Initial Management of Auricular Trauma

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The exposed and unprotected position of the auricle makes it susceptible to injuries. Because many of these injuries are initially managed in a primary care setting, family physicians should have an understanding of the management of auricular hematomas, lacerations, abrasions and thermal injuries. Auricular hematoma requires prompt drainage and pressure applied to the site for several days. Treatment of lacerations and abrasions includes meticulous cleaning and minimal debridement of viable tissue. Thermal injuries require recognition of the extent of injury. Prompt treatment of auricular injuries will help avoid aesthetic and functional complications.

The prominent, unprotected position of the auricle makes it susceptible to hematomas, lacerations, abrasions and thermal injuries. Both blunt and penetrating traumatic injuries to the auricle are common and can subsequently result in significant auricular deformity. The variety of auricular injuries calls for diverse approaches to the care of these injuries.1-4

Anatomy

The external landmarks of the ear are shown in Figure 1. The skin of the anterior surface of the ear is thin and tightly adherent to the cartilage, which is responsible for the shape of the pinna. The skin covering the posterior surface is thicker and more mobile. The cartilage extends to form the distal one-third of the external auditory canal.

The blood supply to the external ear is derived from branches of the external carotid artery, including the posterior auricular artery and the superficial temporal artery. Sensory innervation of the auricle consists of cervical and cranial nerves. Auricular branches of the glossopharyngeal nerve (cranial nerve IX), vagus nerve (cranial nerve X) and facial nerve (cranial nerve VII) are distributed throughout the concha, with branches of these nerves supplying the inferior and posterior walls of the external auditory canal and parts of the tympanic membrane. The auriculotemporal nerve from the mandibular division of the trigeminal nerve (cranial nerve V) innervates the anterior and superior canal wall and the anterior aspect of the tympanic membrane. The greater auricular nerve supplies the skin of the mastoid process and the medial aspect of the auricle.

Hematoma

Any blunt trauma to the auricle may result in a hematoma. The posterior surface of the auricle has a cushion of subcutaneous fat that dissipates direct force and allows the skin to slide over the underlying cartilage. The skin of the anterior surface is tightly adherent to the underlying perichondrium and cartilage. Thus, blunt force applied to the anterior surface of the auricle tends to shear the perichondrium from the underlying cartilage and tear the blood vessels within the perichondrium.5-8

Because the cartilage depends on the perichondrial blood vessels for nutrients and oxygen, any separation can result in necrosis or infection. In addition, a subperichondrial collection of blood often stimulates the overlying perichondrium, leading to the asymmetric formation of new cartilage and bowing of the auricular cartilage.9-11 The resulting deformed auricu-
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The pathogenesis of cauliflower ear was elucidated in 1972. Experiments revealed that a hematoma between the perichondrium and the underlying cartilage leads to new cartilage formation. This finding contradicts earlier theories that the deformity is caused by a subcutaneous or intracartilaginous hematoma, since such hematomas were shown to reabsorb without incident.

An auricular hematoma commonly presents as a moderately painful swelling that obscures the normal contours of the auricle (Figure 3). This swelling may occur immediately or several hours after blunt trauma. Hematomas that present 10 days or more after the trauma often involve organized fibrosis. Such late-stage hematomas require open otoplasty for debulking of newly formed cartilage and perichondrium and are beyond the scope of this article.

The goal of treatment of an auricular hematoma is to remove the fluid collection and maintain pressure in the area for several days to prevent reaccumulation of fluid. The involved areas of the pina are infiltrated with several milliliters of 1 percent lidocaine (Xylocaine) with epinephrine. Using sterile technique, the auricle is prepped and draped. A curvilinear incision is made in a suitable position that allows camouflage (i.e., between the helix and anthelix or at the base of the anthelix as it arises from the conchal bowl). The hematoma is then removed by gentle suctioning or curettage. Simple aspiration usually is not sufficient to allow removal of blood clots. Thus, if open drainage is not used, recurrence of the hematoma is common.

A dental roll is trimmed to fit over the undermined soft tissue and is held in place using through-and-through sutures connected to a similar bolster on the opposite side (Figure 4). Antibiotic ointment is then applied to the incision and suture site. The
patient is instructed to keep the dressing clean and dry. The ear should be examined again in 24 hours for adequate drainage. After one week, the bolster may be removed. Oral prophylactic antibiotics are generally reserved for immunocompromised patients or for those with systemic diseases (e.g., diabetes), and should cover *Staphylococcus aureus*, *Pseudomonas aeruginosa* and a variety of other gram-negative bacteria.\textsuperscript{6,11,15}

**Lacerations**

Lacerations of the auricle require meticulous closure with careful realignment to maintain the contour of the auricle. A thorough examination is required to determine the magnitude of injury. Before suture repair, the wound is infiltrated with 1 to 2 mL of 1 percent lidocaine with epinephrine and gently cleaned with normal saline irrigation. A sterile field is created around

![Diagram showing auricular hematoma with effacement of landmarks]
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FIGURE 4. Method of draining an auricular hematoma using dental rolls. Dental rolls are placed on both sides of the auricle and tied securely in place with nonabsorbable suture.

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the wound, which is then carefully explored with a sterile cotton swab or forceps to determine the extent of injury. Lacerations involving only the skin may be reapproximated with evertong nonabsorbable sutures. Lacerations involving all layers of the auricle require more extensive repair.

Laceration wounds involving all layers of the auricle are prepared in the same manner as that described above. Each of the layers—cartilage, perichondrium and skin—is carefully examined for necrosis. Necrotic tissue is sharply debrided, with attention to preserving as much tissue as possible. The cartilage is reapproximated and the perichondrium is sutured over the cartilage with a
small-gauge 5-0 or 6-0 absorbable suture. If possible, sutures through cartilage should be avoided. The skin is reaproximated as above. After repair, a pressure dressing is applied for 48 hours to minimize edema and prevent formation of a hematoma.

Complete or partial avulsion injuries require extensive repair, including grafting techniques, and are beyond the scope of this article. Consultation (otolaryngology, surgery, plastic surgery) should be obtained in such cases.

**Abrasions**

Frictional contact injury of the ear results in partial loss of the covering epidermis. The affected area may show punctate bleeding, formation of hemorrhagic blebs and even exposure of the underlying dermis or perichondrium.

The wound is thoroughly irrigated with normal saline. If there are any embedded foreign bodies, the injured area is infiltrated with 1 percent lidocaine and the foreign bodies are removed to prevent infection and “tattooing” of the wound. A topical antibiotic ointment or cream is applied to prevent surface contamination and attendant secondary infection. A protective contour dressing may be applied for the first 24 hours. The patient should be instructed to return promptly if pain, fever or swelling develops. Such symptoms usually signal the development of perichondritis, which requires immediate aggressive management. Superficial abrasions generally heal within two to three weeks.

**Thermal Injuries**

Injuries to the pinna from temperature extremes are common. The exposed position of the ear and its thin subcutaneous tissue make it susceptible to thermal injuries. In superficial frostbite injuries, the underlying tissue remains soft and pliable. In deep thermal injuries, the underlying tissue is very hard.

**FROSTBITE**

Appropriate treatment of frostbite may save tissue. The ear initially appears pale and firm. Upon rewarming, the ear may become painful, with edema and blister formation. The blisters that form should be allowed to reabsorb spontaneously. The ear should be aseptically and quickly warmed with gauze soaked in saline that has been warmed to 38° to 40°C (100.4° to 104.0°F). This process is painful and analgesics may be necessary during rewarming.

Accurate demarcation of viable and nonviable tissue may not be possible until several weeks later. Therefore, tissue should not be debrided upon rewarming. A topical antibiotic ointment should be applied, and further trauma to the ear should be avoided until the viability of tissue can be discerned.

**BURN INJURIES**

Factors that affect the healing of burn injuries include the depth of the burn, development of infection, external pressure or friction on the burned auricle. First-degree burns involve only the superficial layers of the epidermis and are characterized by dilation and congestion of intradermal vessels. The skin is diffusely erythematous, with blanching on pressure. Second-degree burns exhibit destruction of varying depths of epidermis, with coagulation necrosis. The skin is erythematous and painful and blisters and bullae may develop. Third-degree burns involve destruction of all skin elements with coagulation of the subdermal plexus. The wound appears dry, hard, inelastic and is painless. Deeper burns have a higher probability of cartilage involvement, with possible avascular necrosis, scarring and resultant infection.

Treatment of first-degree burns involves meticulous cleaning of the ear, avoidance of further trauma to the ear and application of topical antibiotic ointment. Second- and third-degree burns may require reconstruction and should be examined by a consulting specialist.
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REFERENCES
