients passed away a Figure 1.

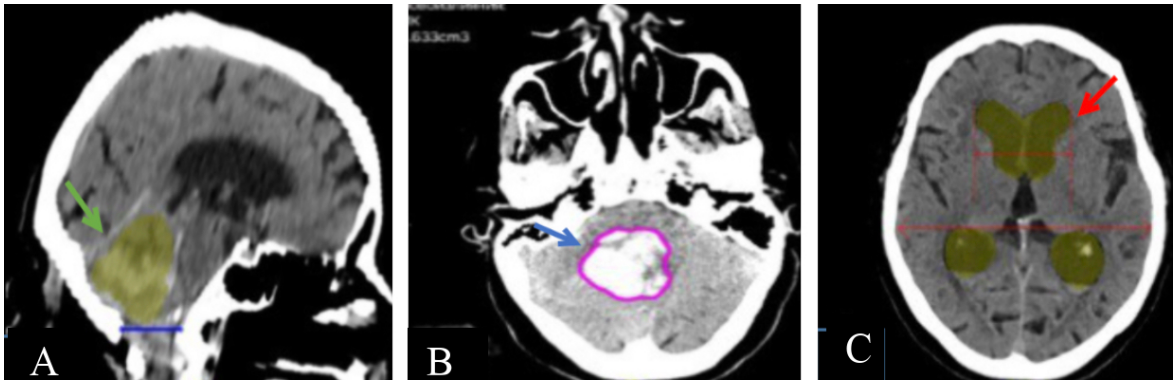

Figure 1. (a) Sagital preoperative imaging acumulation of the hematoma of the posterior cranial fossa at the level of the cerebellumpontino angle; (b) occipital hematoma wirh 40 ml of hematoma; (c) There is an extention of the third and fourth ventricles with probable accumulation of CSF in the posterior horns of the lateral ventricle, with periventricular and focal leukoaraiosis, and the cisterns at the base of the brain are moderately dilated.

3. Discussion

The most common types of hemorrhages after lesions or traumas to the posterior fossa include subarachnoid, parenchymal, and subdural. These include minor lesions in the posterior fossa and/or supratentorial lesions in the posterior fossa, depending on whether the damage is type I or type II. Type III or isolated lesions in the posterior fossa are the clinical lesions with the worst prognosis. Cooper, et al [6]. Since there is almost always an abrupt decline in consciousness and, consequently, mortality from compression of the anatomical brain stem, the majority of hematomas, whether subdural or epidural, of the posterior fossa and extracranial hematomas are classified as neurosurgical emergencies. Considering that a suboccipital craniotomy is currently a fully recognized technique for the evacuation of a posterior cerebral fossa hematoma. To prevent the negative effects of aspirin, patients can be operated on while receiving a platelet solution. The hematoma in this instance spreads to the pontocerebellar area. The mastoid region was reached by performing

the lengthy suboccipital craniotomy. Our method prevented any kind of neurological damage, particularly to the seventh and eighth cranial nerves, and the hematoma was evacuated. Gulsen et al [7]. Suboccipital decompression is a common treatment for hematomas linked to conditions that impact the mass effect of the posterior cranial fossa region or increased intracranial pressure. noting that a number of dural closure surgical procedures are available with the goal of safe and efficient decompression according to Vychopen and Foster et al [8, 9]. Whether extracranial, subdural, or epidural, posterior fossa hematomas are usually regarded as neurosurgical emergencies. These situations frequently involve a fast decline in consciousness brought on by brainstem compression, which, if left untreated, can swiftly turn lethal. Suboccipital craniotomy is the common surgical technique for hematoma evacuation in the posterior fossa, and it is highly acclaimed for its efficacy. Gulsend, Veman and Zemel. et al [7,10,12]

A lengthy suboccipital craniotomy toward the mastoid region may be required if the hematoma spreads to the pontocerebellar region. The goal of the surgical procedure was to safely remove the hematoma while protecting vital organs like the seventh and eighth cranial nerves. The usual treatment for posterior fossa hematomas is suboccipital decompression, particularly when there is high intracranial pressure. Diverse dural closure procedures are designed to guarantee secure and efficient decompression.Given that the brain stem's tissues are located in the posterior cerebral fossa, the majority of surgeons concur that surgical intervention should begin right once if an epidural hematoma is evacuated from this area. Acording to Vychopen, Gedekar and Saad et al [8,11,13]. Table 1, Figure 2.

Table 1. Research of patients with trauma to the posterior cranial fossa, caused by different pathologies, and the volume of hematoma in the most frequent anatomical structures of the cerebellar hemisphere.

No.	Authors	Year	Study	No. patients	Cause	volume	Location	P=value
1	Singh R. et al. [1]	2020	Retrospective	23	Traumatic (PFH)	7-11ml	Cerebellar Hemispheric	0.0008
2	Bhardwaj S. et al. [2].	2019	Case Series	21	Traumatic	1-16.8	Hemispheric Or Midline	N/A
3	Takeuchi S. et al. [3].	2013	Retrospective	41	Traumatic Fractures	N/A	Intracerebellar Hematomas	N/A
4	Karasu A. ET AL. [4].	2008	Retrospective	65	Traumatic EDHs	N/A	(PCF)	N/A
5	d'Avella D. et al. [5].	2003	Retrospective	24	Traumatic Acute	<1 cm	(PCF) Mass effect	<0.05
6	Cooper J. et al. [6].	2024	Retospective	184	Traumatic	N/A	(PCF) Mass effect	N/A
7	Vychopen M. et al. [8].	2021	Retrospective	87	Traumatic Acute	341.4 ± 313.0 ml vs. 839.5 ± 508.2 ml	(PCF)	0.47
8	Foster A. et al. [9].	2023	Rerospective	30	Traumatic	2 mm to 29 mm	(PCF) Mass effect	N/A
9	Verma K. et al. [10].	2018	Retrospective	69	Traumatic	29.2 ml.	(PCF) Mass effect	N/A
10	Gedekar P. et al. [11].	2024	Prospective Study	51	Traumatic Extradural	<15 cm^3	(PCF) Mass effect	0.001

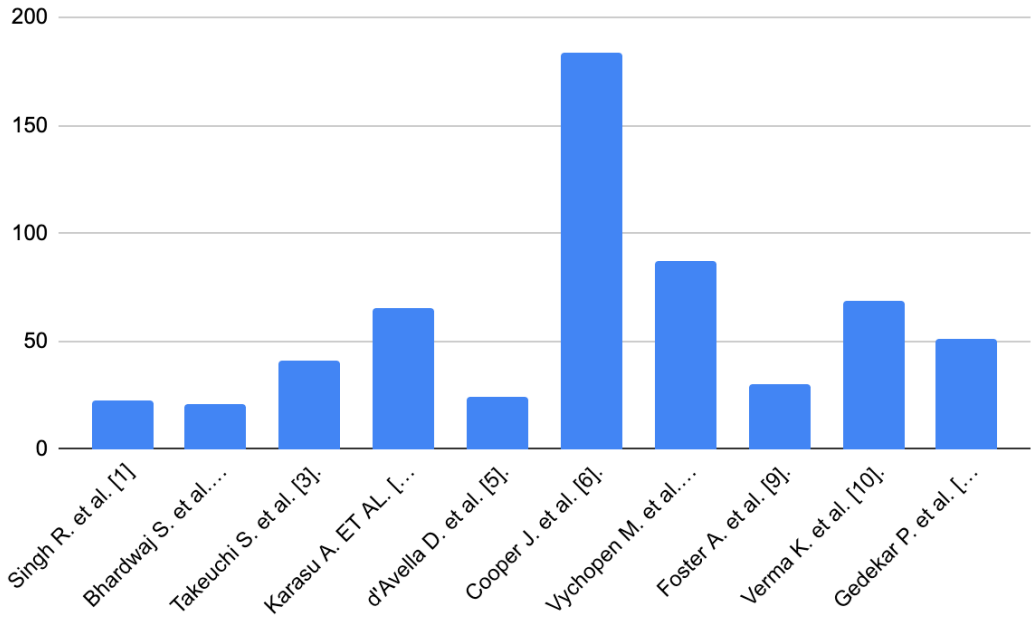

Figure 2. Graphics of comparative studies of patients with posterior cranial fossa trauma, and the surgical management to be taken into account for their emergency.

4. Surgical Approach

The patient was positioned in the prone position with their head fixed in a Mayfield clamp. A midline incision in the skin and aponeurosis was made along the projection of the nuchal line. The overlying muscles were retracted carefully with a surgical retractor to expose the occipital bone. A 3 × 3 cm portion of the occipital bone, to the right of the nuchal line, was removed starting from the first burr hole. Dural Findings and Opening and exposing in situ, the dura was tense and cyanotic with absent brain pulsations. It was followed by a 1.5-cm linear incision in the dura mater to expose the hematoma. The hematoma was evacuated with dense, dark cherry-colored clots intermingled with fresh blood using aspiration, saline irrigation, and gentle manipulation with spatulas. About 40 mL of hematoma was evacuated. Hemostasis, Further examination of the subdural space showed cerebellar cortex vessels as a source of bleeding. The bleeding was stopped using bipolar coagulation. After these manipulations, the brain got its original coloration and pulsation, and it no longer bulged in the trepanation site. Closure After hemostasis was verified, the dura mater was left open, and sialoplasty was performed with the aponeurosis of the occipital muscle. The wound was sutured in layers, and a single-lumen perforated drainage tube was left subaponeurotic.

Everything will depend on the volume of the content and the expansion or size of the hematoma in the accumulated blood clot, and according to the hematoma, if there is compression of the basal cisterns or mass effect on the contents of the 4th ventricle with or without the presence of associated hydrocephalus. According to Foster, Shen and Bobinski et al [9, 14, 15]. The use of MRI in acute extradural hematoma, which is located between the dura mater and the internal cranial bone. with a line between the hematoma and the brain parenchyma, which is pathognomonic of extradural content. According Kurisu et al [16]. CT is the choice for diagnosis but of short duration, which shows us the relationship of occipital fractures with hematomas of the posterior cranial fossa, allowing us to analyze and have access to possible supratentorial infections, such as hematomas present in this region. Which leads to a kind of commitment that compromises and compresses the brainstem, leading to a possible amygdaloid hernia or obstructive hydrocephalus. Early intervention promotes better results [17, 18, 19].

5. Conclusion

After performing a suboccipital craniotomy or simple keyhole, evacuating the cerebellar hematoma from the posterior cranial fossa after compressed the cerebellar anatomical structures, which previously caused the right hemiparesis, An emergency confirmation and treatment were greatly facilitated by CT imaging, underscoring its importance in managing posterior fossa trauma. Timely surgical intervention, such as decompressive resection craniotomy and hematoma evacuation, was essential to prevent fatal complications like brain edema and displacement. Our patient also developed hydrocephalus postoperatively; we complemented it with a VP shunt. The success of this case was enabled by the expertise of the surgical team and a multidisciplinary approach, ensuring precise and timely actions to address both immediate and long-term challenges.

Prompt recognition and treatment resulted in an acceptable outcome, but the patient was recovering well post-surgery and intensive care management, but during follow-up, the patient suffered an event, presenting a pulmonary thromboembolism, and succumbed due to cardiorespiratory arrest.

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Conflict of Interest

The authors declare that there is no competing interest in this research.

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