ORIGINAL ARTICLE

The Experience of Reliable Surgical Management for Intractable Auricular Pseudocysts

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Objective: An auricular pseudocyst occurs when fluid accumulates between the intracartilaginous spaces of the auricle. Many treatment methods have been proposed, however recurrence and cosmetic problems are still noted in some cases. The aim of this article was to discuss our experience of surgical treatment of intractable auricular pseudocysts.

Methods: Fourteen patients with auricular pseudocysts who were unresponsive to simple aspiration followed by intralesional steroid injections or who declined conservative treatment were reviewed in the Department of Otolaryngology, Kaohsiung Municipal Ta-Tung Hospital from December 2010 to May 2013. Deroofing surgical management under local anesthesia was performed in all 14 patients. The epidemiological profiles of the auricular pseudocysts and postoperative results including recurrence rate and complications of the lesions were reviewed.

Results: All patients had acceptable cosmetic result and no recurrence except for one patient who had the complication of a perichondrial reaction.

Conclusions: The deroofing surgical method by removing the anterior cartilaginous leaflet of the lesion followed by compression dressing is a reliable procedure for intractable auricular pseudocysts.

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Introduction

An auricular pseudocyst is an asymptomatic cystic swelling with fluid accumulation between the intracartilaginous spaces of the auricle, which lacks an epithelial lining (so called pseudocyst) and typically involves the triangular fossa, concha fossa and scaphoid fossa of the auricle. It is also known as an intracartilaginous cyst [1], endochondral pseudocyst, and idiopathic cystic chondromalacia [2]. Most pseudocysts of the auricle involve spontaneous swelling without an obvious history of trauma, and aspiration typically produces a viscous straw-yellow colored fluid that resembles olive oil in appearance [1,3-5]. The aim of treatment is to preserve the anatomic architecture and intact appearance of the pinna and prevent recurrence. However, medical treatment and simple aspiration are usually ineffective with high recurrence rates [1,4,5]. Without treatment, permanent deformity due to fibrosis and cartilaginous deposition may cause irreparable injury to the pinna. Many other treatment modalities have been proposed including incision and drainage, aspiration followed by treatment with intralesional steroids, or sclerosing agents injected into the cystic cavity with a local compression dressing such as clothing button

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bolster, compression suture therapy [4] or clip compression dressing [5]. However, recurrence and deformity have still been noted with these treatment methods. In this article, we describe deroofing surgery[6,7] for the resection of the anterior cartilaginous wall of the auricular pseudocyst to treat intractable cases that are unresponsive to aspiration followed by intralesional steroid injections (at least three injections) or those who declined conservative measures.

Materials and Methods

Fourteen patients with an auricular pseudocyst who were unresponsive to aspiration followed by intralesional injections of steroids (triamcinolone, 1 ml of 10 mg/ml suspension, at least three injections) or who refused further conservative treatment due to unsuccessful aspiration in local medical clinics (Table 1) were reviewed in the Department of Otolaryngology, Kaohsiung Municipal Ta-Tung Hospital between December 2010 and May 2013. The higher level of lactate dehydrogenase (LDH) isoenzymes in the cyst fluid of auricular pseudocysts has been used to definitively diagnose a pseudocyst in many articles [7, 8]. All of the patients in the current article were diagnosed with an auricular pseudocyst by clinical presentation, and some also had higher levels of LDH-4 and LDH-5 in the cyst fluid than in serum (Figure 1). All were treated surgically with the deroofing surgical method under local anesthesia using 2% xylocaine with 1:50000 adrenalin. The helical incision line was made on the skin

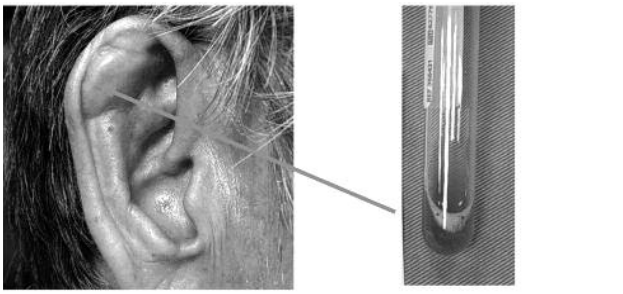

Figure 1. Clinical photograph showing an auricular pseudocyst in the right scaphoid and triangular fossa of a 62-year-old man, and aspirated dark yellowish cyst fluid, together with the percentage distribution of analyzed lactate dehydrogenase (LDH) isoenzymes in the patient's cyst fluid and serum.

Table 1. Summary of reported cases of auricular pseudocyst

Case	Age (yr)	Gerder	Side	Location	Size (cm)	Duration of pseudocyst existent	Intralesional steroid	Tauma history	Follow Up	Complication duration	Recurrence of surgery
1	62	M	R	Scaphoid fossa	2*3	2 weeks	7 injections	denied	30 months	No	No
2	41	M	R	Tiangular fossa	2*2	1.5 months	4 injections	denied	27 months	No	No
3	32	M	L	Concha fossa	3*4	4.5 months	3 injections	denied	21 months	P.R	No
4	50	F	L	Tiangular fossa	3*3	1.5 months	3 injections	denied	19 months	No	No
5	31	M	R	Scaphoid fossa	3*4	2 weeks	Declined*	denied	15 months	No	No
6	36	F	R	Scaphoid fossa	2*3	3 weeks	Declined*	denied	14 months	No	No
7	70	F	L	Scaphoid fossa	2*3	1 month	3 injections	denied	14 months	No	No
8	44	M	R	Tiangular fossa	2*2.5	2.5 weeks	3 injections	denied	11 months	No	No
9	60	M	L	Tiangular fossa	2*3	2 years	Declined*	denied	10 months	No	No
10	41	F	R	Concha fossa	2*3	2 months	3 injections	denied	10 months	No	No
11	45	F	R	Concha fossa	3*3	2 weeks	3 injections	denied	9 months	No	No
12	42	F	L	Concha fossa	2*3	2.5 months	3 injections	denied	7 months	No	No
13	27	F	L	Concha fossa	2*3	1.5 months	Declined*	Yes+	6 months	No	No
14	33	F	L	Concha fossa	2*3	3 months	3 injections	denied	6 months	No	No

M: male; F: female; R: right ;L: Left; *:Received at least 3 times aspirations at a local medical department but in vain ;+: traffic accident; P.R: perichondrial reaction

Figure 2. The helical incision line was made over the skin overlying the pseudocyst.

Figure 3. The skin flap was elevated by carefully separating the overlying skin and anterior leaflet of cartilage until the pseudocyst was fully exposed.

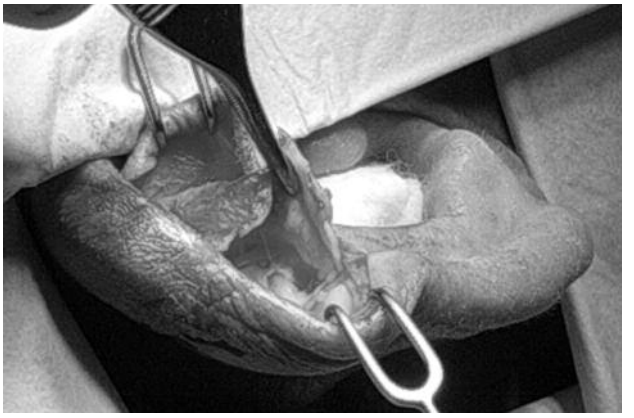

Figure 4. The anterior leaflet of the pseudocyst was excised along the surrounding boundary of the cartilage with drainage of an olive oil colored fluid.

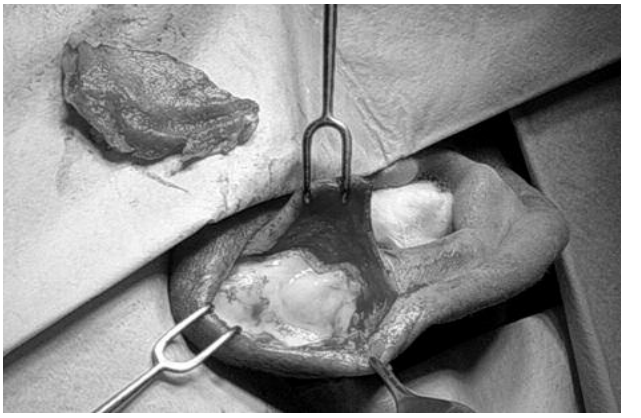

Figure 5. After the anterior leaflet had been totally removed; curettage of the posterior leaflet was performed to remove any debris or soft granulation tissue.

overlying the pseudocyst (Figure 2), and the skin flap was elevated by carefully separating the overlying skin and anterior leaflet of cartilage until the pseudocyst was fully exposed (Figure 3). The anterior leaflet of the pseudocyst was excised along the surrounding boundary of the cartilage with drainage of olive oil colored fluid (Figure 4). After the anterior leaflet had been totally removed, curettage of the posterior leaflet was performed to remove any debris or soft granulation tissue (Figure 5). The skin flap was repositioned and sutured with a 4-0 nylon simple suture along the incision line. Two iodine gauzes were then sutured double-sided over the surgical lesion as a compression dressing and retained for at least one week until the sutures were removed. All specimens were sent for histological examination.

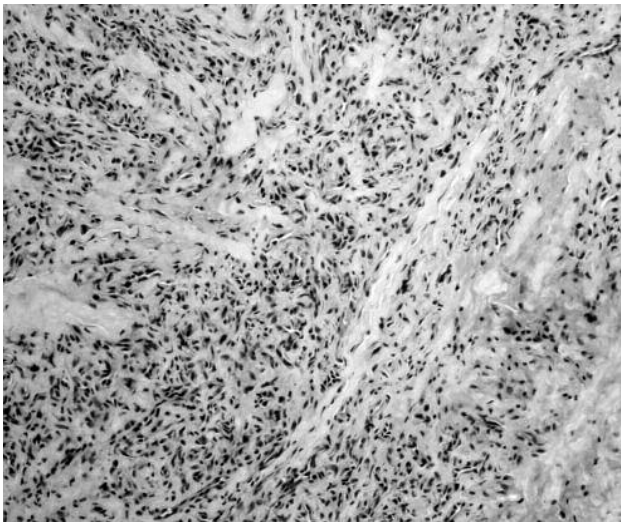

Figure 6. Histopathology of the pseudocyst showed cyst-like lesions with a fibrous, cartilaginous and granulation tissue lining but no epithelium (H&E stain; original magnification x100).

Results

All of the 14 patients who had a unilateral intractable pseudocyst lesion failed or declined conservative treatment (Table 1). Seven (50%) patients had right-sided lesions and 7 (50%) patients had left-sided lesions. There were 6 males (43%) and 8 females (57%) with a mean age of 43.8 years (range 27 to 70 years). Six pseudocysts were located on the concha fossa, four on the triangular fossa, and four on the scaphoid fossa. The average duration of the pseudocysts were 3.2 months with a lesion size ranging from 2 to 4 cm. Ten patients had undergone aspiration followed by intralesional steroid injections at least 3 times, but ultimately the treatment failed in all cases. One patient received seven injections of steroids, however the pseudocystic lesions still recurred. Four patients who received at least three simple aspirations at local medical departments requested surgical intervention on their first visit to our outpatient department. All of the patients received the deroofing surgical method to remove the pseudocysts. The specimens showed cyst-like lesions with a fibrous, cartilaginous and granulation tissue lining but no epithelium (Figure 6). The patients were followed up for 6 to 30 months (average 14 months) without any recurrence. Although one of the patients had the complication of a perichondrial reaction, all of them had a cosmetically acceptable appearance of the pinna after treatment.

Discussion

Auricular pseudocysts are benign, asymptomatic bulging masses which are defined as an accumulation of fluid unlined by epithelium in the intracartilaginous spaces of the ear. They usually occur on the anterior surface of the auricle with an olive oil colored fluid found upon simple aspiration (Figure 1). Engel [9] was the first to describe this type of endochondral cystic lesion, which shows different features from other cystic lesions of the pinna, in 1966. An auricular pseudocyst may occur in both sexes and any ethnicity, although most commonly in middle-aged Chinese males [10]. Of the intractable pseudocyst cases in the current study, all were of Chinese ethnicity but there was no obvious gender difference (M:F = 6:8), in contrast to a high male preponderance in most reports [10, 11]. The mean age of our patients was 43.8 years, which is similar to that reported by Choi [12] (42.8 years) and Tan [11] (38.2 years). There was no difference in the side that the lesions occurred (right:left = 7:7), however Tan [11] reported that lesions occurred on the right side 1.8 times more frequently than the left side. This difference may be due to different sleeping habits. In our patients, there was no obvious predominance in occurrence on the scaphoid, triangular and concha fossa of the antihelix (4:4:6). However, Kanotra [7] and Tan [11] reported 72.1% and 61% of cases on the concha fossa, whereas Choi [12] found 80.6% on the scaphoid fossa. Therefore, there does not seem to be a consensus on the most common site of pseudocysts [7, 11, 12].

The diagnosis of an auricular pseudocyst is based on the clinical picture. It is usually asymptomatic, with fluctuant outpouching over the auricle, however mild inflammatory signs may occur. Typically, a straw-yellow viscous fluid resembling olive oil is found by needle aspiration; however, serosanguineous and serous fluid may be observed in some cases [10]. In some clinically suspected cases (ex. Figure 1), LDH may be a useful laboratory marker to assist in making an accurate diagnosis of pseudocyst [8, 13–14]. The percentages of LDH-4 and LDH-5 are usually higher in cyst fluid than in serum, while those of LDH-1 and LDH-2 are usually higher in serum than in cyst fluid. The predominant results of LDH isoenzymes is based on Ickioka's theory[14] in which LDH may be released from disrupted auricular cartilage during pseudocyst formation. The differential diagnosis should include sebaceous cyst, fibroma, subperichondrial hematoma, relapsing polychondritis, chondrodermatitis nodularis helices, and cauliflower ear [7, 15]. The major distinguishing characteristic of a pseudocyst is that it is an intracartilaginous lesion whereas the others are subperichondrial lesions.

The etiology of a pseudocyst is still unclear, however two hypotheses have been proposed. The first is that congenital embryonic dysplasia of the auricular cartilage is the predisposing factor in the development of pseudocysts [16,17]. The auricle develops from six tubercles on the first and second branchial arches. During the complex fusion and folding development processes, residual tissue plans may form within the auricular

cartilage, in which the potential intracartilaginous space is probably reopened later by another stimulus to result in the formation of a pseudocyst [17]. The second hypothesis is that chronic low-grade trauma may play a major role in the formation of an auricular pseudocyst [7, 12], for example, carrying large containers on the shoulders, wearing a motorcycle helmet or stereo headphones, and sleeping on a hard pillow [15, 16]. This repeated low-grade trauma may lead to perichondrial ischemia which can cause the initial degeneration in the cartilage leading to formation of a pseudocyst. There is strong evidence to support that LDH isoenzymes levels[8, 13] are elevated and that hemosiderin is present [6] in the cyst fluid. Lactate dehydrogenases 4 and 5 have been reported to be major components in the auricular cartilage [8, 13~14]. Repeated minor auricle trauma could cause elevated isoenzyme levels of LDH-4 and LDH-5 in the cyst fluid, which may then assist in the diagnosis of suspected pseudocyst cases. In addition, the presence of hemosiderin[6] may suggest previous leakage of erythrocytes due to minor trauma-related blood vessel injuries. In the current study, only one patient (7.1%) had an obvious history of ear trauma due to a traffic accident, compared to 10% with a history of trauma in the articles of Tuncer [18]. However, Suhail [16] reported 78% (22/28) of their patients had a definite history of trauma due to being beaten or other forms of trauma. Despite these differences, most physicians accept that chronic low-grade trauma is a major etiologic factor for pseudocyst formation because it may be unavoidable in daily life.

Several modalities of treatment for pseudocyst of the auricle have been described in the literature [4-6,11,13,15]. However, the results have been contradictory with regards the definitive treatment of pseudocysts. The goals of treatment include preserving normal architectural structure and acceptable appearance of the auricle without recurrence of the lesion. Both needle aspiration [2, 6, 13] and incision and drainage [6, 11] of pseudocysts result in re-accumulation of the fluid within the lesion. Compression dressings such as traditional contour dressing, compression suture therapy [4], clip compression dressing[5], bolstered pressure suture [19, 20], and clothing button bolster [7,21] after aspiration and incision and drainage can decrease the recurrence rate, however recurrence of the lesions cannot be avoided. The use of systemic or intralesional steroids for pseudocysts of the auricle is still controversial. Juan [22] reported good results in successfully treating pseudocysts with at most three intralesional steroid injections that contributed to reversal of enhanced capillary permeability. However, Glamb [6] reported no benefits with systemic or intralesional steroid (triamcinolone) use, and even reported permanent deformity of the ear. Aspiration followed by curettage of the endochondral surfaces [1] or instillation of sclerosing agents has been described by many authors. Intralesional injections of minocycline hydrochloride two to three times at two-weekly intervals successfully treated recurrent pseudocysts by anti-inflammatory and immunomodulatory mechanisms in two patients in Oyama's [23] study. Curettage followed by fibrin glue sealer injected into the intracartilaginous layer also worked for the management of recurrent pseudocysts in Tuncer's [18] study. However, it is difficult to make a conclusion with regards to the treatment results because only a few patients were involved in these studies. Surgical deroofing treatment of auricular pseudocysts has been reported to be the most reliable method for preventing the recurrence of lesions with good cosmetic outcomes of the pinna in many articles [7, 12, 15]. This surgical technique destroys the pseudocyst by removing the anterior wall of the cyst to avoid recurrence, and maintains the structural integrity by the intact posterior wall to achieve an acceptable appearance of the ear. However, this method still has some complications, such as perichondrial reactions and thickness of the pinna reported in Suhail's [16] study. In the current report, all of the patients received deroofing surgery under local anesthesia, and no recurrence was noted. One patient suffered from the minor complication of a perichondrial reaction after surgery, however it subsided with antibiotics and anti-inflammatory drugs in a few days with acceptable cosmetic results.

Conclusion

Conservative modalities may be the first choice of treatment for auricular pseudocysts. However, the deroofing surgical technique is a reliable and easy procedure which can achieve an acceptable appearance of the pinna without recurrence when conservative management fails or is refused by the patient.

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