

## Case 1: What is that in your mouth?

A nine-year-old girl presented with a four-day history of a growing mass under the right side of her tongue. The mass had been steadily increasing in size, but was not affecting her ability to swallow, speak, chew or breathe. The lesion was not tender or painful. It was light blue in colour. The patient had previously been well and had not experienced any recent nausea, vomiting, fever or weight loss. She had no history of oral trauma.

On examination, the patient appeared well. The mass was approximately 6 cm long and 3 cm wide, fluid-filled, fluctuant, bluish-red in colour and nontender to palpation. It was located beneath the right side of the tongue and extended to the base of the mouth (Figure 1). The patient's oral cavity and palate appeared otherwise normal. No cervical lymphadenopathy was present, and the patient's neck was supple.



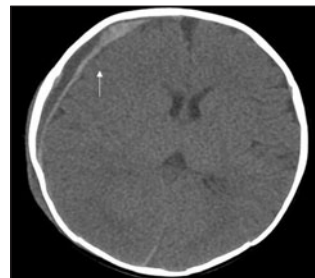
**Figure 1)** A 3 cm × 6 cm fluctuant, bluish-red, nontender mass located beneath the right side of the tongue

## Case 2: Seizures in a four-month-old infant

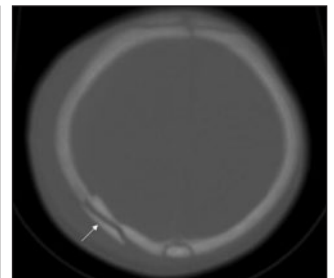
A four-month-old previously healthy boy was brought to the emergency department after an episode of left arm "shaking". His mother reported that she was at the grocery store earlier that day, carrying the patient, at which point she tripped over her three-year-old son. The patient fell out of her arms onto the floor on his left side. He did not lose consciousness and cried immediately. After arriving home, he fell asleep for approximately 2 h, and on awakening, his mother noted that he was "breathing funny" and "shaking his left arm". His mother called 911 immediately and the patient was taken to the emergency department.

On arrival in the emergency department, tonic clonic movements of the left arm were noted, which were successfully treated with rectal diazepam. Physical examination revealed vital signs as follows: temperature 37.2° C, respiratory rate 32 breaths/min, heart rate 120 beats/min, blood pressure 95/56 mmHg and oxygen saturated 99% in room air. He was awake but lethargic. He had a boggy area of edema over the left scalp and a 12 cm × 12 cm round, brownish-red bruise in the middle of the chest. His abdomen was soft and not distended. His pupils were reactive, and the rest of his cranial nerves were symmetrical. He had good tone and no clonus.

Initial laboratory results were as follows: white blood cell count  $23 \times 10^9/L$  (normal  $5 \times 10^9/L$  to  $19.5 \times 10^9/L$ ), hemoglobin 83 g/L (normal 97 g/L to 136 g/L), platelets  $200 \times 10^9/L$  (normal  $150 \times 10^9/L$  to  $450 \times 10^9/L$ ), prothrombin time 16.4 s (normal 11.5 s to 15.5 s) and partial thromboplastin time 40 s (normal 27.8 s to 42.5 s). A computed tomography (CT) scan (Figure 1) of the head was obtained and showed a subdural hematoma with areas of different attenuation, suggesting the presence of blood of differing ages. He had a comminuted fracture of the right parietal bone (Figure 2) and a parenchymal contusion. Because of the bruise on his chest, possible blood loss suggested by his low hemoglobin and other suspicious injuries, further investigations were done.



**Figure 1)** Subdural hemorrhage along the right frontal and temporal regions, which demonstrates difference in attenuation. Mild mass effect and midline shift is also present



**Figure 2)** Bone window showing evidence of a comminuted calvarial fracture involving the right parietal bone with overlapping fragments

### CASE 1 DIAGNOSIS: RANULA

Ranulas and mucocoeles are probably the most common disorders of the salivary glands. The development of a mucocoele is dependent on the disruption of flow from the secretory apparatus of the salivary glands. The majority are extravasation mucocoeles in which there is pooling of mucus in the connective tissue, presumably arising from trauma to a salivary duct. Less common are retention mucocoeles, resulting from ductal obstruction and retention of saliva within the ductal system. The two types of mucocoeles cannot be distinguished clinically. Ranulas are similar to mucocoeles, but involve the major salivary glands. There are two types of ranulas: oral and cervical. Oral ranulas result from pooling of mucus superior to the mylohyoid muscle, while cervical ranulas are caused by mucus extravasation along the fascial planes of the neck.

Mucocoeles have an estimated prevalence of 2.4 cases per 1000 persons. More than 70% of mucocoeles occur in those aged 20 years and younger, although they are rare in infants. Ranulas are less common (0.2 cases per 1000 persons) and tend to occur in children and young adults. The lateral aspect of the lower lip is the most common site for mucocoeles, but other common sites include the floor of the mouth and ventrum of the tongue. Ranulas typically present in the floor of the mouth. They usually arise from the sublingual gland (likely in the present case), but on the rare occasion, they may arise from the submandibular gland.

Mucocoeles and ranulas present as painless, asymptomatic swellings that have a relatively rapid onset and fluctuate in size. Deeper mucocoeles tend to take on a normal mucosal coloration, while those that lie more superficial appear bluish in colour. Ranulas are usually large, unilateral, translucent bluish masses. Both mucocoeles and ranulas may rapidly enlarge and then appear to involute because of rupture into the oral cavity or resorption of the extravasated mucus. The patient may relate a history of recent or remote trauma (eg, oral surgery) to the mouth or face, or the patient may have a habit of biting his or her lip. The duration of the lesion is usually three to six weeks. Infections are uncommon, and therefore symptoms of pain, tenderness, fever, associated adenopathy or significant dysphagia are seldom seen. Serious sequelae of any kind are rare, but large mucocoeles and ranulas can interfere with speech and cause mastication problems, or even breathing and swallowing difficulties because of upward and medial displacement of the tongue.

Mucocoeles and ranulas located beneath the tongue are often confused with other entities. The broad differential diagnosis can include hemangioma, lymphangioma, dermoid cyst, benign or malignant salivary gland neoplasm, lipoma, abscess, venous lake, fibroma or benign mesenchymal neoplasm. The diagnosis, as in the present case, is often a clinical one based on a typical history and appearance of the mass.

High-resolution ultrasound or sonography is useful when performed by experienced radiologists and can detect calculi, abscesses and cysts, and can even correctly assess up to 90% of benign versus malignant tumours. Vascular lesions can be demonstrated more clearly through the use of colour Doppler imaging. Computed tomography or magnetic resonance imaging are seldom necessary except in the case of a large or 'plunging' ranula, which may breach the mylohyoid muscle and present in the lateral aspect of the neck. Detailed imaging can define the extent of the lesion and may be critical for the planning of

surgery. Computed tomography and magnetic resonance imaging do not differentiate between benign and malignant processes. Ultimately, a biopsy may be required for this purpose.

The treatment of choice for both mucocoeles and ranulas is surgical excision of the lesion. Because the majority of mucocoeles are small, often less than 10 mm in diameter, complete excision with the associated glandular components is preferred. Recurrence of these lesions is uncommon if carefully excised. Treatment of the ranula requires complete surgical excision, usually including the affected salivary gland. Alternative treatments, including corticosteroid injection and cryotherapy, have also been reported. Aspiration and marsupialization have been advocated in the past; however, the rates of recurrence tend to be very high with these techniques. In the case of the present patient, her ranula persisted for two months after initially being assessed, and she is now awaiting surgical excision by the paediatric otolaryngologist.

### CLINICAL PEARLS

- Oral mucocoeles and ranulas result from disruption of flow from the salivary glands.
- Ranulas usually present as painless, translucent bluish masses in the floor of the mouth below the tongue, usually with no other associated symptoms or signs.
- Definitive treatment of a ranula consists of complete excision, usually involving the affected salivary gland.

### RECOMMENDED READING

1. Cawson RA, Binnie WH, Eveson JW. Salivary gland disease. In: *Colour Atlas of Oral Disease: Clinical and Pathological Correlations*, 2nd edn. London: Wolfe, 1993:14.
2. Greenberg MS. Salivary gland disease. In: Lynch MA, Brightman VJ, Greenberg MS, eds. *Burket's Oral Medicine: Diagnosis and Treatment*, 9th edn. Philadelphia: Lippincott, 1994:415-8.

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### CASE 2 DIAGNOSIS: NONACCIDENTAL TRAUMA

An abdominal CT scan (Figure 3) showed a large stellate liver laceration with a subcapsular hematoma. A skeletal survey revealed three healing rib fractures, as well as the parietal skull fracture. Ophthalmology confirmed no evidence of retinal



Figure 3) Large, stellate liver laceration extending anterolaterally from the region of the porta hepatis

hemorrhages. The child abuse team was consulted and determined that his injuries were consistent with nonaccidental trauma. At the time of surgical evacuation of the subdural hematoma, old and fresh blood was found. The liver laceration was treated conservatively without surgical intervention. Subsequent imaging showed a right cerebral infarct. At follow-up examination, significant neurodevelopmental impairment was evident.

In 2002, an estimated 896,000 children were victims of child abuse in the United States, including 1400 children who died as a result of the abuse. The highest rates were seen in children younger than three years, and more than 80% of victims were abused by one or both parents.

In a child who has evidence of trauma on examination, there may be clues that suggest that the injuries were nonaccidental. The physician must be alert to an unexplained injury, a mechanism offered by history that is not consistent with the injury, a changing or evolving history, a delay in seeking medical care, an inappropriate affect of the caregiver, crisis or stress in the family and, finally, a history of abuse in the childhood of the caregiver. Specific abusive episodes may be triggered by crying, colic, toilet accidents or parent-child conflicts. Children with chronic medical problems, including physical and behavioural handicaps, may be at higher risk of abuse or neglect.

A thorough physical examination is critical in a patient with suspected abuse. Growth parameters are important in the evaluation of medical neglect. The head should be examined for signs of trauma, such as abrasions, lacerations, swelling or depressions in the skull. The anterior fontanelle may give clues to the presence of intracranial pathology. A good fundoscopic examination is possible even without dilating the pupils, and one may see evidence of retinal or vitreous hemorrhages. An abusive caregiver may attempt to silence a crying infant by forcing a bottle or utensils into the child's mouth, resulting in a torn frenulum, dental trauma, or injury to the hard and soft palate or mucosal surfaces. A child who is being neglected may have severe dental decay or caries. Visible signs of injury, such as bruises, abrasions, burns or bite marks, are frequently evident and necessitate careful and thorough examination. As in the case of the present patient, any bruising in a nonambulatory child must result in careful assessment for nonaccidental injury. Bruises of the chest or abdomen require assessment for the presence of accompanying internal injuries. Careful attention should be paid to the chest for evidence of asymmetrical breath sounds, which would suggest a pneumothorax or hemothorax. Callus formation secondary to healing rib fractures may be identified by palpation of the chest wall. Abdominal injuries often present insidiously; the most common intentional injuries involve the liver and spleen. The genitalia and anus should also be examined for signs of trauma.

If the history and examination suggest the possibility of nonaccidental trauma, several key tests are indicated. A radiographic skeletal survey, which is recommended in all children younger than two years suspected of abuse, and a bone scan, if necessary, may identify old and new fractures. It is essential that this include separate views of each area imaged, typically 12 to 15 x-ray films. A 'babygram' (one or two x-rays of the

whole body of an infant) is not adequate to assess for nonaccidental fractures. A dilated eye examination performed by a trained ophthalmologist can confirm retinal hemorrhages. If intracranial trauma is suspected, a noncontrast CT scan of the head is the first-line image to obtain. Some experts recommend a head CT or magnetic resonance image in all children younger than six months with any evidence of abuse, and younger than one year with high-risk injuries (rib fracture, multiple fractures or facial injury). If abdominal pathology is suspected, a noncontrast CT scan of the abdomen is indicated. Laboratory tests include a complete blood count (which may reveal anemia secondary to blood loss, or, if the child has been neglected, nutritional deficiencies) and coagulation tests, where bleeding or bruising is evident or intracranial pathology is suspected. In evaluating a child for suspected abuse, it is important to rule out medical causes, such as hemophilia or hemorrhagic disease of the newborn in a child with intracranial hemorrhage, leukemia in a child with bruising, or osteopenia and collagen vascular diseases in a child with multiple fractures.

All cases of suspected child abuse or neglect must be immediately reported to local child welfare agencies, such as the Children's Aid Society. In many medical centres, there is a social worker available to assist with referrals.

### CLINICAL PEARLS

- For the child with suspicious injuries or a history concerning for abuse or neglect, a thorough workup is essential.
- The finding of one suspicious injury should prompt the investigation for others.
- Evaluation may include a complete blood count, prothrombin time, partial thromboplastin time, skeletal survey, fundoscopic examination, bone scan, head CT scan and abdominal CT scan, as well as other tests depending on the type of injury suspected.

### RECOMMENDED READING

1. Sidebotham P, Heron J; ALSPAC Study Team. Child maltreatment in the "children of the nineties": The role of the child. *Child Abuse Negl* 2003;27:337-52.
2. Sirotnak AP, Grigsby T, Krugman RD. Physical abuse of children. *Pediatr Rev* 2004;25:264-77.
3. Trokel M, DiScala C, Terrin NC, Sege RD. Blunt abdominal injury in the young pediatric patient: Child abuse and patient outcomes. *Child Maltreat* 2004;9:111-7.

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