CASE REPORT

Traumatic orbital CSF leak

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SUMMARY

Compared to the cerebrospinal fluid (CSF) leak through the nose and ear, the orbital CSF leak is a rare and underreported condition following head trauma. We present the case of a 49-year-old woman with oedematous eyelid swelling and ecchymosis after a seemingly trivial fall onto the right orbit. Apart from the above, she was clinically unremarkable. The CT scan revealed a minimally displaced fracture of the orbital roof with no emphysema or intracranial bleeding. The fractured orbital roof in combination with the oedematous eyelid swelling raised the suspicion for orbital CSF leak. The MRI of the neurocranium demonstrated a small-sized CSF fistula extending from the anterior cranial fossa to the right orbit. The patient was treated conservatively and the lid swelling resolved completely after 5 days. Although rare, orbital CSF leak needs to be included in the differential diagnosis of periorbital swelling following orbital trauma.

BACKGROUND

I saw this interesting patient in our outpatient clinic. She had a seemingly trivial fall in her bathroom and hit her orbital region against the sink. There was no loss of consciousness. She came with a massive lid swelling, but there was no emphysema present. As there was also no emphysema on the CT, suspicion was raised for orbital cerebrospinal fluid (CSF) leak. To avoid the risk of meningitis, we did not aspirate the orbital fluid for β 2-transferrin Tests. The MRI confirmed the CSF leak, which was treated conservatively.

Clinicians frequently associate periorbital swelling with bleeding and/or emphysema. This brief report demonstrates that cerebrospinal fluid can cause periorbital swelling and lid oedema following orbital trauma.

Although rare, traumatic orbital CSF leak needs to be included in the differential diagnosis of orbital trauma.

CASE PRESENTATION

A 49-year-old woman was referred 1 day after falling in her bathroom and hitting her right orbit against the washbasin. There was no loss of consciousness. On examination, there was a massive oedematous eyelid swelling and periorbital ecchymosis (figure 1). The eye motility was not restricted and there was no diplopia present. A native CT scan of the neurocranium and viscerocranium revealed a minimally displaced fracture of the orbital roof requiring no surgical repair (figure 2). There was no intracranial bleeding and no emphysema in the periorbital soft tissues (figure 3). The massive oedematous swelling of the upper eyelid

Figure 1 Demonstrating the clinical picture of the patient after right orbital trauma with oedematous eyelid swelling and ecchymosis.

could not be explained either clinically or on the CT scan. Hence, suspicion was raised for orbital cerebrospinal fluid (CSF) leak. To minimise the risk of infection, the orbital fluid collection was not aspirated for biochemical analysis. A T2-weighted three-dimensional MRI of the neurocranium was performed that confirmed the diagnosis of

Figure 2 The axial plane of the CT scan demonstrating the orbital roof fracture (arrow).

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Figure 3 The axial plane of the CT scan demonstrating the periorbital soft tissue swelling. Notice there is no emphysema.

traumatic orbital CSF leak (figure 4). The small sized orbital CSF fistula did not require neurosurgical closure. The patient was treated with prophylactic intravenous antibiotics and the CSF leak subsided completely after 5 days of bed rest.

DISCUSSION

CSF leak was first described by Galen as a periodic release of fluid into the nose via the sella and ethmoid regions.^{1 2} The middle and anterior cranial fossa are well-known sites, where a CSF fistula (otorrhea/rhinorrhea) can develop following head trauma.¹ Compared to the above, the traumatic orbital CSF leak is a rare and under-reported condition.^{1–4} The diagnosis of orbital CSF leak can be demanding if there is an exclusively internal communication between the cranial vault and the orbit with no external CSF leakage. The external CSF leakage from the orbit may mimic tear formation (epiphora), and hence this condition was named oculorrhea.^{3 5} In cases with no external CSF leakage, the periorbital soft tissue swelling following orbital trauma is frequently held for haematoma and/or emphysema. Thus, the orbital CSF leak may frequently remain undiagnosed. According to a recent systematic review, just 22 cases of traumatic orbital CSF leak have been reported in the English literature.¹ However, recognition of CSF leak is important to avoid persistent CSF leakage, meningitis and abscess formation.^{1–6} The external CSF leakage from the orbit can cause intracranial

Figure 4 The T2-weighted three-dimensional MRI of the neurocranium demonstrates the orbital CSF leak extending superiorly to orbital fat tissues (arrow). The MRI was performed 2 days after the trauma.

hypotension.¹ Furthermore, late meningitis 3 years after trauma and personality changes have been reported as a consequence of orbital CSF leak.¹ In the majority of cases, the onset of orbital CSF leakage is reported to be within the first 48 h following trauma, and delayed onset reportedly occurred 5–14 days after orbital injury.^{1 5} In cases with no external leakage, the persistent CSF leak presented as a periorbital soft tissue swelling and cyst formation.¹ Biochemical analysis of the epiphora for Glucose or β 2-transferrin can be performed if there is suspected orbital CSF leakage.^{1 7} The orbital CSF leak can be detected and visualised by available imaging techniques such as cisternography.² As presented in this case report, a non-invasive technique for detection of CSF leak is MRI.⁸ For preoperative planning and accurate localisation of the CSF leakage and fractured fragments, the MRI and CT images can be superimposed.⁹ Overall, there is sparse data available on the management of traumatic orbital CSF leak. Conservative management is warranted in many cases of orbital CSF leak.¹ The decision for surgical closure of the dural/arachnoidal defect depends on the severity of the leakage and response to the initial conservative treatment.¹ This case report aims to sensitise the clinician to the potential presence of orbital CSF leak, which needs to be included in the differential diagnosis of periorbital swelling following orbital trauma.

Learning points

- ▶ Orbital cerebrospinal fluid (CSF) leak needs to be included in the differential diagnosis of periorbital swelling following orbital trauma.
- ▶ The orbital CSF leak can be detected by MRI.
- ▶ The management of the traumatic orbital CSF leak depends on the size and response to conservative treatment.

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Competing interests None.

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