WHAT'S YOUR DIAGNOSIS?

FACIAL BRUISING AND ALTERED MENTAL STATUS AFTER A FALL

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A pediatric patient with this presentation had normal vital signs and no other indications of serious trauma. Can you guess what these signs suggest?

A three-year-old boy, with an unremarkable medical history, was brought to the U.S. Army Hospital at Bagram, Afghanistan after he had fallen approximately 8 ft from the roof of his home. Upon admission, he was placed in a cervical collar and was immobilized on a spine board.

Physical examination revealed facial bruising predominately around the left eye and left retroauricular area (Figure 1). His pupils were equal in size and reactive to light.

His vital signs were stable, with normal respirations. His Glascow Coma Scale (GCS) score was 10 (inappropriate speech, eye opening upon verbal stimulation, and withdrawal from painful stimuli) (Table). The remainder of the examination was unremarkable, with no other signs of serious trauma.

What's your diagnosis?

OUR DIAGNOSIS

Suspecting a basilar skull fracture, we performed a computed tomography (CT) scan of the brain. The CT revealed a fracture in the orbital roof portion of the left frontal bone, with probable extension into the sphenoid (Figure 2).

The patient responded well to supportive care. Within about 48 hours, he was alert enough to receive oral nutrition. He recovered fully with no observed neurologic sequelae after seven days (Figure 3).

ABOUT THE CONDITION

Altered mental status following a fall should alert clinicians to the possibility of an intracranial abnormality. Periorbital ecchymosis (sometimes called "raccoon eyes") and retroauricular ecchymosis (also know as Battle's sign) specifically suggest a basilar skull fracture. In most cases, this fracture occurs at the temporal bone, leading to such common signs as cerebrospinal fluid (CSF) rhinorrhea and otorrhea, hemotympanum, and pneumocephalus. Additionally, because basilar fractures can compress the cranial nerves that pass through the basal foramina, the patient may display facial paralysis, hearing loss, nystagmus, and other neurologic symptoms.

The case presented here, however, underscores the fact that basilar skull fracture should not be excluded from the differential diagnosis of a patient with altered mental status and facial bruising after a fall—even when vital signs are nor-

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Figure 1. Photograph of the patient showing periorbital and retroauricular ecchymosis.

mal and other neurologic abnormalities are absent. Although it's typically caused by substantial impact forces, basilar skull fracture is not always associated with severe underlying brain injury.

Nevertheless, there is the possibility of other significant trauma associated with this type of skull fracture, and as such, patients should be immobilized on a spinal board with a cervical collar until thoroughly assessed for other injuries. Initial treatment should focus on maintaining ventilatory stability, avoiding hypotension, and preventing hypothermia.

Because sedation interferes with neurologic examination and subsequent treatment, it should be avoided if not clinically indicated. Reserve intubation for patients who meet established clinical criteria, which include a GCS score of 8 or less, hypoxia, hypercapnia, spontaneous hyperventilation, apnea, or loss of gag reflex.[2] Nasopharyngeal intubation is contraindicated in patients with a suspected basilar skull fracture, as insertion risks inadvertent placement of the tube into the cranial cavity. This could further disrupt the skull base and possibly introduce bacteria into the skull. If ventilatory support is required, tracheostomy or orotracheal intubation is preferred.

If a dural tear occurs secondary to a basilar skull fracture, infection also may be introduced into the cranium through direct spread of organisms from the nasopharynx, nasal or mastoid sinuses, or the external auditory canal. Because the time to possible development of meningitis is highly variable, however, antibiotic prophylaxis is not recommended in patients with basilar skull fractures resulting from nonpenetrating head trauma, with or without CSF leakage.[3]

Managing basilar skull fracture

Patients with basilar skull fractures typically are managed conservatively with neurosurgical consultation. Supportive care should

Table. Glascow Coma Scale (GCS)*,[1]

Assigned value	Motor response		Verbal response		Eye opening response†
	Adults and verbal children	Infants and preverbal children	Adults and verbal children	Infants and preverbal children	
6	Obeys commands	Spontaneous			
5	Localizes	Purposeful/localizes	Oriented	Coos, babbles	
4	Withdraws	Withdraws	Confused	Irritable, cries	Spontaneous
3	Flexor posturing	Flexor posturing	Inappropriate words	Cries to pain	To voice
2	Extensor posturing	Extensor posturing	Incomprehensible sounds	Moans to pain	To pain
1	None/flaccid	None/flaccid	None	None	None

Table adapted from: *Pediatric Clinics of North America,* Vol. 51, Dias MS, Traumatic brain and spinal cord injury, Pages 271–303, Copyright 2004, with permission from Elsevier. *The patient is assigned a number value from 1 to 6 for each of the three categories (motor, verbal, and eye opening). Combined, these values give the GCS score, which ranges from 3 to 15 points. Scores of 13 to 15 are defined as mild, 9 to 12 as moderate, and 3 to 8 as severe head injuries.[1] †Same for adults/verbal children and infants/preverbal children.

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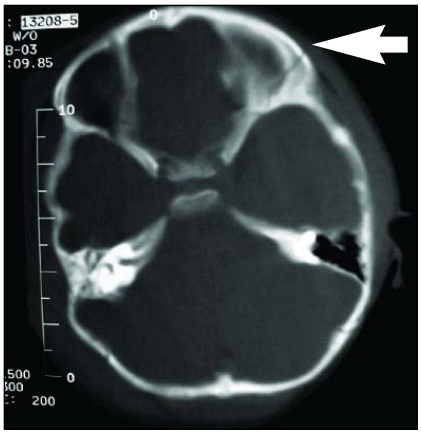

Figure 2. Computed tomography scan of the brain, showing a fracture in the orbital roof portion of the left frontal bone, with probable extension into the sphenoid.

include intravenous hydration and nutritional supplementation until the patient's neurologic status has improved to the point of tolerating oral intake. Patients may benefit from positioning the head of the bed at an elevation of 20° to 30° to facilitate adequate cerebral venous and CSF drainage.[2]

CSF rhinorrhea stops spontaneously in nearly all cases, and CSF otorrhea stops in 85% of cases.[4] Persistent CSF leakage, which can cause meningitis, may be treated successfully with CSF diversion through serial lumbar punctures, continuous lumbar drainage, or external ventricular drainage. Direct surgical repair generally is reserved for cases in which either CSF leaks have persisted beyond one to two weeks despite CSF diversion or the leaks have caused repeated episodes of meningitis.[1]

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Figure 3. The patient, fully recovered, after seven days.

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