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Effectiveness of cartilage window with button technique in treatment of pseudocyst pinna

[*1] Dr. Sagesh M, [2] Dr. Aju Ravindran
[1] Associate Professor, Department of ENT, Malabar Medical College, Calicut, Kerala, India
[2] Assistant Professor, Department of ENT, Malabar Medical College, Calicut, Kerala, India

Abstract
Background: Pseudocyst of pinna presents as a cystic swelling over the anterior aspect of pinna. Even though various treatment modalities have been proposed for the management of this condition, most of them do not provide a consistent and reliable result.
Aim: To study the effectiveness of cartilage window with buttoning technique in the treatment of pseudocyst of the pinna.
Methods: A prospective study at a tertiary care centre for a period of two years, which included 17 patients with a diagnosis of pseudocyst pinna. All the patients were treated by excising a small cartilage window and using the buttoning technique for compression; and were followed-up after one week and one month of surgery.
Results: All the 17 cases were completely relieved of the disease at the end of one month and none showed any recurrence. None of our patients had any postoperative complications like perichondritis of pinna or any structural deformities.
Conclusions: The surgical treatment of pseudocyst pinna by the cartilage window with buttoning technique gave a reliable result in all cases.

Keywords: pseudocyst pinna, cartilage window, buttoning technique, surgical deroofing

1. Introduction
Pseudocyst of pinna is a benign, idiopathic, asymptomatic, cystic swelling over the anterior aspect of auricle. It is often a source of disappointment for the surgeon because of the frequent recurrence after its treatment [1]. Even though various surgical and non-surgical treatment modalities have been proposed for the management of this condition, most of them do not provide a consistent and reliable result. Of the different treatment options, surgical deroofing and buttoning method have been proposed as an effective treatment method and so is the cartilage window technique. This study aims at evaluating the effectiveness of combining the cartilage window and buttoning technique in the treatment of pseudocyst pinna.

2. Aim of the study
To study the effectiveness of cartilage window with buttoning technique in the treatment of pseudocyst of the pinna.

3. Materials and Methods
The study was conducted at a tertiary care hospital, for a period of two years, from January 2015 to December 2016 and had a prospective design. All patients presenting to the ENT OP with a diagnosis of pseudocyst pinna and willing for surgical treatment were included in the study group. Patients were explained about the different treatment options and the success rate of each option. All patients who were not willing to take up this treatment option were excluded from the study. A written informed consent was obtained from all individual participants included in the study. The patients in the study group were treated surgically by the cartilage window and buttoning method under local anaesthesia. They were followed up for a period of one month to look for any recurrence.

3.1 Surgical technique
After getting proper informed consent, all cases were operated under local anasethesia. An incision of size about 2cm was made on the posterior (medial) aspect of the pinna, corresponding to the site of the swelling on the lateral aspect. This technique ensured that the skin on the anterior aspect is not injured while cutting out the cartilage window, as the cartilage would be already separated from the opposite perichondrium due to the fluid collection, thus avoiding a cut-through injury. Another advantage of this incision is its cosmetic aspect as the postoperative scar will be on the posterior aspect.
The cartilage is exposed and a small incision of about 0.5 cm is made on the cartilage which would immediately drain the fluid collection in the pseudocyst. Once the fluid is drained out completely, a cartilage piece of size 0.5 x 0.5 cm is cut off taking care not to injure the opposite perichondrium, thus creating a cartilage window. The skin incision was sutured with 3-0 black silk. Next, two sterilized small shirt buttons are placed on either side of the pinna corresponding to the site of the pseudocyst and sutured through and through using 2-0 black silk. Care is taken that the buttons are just tight enough to compress the two skin surface and to avoid too much pressure. No mastoid bandage dressing is given. The patient is prescribed antibiotics and local antiseptics for one week.
The sutures and the buttons are removed after one week, and recurrence if any, were noted. The patients are then followed-up after one month to look for any recurrence. The findings were noted and the results analysed.

4. Results
A total of 21 cases attended our outpatient department during

the study period with a diagnosis of pseudocyst pinna. Among them 4 patients were not willing for the surgical treatment, thus the study group constituted of 17 patients. The age group of the patients ranged from 27 years to 45 years. Majority of our patients were males (14 males and 3 females) and the left side was involved in 9 cases and the rest 8 cases had a right side involvement. The scaphoid fossa was involved in 7 cases (41%) and the triangular fossa was involved in 10 cases (59%). The size of the pseudocyst was described based on the measurement of the largest dimension of the swelling. In our study most of the patients had as pseudocyst size of 3cm (59%) and one patient had a size of 5cm.Table 1 gives the demographic data of the patients in the study.

All the patients were treated by the cartilage window and buttoning technique as described above and were followed-up after one week and one month of surgery. None of our cases had a reaccumulation of fluid at the time of suture removal after one week. All the 17 cases were completely relieved of the disease at the end of one month and none showed a recurrence. None of our patients had any postoperative complications like perichondritis of pinna or any structural deformities. Thus the surgical treatment of pseudocyst pinna by the cartilage window with buttoning technique gave a reliable result in all cases.

5. Discussion

Pseudocyst of the pinna was first described by Hartmann in 1846 and the term Auricular Pseudocyst was coined by Engel [2] in 1966. Pseudocyst of the auricle has also been referred to as an intracartilaginous cyst, an endochondral pseudocyst, and cystic chondromalacia of the auricle [3]. In this condition there is a spontaneous accumulation of sterile fluid in the intercartilaginous plane, presenting as a painless cystic swelling on the upper portion of the pinna, with normal overlying skin [4].

Even though the exact etiology of pseudocyst of the auricle is unknown, two main theories have been proposed. The first theory suggests that the pseudocyst is often the result of repeated minor low grade trauma, such as rubbing, pulling the ear, sleeping on hard pillows [2] or wearing a motorcycle helmet or headphones [5]. It was suggested that chronic trauma would induce cartilage degeneration resulting in progressive dilatation and formation of a cystic space within the auricular cartilage [6]. The second theory attributed a congenital embryologic defect of the auricular cartilage in the development of the pseudocyst. The congenital maldevelopment of first and second branchial arch may result in residual tissue planes within the cartilage which may later reopen, giving rise to a pseudocyst [7]. Another proposed etiological factor is the [8] accumulation of reactive exudates due to immunoreactions of autologous antibody and auricular tissue. Histopathology of the pseudocyst reveals an intracartilaginous accumulation of fluid without an epithelial lining. The lack of epithelial lining led to the term "pseudocyst" [9].

Pseudocyst of the pinna has been observed to occur predominantly in men. In a study by Philip Cohen [3] the male patients constituted 93% of the total 114 patients studied whereas Lim CM reported the incidence as 87% in males [10]. The age at onset in patients with pseudocyst of the auricle ranges from 16 to 73 years, with most patients between the ages of 30 and 39 years. The auricular pseudocyst usually presents as a painless, solitary, fluctuant, dome shaped cystic swelling on the anterior surface of pinna. In the pinna the most common sites involved are the scaphoid fossa, triangular fossa and the cymba concha [3]. In a study by Ayaz Rehman *et al* [1], the most common site of involvement was scaphoid fossa in 60.4% followed by concha in 33.3% and triangular fossa in 6.2%, of the total 48 patients studied. In our study 82% of patients were males and the triangular fossa was the most common site involved.

Several methods of surgical and nonsurgical treatment have evolved over the years for the treatment of pseudocyst pinna, which includes repeated aspiration with pressure dressing, incision and drainage, insertion of drainage tubes, magneto-therapy, intralesional injection of corticosteroids, deroofing of the cyst, creating a cartilage window and the buttoning technique. The role of intralesional corticosteroids is controversial with varying success rates and intralesional minocycline is thought to work as a sclerosant through its anti-inflammatory and immunomodulatory mechanisms. Tuncer *et al* [11] used fibrin glue as a sealer between the two leaves of the cartilage and had a positive result in one patient of recurrent pseudocyst. Zhu and Wang [12] have reported a method of inserting a small drainage tube in to the cavity of the pseudocyst with a guidewire. Despite the large number of treatment modalities, the definitive treatment still remains controversial because of high recurrence rate. A successful resolution of the lesion restoring the normal architecture of the auricle with no recurrence should be the main goal of the treatment of a pseudocyst.

Both needle aspiration and incision drainage of the pseudocyst resulted in prompt accumulation of the fluid in the lesion [2, 3] but when it was followed by compression the recurrence rate decreased. Different methods were described for compression like traditional contour dressing, bolstered pressure sutures, plaster of paris casts and buttoning technique.

Surgical deroofing by excision of the anterior wall of the cyst, as a treatment of pseudocyst was first described by Choi [6], who got very good results in 90% of his 31 patients using contour dressings for compression. Lim [10] modified this technique by using buttoning as a compression method in his group of 41 patients and reported no recurrence with good cosmetic outcome in all the patients. The use of buttoning by Lim gave the advantage of providing a constant compression as compared to contour dressings, leading to a better result. Similarly Nazir A Khan *et al* [13], showed 96% efficacy of deroofing procedure in their study. Satheesh Bhandary *et al* [14], treated 30 pseudocyst cases with different modalities like wide bore needle aspiration, intracavitary steroid injection and window de-roofing procedure. Among them, the window de-roofing procedure was found to be successful in 100% of the cases with a minimum of sequelae.

In a study by Vinay S et al [15], 30 patients underwent surgical deroofing of the pseudocyst along with compression buttoning. All 29 patients (96.7%) had no recurrence and the failure in one case was attributed to the use of improper buttons for compression. Ayaz Rehman *et al* [1] divided 41 patients of pseudocyst with recurrence after needle aspiration and intralesional steroid injection into two groups. Group I comprising of 26 patients, underwent incision and drainage with curettage followed by buttoning and group II comprising of 15 patients, underwent surgical deroofing of the cyst along with buttoning. 7 of the 26 patients showed recurrence after incision and drainage with buttoning whereas the 15 patients who underwent surgical deroofing with buttoning showed no recurrence.

The other important method described in the treatment of pseudocyst pinna is by excising a small piece of cartilage (cartilage window) of the pinna at the site of the cyst. Vijayendra H *et al* [16] treated 27 patients with pseudocyst pinna by excising a rectangular piece of cartilage measuring about l cm x 0.5cm at the site of the cyst. The wound was closed with a corrugated rubber drain in-situ followed by pressure dressing. No incidence of any recurrence or alteration in the shape of the pinna or perichondritis was noted in any of the patients. In their study K Koirala *et al* [4], compared the posterior cartilage window technique with aspiration followed by quilting technique in 17 patients each of pseudocyst pinna. None of the patients had any recurrence in the cartilage window group whereas 7 patients had a recurrence in the aspiration group.

In our study we have combined the technique of creating a cartilage window in the pinna followed by the buttoning technique for providing the constant compression. In all our 17 patients there were no recurrences, no infection or perichondritis of the pinna or any structural deformities. Thus combining the two reliable methods in the treatment of this condition would ensure a 100% success. The use of buttoning for compression ensured that a constant pressure is maintained during the first week after surgery, thus preventing any reaccumulation of fluid. Moreover, the use of dark coloured buttons would camouflage its presence and would be cosmetically more acceptable for the patient. So the buttoning technique avoids the use of postoperative drains or mastoid bandage for the patient.

One of the main disadvantages of the surgical deroofing surgery is the chance of developing a perichondritis, as a part of the anterior skin is removed, and the second one being an ugly scar. Even in the other techniques described by some authors, the scar in the anterior part of the pinna was an evident cosmetic problem. Our technique of using the posterior incision would be cosmetically accepted better by the patient. Since we just excise a very small part of the cartilage for creating the window, the chance of developing any structural deformity is also minimised.

The demerits of this study are that the number of patients is comparatively less than that required for an effective epidemiological study. Moreover, there is no comparison with other methods of treatment.

6. Conclusions

Although several treatment methods have been proposed for the treatment of pseudocyst pinna, most of them have found to have recurrence. The surgical treatment of making a cartilage window along with buttoning technique is an excellent method for the treatment of pseudocyst pinna. This method is reliable and safe ensuring a successful treatment with minimum chance of recurrence. It is relatively free of any complications and does not produce any structural deformities of the pinna. Moreover our method of using a posterior incision provides a good cosmetic result.

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8. Declarations

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Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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