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Auricle hematoma – clinical appearance and treatment strategy, followed by a case report

Krwiak małżowiny usznej – obraz kliniczny i strategia leczenia zilustrowane opisem przypadku

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KEYWORDS

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SUMMARY

Injuries of the outer ear are a relatively common reason requiring professional help and otolaryngological consultation. Hematomas of the auricle may occur due to a blunt trauma or a traction of the ear. Such traumas lead to the disruption of the blood vessels in the perichondrium and then blood accumulation between the perichondrium and the cartilage. Auricular hematomas can often be seen in people practicing martial arts or other contact sports. Physical examination reveals an irregular and disturbed contour of the auricle due to a distended lesion. The skin may have no change in color, but typically becomes red, flushed, or bruised. The swelling of the ear may be local or may cover the entire auricle and is usually accompanied by pain and paresthesia. Unfortunately, the hematoma cannot be absorbed on its own. If hematoma is left untreated or treated incorrectly, it may develop into so-called "cauliflower ear" caused by the cartilage destruction, followed by fibrocartilage overgrowth. Therefore, it is crucial to drain the auricular hematoma as soon as possible, to avoid necrosis of the cartilage and its deformation. Drainage procedure, if possible, is preferably performed in local anesthesia. The site and the extent of the incision depend on the location of the hematoma but are most often performed in a sub-helical fold or anti-helical fold (due to esthetical reasons). It is recommended not to suture, because some content may still be accumulating in the remaining space. After procedure, the area should be pressed for about 5 to 10 minutes, and then a pressure dressing should be applied. Every patient receives obligatorily antibiotic treatment for at least 7-10 days, even if pus presence was not confirmed during drainage procedure. We would like to present a literature review and a case report of a 9-year-old boy with an auricular hematoma, which reflects our treatment scheme of this entity.

STRESZCZENIE

Urazy ucha zewnętrznego dosyć często wymagają profesjonalnej pomocy medycznej oraz konsultacji otolaryngologicznej. Krwiaki małżowiny usznej mogą pojawić się wskutek tępego uderzenia lub pociągnięcia małżowiny. Takie urazy prowadzą do rozerwania naczyń krwionośnych w obrębie chrzęstnej, co wywołuje krwawienie i gromadzenie się krwi pomiędzy chrzęstną a chrząstką. Krwiaki małżowiny usznej często występują

u osób uprawiających sztuki walki lub inne sporty kontaktowe. W badaniu fizykalnym zwraca uwagę nieprawidłowy kształt małżowiny usznej. Skóra małżowiny może nie mieć zmienionego koloru, ale zazwyczaj jest zaczerwieniona lub zasiniona. Opuchlizna może dotyczyć zarówno fragmentu, jak i całej małżowiny, zazwyczaj towarzyszą jej ból oraz parestezje. Niestety, krwaki małżowiny nie wchłaniają się samoistnie – jeżeli krwiak pozostanie nieleczony lub leczenie będzie nieefektywne, może dojść do rozwoju późnego powikłania w postaci tzw. ucha kalafiorowego, spowodowanego destrukcją chrząstki i przerostem tkanki chrzęstnej włóknistej. Z tego powodu, aby uniknąć martwicy chrząstki i jej deformacji, kluczowy jest jak najszybszy zabieg – drenaż krwiaka. Jeżeli to możliwe, procedura drenażu powinna być wykonywana w znieczuleniu miejscowym. Miejsce i rozległość nacięcia zależą od lokalizacji krwiaka, ale najczęściej wykonuje się je pod obrębką małżowiny usznej lub w okolicy grobelki (z powodów estetycznych). Zaleca się, aby nie zakładać szwów, ponieważ w pozostałej po krwaku pustej przestrzeni nadal może zbierać się krwista treść. Po zabiegu, okolica nacięcia powinna być uciskana przez 5-10 minut, a następnie zaleca się założenie opatrunku uciskowego. U każdego pacjenta obowiązkowo stosuje się antybiotykoterapię przez co najmniej 7-10 dni, nawet jeżeli zdrenowana treść nie zawierała ropy. Chcielibyśmy przedstawić opis przypadku 9-letniego chłopca z krwakiem małżowiny usznej, który obrazuje schemat postępowania i leczenia stosowany w naszej Klinice.

INTRODUCTION

The ear is not only an organ responsible for hearing, but it is also an integral part of the facial aesthetics. It consists of 3 parts: the external ear, the middle ear, and the inner ear, all of which may be a subject to trauma.

The external ear consists of the auricle, a complex cartilaginous organ built of concave and convex structures, and external acoustic meatus followed by its canal. The cartilaginous frame of the auricle is directly covered with a layer of highly vascularized perichondrium, which supplies avascular cartilage with blood carrying oxygen and nutrients. The arterial vascularization of the auricle and the cartilaginous part of the external auditory canal comes from two interconnected systems – branches of the external carotid artery. Posterior auricular artery supplies the entire postauricular surface and concha in the anterior part, while anterior surface of the auricle is supplied by the branches of superficial temporal artery and occipital artery. Venous drainage is usually through postauricular vein into the external jugular-superficial temporal-retromandibular vein system (1, 2).

Injuries of the outer ear are a relatively common reason requiring professional help and otolaryngological consultation. They usually involve the auricle and the external auditory canal. Mechanical trauma is usually caused by a blunt force or cutting. Blunt force leads to local posttraumatic changes, but sometimes a hematoma may develop. Cutting force traumas result in superficial scratches, wounds, sometimes requiring surgical suturing, in extreme cases a complete detachment of the concha may be observed (2).

Injuries of the middle and inner ear usually are a result of a much higher force, but sometimes an auricle hematoma is observed as an associated symptom. This issue, however, exceeds the scope of this article.

An auricular hematoma is defined by the blood accumulation under the perichondrium of the auricle and usually

is of traumatic origin. Such injury requires rapid drainage and antibiotic treatment to prevent blood re-accumulation and inflammation. Hematomas are often multi-chamber, which is why it is necessary to empty all of them during drainage procedure. Auricle hematomas left untreated or treated incorrectly may develop into a deformation – the so-called cauliflower ear – caused by the cartilage destruction, followed by fibrocartilage overgrowth. This occurs when hematoma is not completely emptied, when it returns or is left untreated, and local inflammation develops leading to chondritis and destruction of the cartilage (3).

Below we would like to present a literature review and a case report of a patient with an auricle hematoma together with its treatment according to the standards used in our department.

DISCUSSION

Etiology and pathophysiology

Hematomas of the auricle may occur due to a blunt trauma or a traction of the ear. Such traumas lead to the disruption of the blood vessels in the perichondrium and then blood accumulation between the perichondrium and the cartilage. The resulting “tamponade effect” creates a physical barrier to the blood supply of the cartilage. Deprivation of the blood supply may cause local infection and necrosis of the cartilage. Most often, blood collects in the depression between the helix and antihelix and continues into the triangular fossa. Less commonly, the hematoma may involve the concha or the area inside or around the external auditory canal. The least frequently observed hematomas are on the posterior surface of the auricle. The risk of necrosis is greater if hematomas are present on both sides of the concha (2). If left untreated, auricle hematoma can cause cartilage remodeling. It is said that after 2 weeks, cartilage begins to form on both sides of the hematoma, and as a result pathological space resulted

from the hematoma fills with disorganized connective tissue. After about 8 weeks, the soft tissue is replaced by a newly formed cartilage, followed by further processes, like tissue calcification, ossification and eventually cartilage regrowth. The histological and anatomical structure of the newly created cartilage is aberrant (resulting in a different arrangement of the auricle). Such deformation is called cauliflower ear (3).

The etiology of the injury resulting in the formation of an auricle hematoma and subsequently a cauliflower ear may be different. Most often, auricle hematomas occur as a result of sports trauma in people practicing physical activities with close interpersonal contact, especially rugby, boxing, wrestling, mixed martial arts or “ultimate fighting”. Other significant causes of hematomas are injuries resulting from an assault, abuse, fall or accidental trauma (4). Less common causes of the auricle hematoma include postoperative complications, side effect of piercing or improper wound healing and self-harm injuries (e.g. due to autism (5)). Interestingly, in rare cases, hematomas can also develop spontaneously. It is believed that psoriasis may increase the risk of the spontaneous auricular hematoma development (6). Due to the character of the injury, it is not surprising that men are most affected by this illness. Wearing a protective helmet while practicing contact sports significantly reduces the risk of injury and therefore auricle hematoma (3). The formation of a cauliflower ear is associated with improper management of hematomas and their frequent recurrences. The lowest risk of recurrence occurs in patients, in whom treatment was initiated immediately, in cooperation with an otolaryngologist, and in those who received specialist bolster dressings (pressure dressings) (7). According to the literature, patient’s age, sex, race, smoking status, presentation setting, and etiology of the hematoma were not associated with the likelihood of recurrence (4).

Clinical appearance

Physical examination reveals an irregular and disturbed contour of the auricle due to a distended lesion. The skin may have no change in color, but typically becomes red, flushed, or bruised. The swelling may be local or may cover the entire auricle and is usually accompanied by a mild to moderate stabbing pain and paresthesia. On palpation of the auricle, examiner may also feel dense fluid passing between the fingers (the lesion tends to be very soft), named as “splashing symptom”. 24 hours after the injury, the blood in the hematoma may begin to clot, and that’s why the swelling may become firmer. Hematoma of the auricle may also be accompanied by wounds caused by trauma with sharp instruments, e.g. broken glass, but most often the continuity of the skin remains intact.

Patient may report hearing and visual disturbances, tinnitus, pain, and headache. Hearing loss is not usually observed. It is also important to rule out possible intracranial

pathologies due to trauma, especially if a loss of consciousness was observed.

If an auricle hematoma occurs in a child, a non-accidental etiology (domestic violence) should always be considered, especially if other associated injuries are present (2).

Differential diagnosis

Differential diagnosis for patients presenting with a swollen ear associated with pain and reddening remains broad. In addition to infectious, traumatic, and allergic causes, hematologic and rheumatologic factors also need to be considered. Some examples of possible illnesses for differential diagnosis are listed below (7):

- “simple” swelling of the auricle due to infection, autoimmune reaction, or trauma,
- perichondritis or chondritis,
- cellulitis,
- auricle abscess (advanced form of a hematoma, when the fluid gets infected),
- Winkler’s disease (recurrent perichondritis),
- sunburn,
- skin cancer,
- atopic dermatitis.

The final diagnosis is made based on a thorough medical interview and physical examination. History taking should be focused on questions regarding past injuries, ear pain, fever, chills, ear effusion, hearing loss, previous occurrence of auricle hematomas or other auricular lesions, chronic diseases, especially diabetes mellitus, hypertension, allergies, and bleeding disorders, as well as drugs, especially anticoagulants (3). During physical examination the pathological appearance of the auricle should be assessed. Then otoscopic examination helps to assess the outer ear canal and the tympanic membrane and enables to exclude their pathologies (tympanic membrane perforation, hemotympanum, inflammatory and posttraumatic outer ear canal lesions). Additionally, thorough examination of the head and neck region, including functional assessment of the facial nerve, is recommended. In case of major traumas, temporal bone fracture and other cranial injuries should be excluded. In those cases, radiological examination, CT and/or MRI, is advised. However, it’s not a routine procedure in “simple” cases (3).

Victims of violence often present multiple other injuries and an auricle hematoma is easy to miss unless the physical examination is specifically focused on its diagnosis.

Finally, although quite rare, acute spontaneous hematomas can also occur.

Prevention

Prevention of auricle hematomas primarily involves patient’s education about the potential risks of its formation (especially in predisposed groups/sports), for example, wearing special helmets to protect the auricle when practicing contact sports, and if a concha has already been injured,

it is beneficial to apply ice packs every 15-20 minutes to minimize the formation of a hematoma (3).

Treatment

Unfortunately, the hematoma cannot be absorbed on its own, and further local inflammatory changes may develop (as mentioned above), if not specifically and surgically treated.

The classic surgical procedure indicated when a hematoma is confirmed in clinical examination with palpation (soft swelling of the auricle after trauma, distorting its anatomy) is called drainage. Preferably, it should be performed as soon it occurs. The longer it forms the risk of the abscess formation is larger. Moreover, it is said that after 7 days hematoma begins to organize (so called "persistent hematoma") and tissue granulation may make the procedure more difficult leading to less successful general outcome.

Drainage procedure, if possible, is preferably performed in local anesthesia. But of course, there are obvious examples, like lack of cooperation, fear, and massive changes, that require general anesthesia. The first step, as in all surgical procedures, is disinfection. Local anesthesia of the greater auricular nerve is usually performed using xylocaine 1% with adrenaline or lidocaine 1% with or without adrenaline, administered directly into the area to be incised. According to the literature, such method is believed to be safe and successful, but some authors question the usage of vasoconstrictors in this area. Alternatively, it is also possible to apply an auricular block (8, 9).

The site and the extent of the incision depend on the location of the hematoma but are most often performed in a sub-helical fold or anti-helical fold. The shape and direction of the incision is tried to be done along the natural carvings, to ensure better aesthetic results after recovery. Prior separation of the skin from the cartilage by accumulated blood facilitates the elevation of the anterior flap for blood evacuation. It is always important to be sure to visualize the cartilage surface, look for possible cartilage destruction and to evacuate all possible compartments of the hematoma (3, 9). After evacuation of the hematoma, the wound should be rinsed with sterile saline solution. It is recommended not to suture, because some content may still be accumulating in the remaining space. What's more, for the first few days a drain is left in the wound to facilitate fluid evacuation and to prevent scar closure. In cases with large hematomas, with bilateral changes (anterior and posterior side) an incision connecting both compartments is recommended and a drain is placed through the cartilage surface.

After procedure, the area should be pressed for about 5 to 10 minutes, and then a pressure dressing should be applied. Simple surgical dressing may not be sufficient and may result in a risk of re-accumulation. It's a good idea to apply a pressure dressing with Vaseline- or ointment-soaked (usually steroid with antibiotic) gauze most internally, followed by a sterile dressing and an elastic bandage around

head. Various materials can be used to fill the dead space and apply sufficient pressure, like dental rolls, cotton bolsters, buttons, or thermoplastic splints. Due to the irregular shape of the ear, it is important to place the dressings on both sides of the ear, in some cases bolsters may be secured by the sutures with non-absorbable threads. Such pressure dressing helps in proper healing – initially prevents further fluid accumulation and then facilitates re-adhesion of the perichondrium to the cartilage. Some authors describe the use of fibrin glue to reduce the risk of separation of perichondrium and cartilage (10).

Auricle hematomas are most often treated on an outpatient basis, with regular check-ups and specialist dressing changes, initially every 24 hours, then less frequently, when satisfactory healing is confirmed. In case of re-accumulation drainage should be repeated (larger incision or broadening to the deeper hematoma compartments with forceps). We usually hold drain for at least 2-3 days, depending on fluid evacuation and pressure dressings for another 3-4 days (till local recovery – skin sealing)

Every patient receives obligatorily antibiotic treatment for at least 7-10 days to prevent chondritis and auricle deformation, even if pus presence was not confirmed during drainage procedure (11). We usually recommend amoxicillin with clavulanic acid, as it covers anaerobic species (characteristically engaged in abscess formation). If *Pseudomonas aeruginosa* infection is suspected, patients should be admitted to the ward for intravenous anti-pseudomonas dedicated antibiotic therapy in a form of ceftazidime (which has no oral substitute). We also routinely send the material gathered from hematoma/abscess for microbiological evaluation, and then modify our treatment, when needed.

Rarely in children, but if used, aspirin, NSAIDs and anticoagulants should be avoided for the next few days to prevent bleeding. On the other hand, in patients with hematological disorders connected with blood clot formation, tranexamic acid or specialist concentrates of coagulation factors may be necessary for proper healing.

After the procedure, patients should limit physical activity, especially contact sports, for at least 10 to 14 days to avoid re-occurrence of the hematoma. Skin and deeper tissues usually heal even up to 1 month (3).

Complications – a cauliflower ear

Auricle hematomas that are properly drained and treated have a minimal risk of long-term complications. However, untreated, or inadequately treated hematomas may lead to further progression of the local inflammatory process – the development of chondritis and/or an abscess. After the first episode of an auricle hematoma, the risk of recurrence in the future increases significantly. The risk of perichondritis and neocartilage or abnormal scar formation is also higher. In extreme cases, degenerative and regenerative processes may lead to the development of a deformation called cauliflower ear, that is of an important esthetic significance.

Surprisingly, cauliflower ear is often a desirable appearance among martial arts athletes – very few seek medical help after suffering an auricle hematoma or perform aspiration procedures by their own.

Historically, descriptions of a cauliflower ear appeared already in ancient Rome and Greece, but it was only in the 20th century when, with the development of physiology and traumatology, a better understanding of this phenomenon arose (7). Thorough pathophysiology of a cauliflower ear was established in the 1970s when experiments were carried out on rabbits. Weights were dropped on their ears to induce hematoma formation. This experiment helped to determine that blood was accumulating in the sub-perichondral space, depriving cartilage of its blood supply and consequently leading to its necrosis and subsequent fibrosis (7). The diagnosis of a cauliflower ear does not require additional imaging tests and is based on clinical appearance and physical examination. Apart from the esthetic defect, cauliflower ear may cause discomfort during sleep or in other situations when there is a pressure applied on the ears. For above mentioned reasons, people sometimes choose to undergo auricular reconstructive surgery (otoplasty). The technique of the surgery depends on the severity of the fibrosis and the lesion's location. The goal of the surgery is to remove the destructive fibrocartilage without disturbing the structure, integrity, and contours of the auricle. In cases with poor structural integrity, rib cartilage may be used to provide a graft for the satisfactory reconstruction (7). These are very complicated and demanding operations, as the structure of the auricle has already been violated, usually bringing unsatisfactory results, which is why plastic surgeons are not eager to perform such procedures, unless there is an evident obstruction of the external ear canal (7).

CASE REPORT

A 9-year-old boy presented to the emergency department after suffering from an ear trauma. Earlier that day (5 hours earlier) during school break while playing with friends in a classroom our patient fell and hit his ear directly on a desk ridge. His parents did not report any chronic diseases or known allergies to medications. An ENT consultation was ordered. Otorhinolaryngological examination of the right ear showed no abnormalities, while the left auricle showed signs of a hematoma – upper half of the antihelix was edematous and reddened, with splashing symptom on palpation (fig. 1a, b). At the same time his external auditory canal and tympanic membrane remained normal. Other parts of the otorhinolaryngological examination were unremarkable.

As the diagnosis was set our patient was qualified for the surgical intervention – drainage of an auricle hematoma. The procedure was performed under local anesthesia with lidocaine 1%. At first, a puncture of the auricle on the site of suspected fluid accumulation was performed, and then an approximately 1 cm incision was made through the skin in the antihelix area, which allowed for the drainage.



Fig. 1a, b. Auricular hematoma on the day of injury, before laryngological intervention (drainage)



Fig. 2a, b. Healing process – 3rd day after drainage



Fig. 3a, b. Healing process – 5th day after drainage



Fig. 4a, b. Healing process – 10th day after drainage

A significant amount of bloody fluid was found flowing out from the hematoma cavity, without any purulent content. The hematoma cavity was widened using a paeon, and then a sterile drain was inserted and left inside. The procedure site was thoroughly cleaned using Octenisept and a sterile pressure dressing was applied to the auricle. Antibiotic therapy with amoxicillin with clavulanic acid 2 times daily, with a dose of 90 mg/kg body weight daily, for 7 days, together with painkillers, according to patient's needs, were prescribed. First follow-up visit was scheduled for the next day. During the visit, the drain in the wound was replaced. No blood flow from the hematoma cavity was observed. The wound was thoroughly cleaned, and a new pressure dressing was applied. The next follow-up took place on the 3rd, 5th, 7th, 10th day, and eventually 1 month after the drainage (fig. 2a, b-4a, b present the gradual healing process). Caregivers were also taught how to perform regular (every day) dressing changes. On examination a week after the drainage (fig. 4a, b), the auricle was slightly bluish, with no purulent discharge from the wound and no signs of fluid re-accumulation. The healing process was satisfactory. The pressure dressing was continued for another week. One month after the injury, the drainage site was sealed. A small, slightly hyperemic scar remained, with no signs of inflammation. There were no further indications for otolaryngological intervention or regular check-ups. Avoiding exposure of the auricle to the sun and using a protective sun cream with an SPF50 filter were recommended.

CONCLUSIONS

Auricular hematomas stand for an important emergency otolaryngological entity. They arise from the blood accumulation between the perichondrium and the cartilage due to a blunt trauma or traction of the ear. The resulting "tamponade effect" creates a physical barrier to the blood supply of the cartilage. Moreover, there is also a high risk of inflammation with abscess formation and resultant cartilage destruction. That is why, it is essential to refer a patient with such suspicion to the specialist as soon as possible. If an auricle hematoma occurs in a child, a non-accidental etiology (domestic violence) should always be considered, especially if other associated injuries are present. Swelling of the auricle should always be differentiated with, among others, allergic and autoimmune reactions, skin lesions (cancerous and non-cancerous) or sunburn. The "gold standard" treatment protocol comprises of the drainage procedure (with identification of the level of advancement – simple hematoma, abscess formation, cartilage destruction), usually under local anesthesia, together with drain placement, pressure dressings, antibiotic therapy, and regular ambulatory follow-ups. Such measures help in prevention of blood re-accumulation, progression of the inflammatory process and cartilage destruction, leading to a late complication known as "cauliflower ear". Typically, incision performed during drainage procedure is made along natural carvings of the auricle, what ensures good esthetic results after healing.

CONFLICT OF INTEREST KONFLIKT INTERESÓW

None
Brak konfliktu interesów

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