

Clinical Characteristics of Patients with Preauricular Fistula

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ABSTRACT:

A preauricular fistula is a congenital malformation of the auricle, presenting as a small opening or pit in the preauricular area, located along the anterior margin of the helix. Various international studies have presented the demographic and clinical profiles of preauricular fistula, including sex-specific prevalence, the dominant side of the lesion, and surgical techniques employed. However, such information cannot always be directly generalized to the local context due to significant differences in genetic factors, socio-cultural backgrounds, and healthcare systems. In Indonesia, there are no national data on the prevalence of preauricular fistula, while case reports from teaching and referral hospitals, such as Dr. Soetomo General Hospital, remain largely anecdotal. Given that Dr. Soetomo General Hospital is the largest tertiary referral center in Eastern Indonesia, it is important to conduct a systematic clinical mapping of the number of cases, age distribution, sex, lesion laterality, clinical symptoms, and management of preauricular fistula in the hospital's ORL-HNS outpatient unit. Such information would be highly valuable as a foundation for more targeted and evidence-based clinical policies. Methods: The research method employed was a retrospective descriptive study using medical record data of patients with preauricular fistula who presented to the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital. The study period covered January to December 2024. Results: A total of 15 patients with preauricular fistula underwent surgery at the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital during the period of January to December 2024. Conclusion: The male-to-female ratio was 3:2, with the highest prevalence in the 12–25 years age group. The most common clinical symptoms were pain and erythema at the fistula site. The majority of cases were classic preauricular fistulas. Bilateral location was the most frequently observed. The most common symptom duration prior to surgery ranged from 2 weeks to 2 months.

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Introduction

Preauricular fistula, first described by Heusinger in 1864, is a benign, congenital malformation of the preauricular soft tissue located at the anterior margin of the ascending limb of the helix. Preauricular fistula is more often unilateral and sporadic. Bilateral cases are more likely to be inherited. When inherited, the pattern is incomplete autosomal dominance with reduced penetrance (around 85%). This anomaly results from failure of fusion between the first and second branchial arch tubercles. Although preauricular fistula is recognized as a relatively common congenital anomaly in otolaryngology practice, comprehensive and systematic clinical studies on patient profiles in the Southeast Asian context, particularly in Indonesia, remain very limited.¹⁻³

Data on the incidence of preauricular fistula remain limited. The incidence varies globally and is estimated to be 0.1%-0.9% in the United States, 0.9% in England, and 4%-10% in some areas of Asia and Africa. The reported incidence in several countries, such as Hungary, Taiwan, and the United Kingdom, ranges from 0.47% to 2.5%. The incidence is estimated at 4-10% in several Asian and African countries. The prevalence of preauricular fistula varies across populations, ranging from 0.1% to 0.9% in the general population, with higher incidence observed in Asian and African populations compared to those in Europe and the Americas.⁴⁻⁶

The diagnosis of preauricular fistula is established clinically and is characterized by a fistulous opening anterior to the auricle that persists from birth. A thorough history-taking and clinical examination are required to identify any associated anomalies.⁴ Most preauricular fistulas are asymptomatic and do not require any treatment; however, if infection occurs, prompt and appropriate management is necessary.⁷⁻⁸ Erythema, swelling, pain, and discharge are common signs and symptoms of infection. Retained secretions also serve as a favorable

medium for bacterial growth, which may lead to infection and subsequently progress to abscess formation, pyoderma, or facial cellulitis.^{4,9,10}

Inadequate management may lead to recurrence, with reported rates ranging from 0-42%. Therefore, appropriate treatment is essential, with most cases ultimately requiring surgical intervention. Surgical management of preauricular fistula involves dissection and complete excision of the fistula tract. This procedure is generally performed in cases of recurrent infection, as complete removal of the fistula can be technically challenging.^{9,11} Preauricular fistula generally carries a good prognosis. When managed skillfully and meticulously, the outcomes are satisfactory, and the likelihood of recurrence is minimal.⁴

This study aims to establish the clinical and demographic profile of patients with preauricular fistula who presented to the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital during the period of January to December 2024. Using a retrospective descriptive design based on medical records, the study is expected to provide a comprehensive overview of case patterns, age distribution, sex, chief complaints, laterality, and clinical management applied. The outcomes of this research are anticipated not only to enrich local literature but also to contribute to the development of more contextual, evidence-based clinical management protocols.

Methods

The research method employed was a retrospective descriptive study using medical record data of patients with preauricular fistula who presented to the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital. The study period covered January to December 2024. The study population consisted of all patients with preauricular fistula who attended the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital, Surabaya. The study sample included members of the population who

met the inclusion and exclusion criteria. The inclusion criteria were preauricular fistula patients who had undergone examination, had complete medical record data, and had undergone surgery in the ORL-HNS Department of Dr. Soetomo General Hospital in 2024. The exclusion criteria were patients with recurrent preauricular fistula. Sampling was carried out using a total sampling technique. All collected medical record data were

compiled using Microsoft Excel and subsequently organized into tables.

Results

A total of 15 patients with preauricular fistula underwent surgery at the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital during the period of January to December 2024.

Table 1. Demographics of patients with preauricular fistula by sex and age

Distribution	Total	Percentage (%)
Sex		
Male	9	60
Female	6	40
Age		
0 – 5 years	5	33,33
6 – 11 years	3	20
12 – 25 years	6	40
> 25 years	1	6,67

The sex distribution in this study showed that there were 9 male patients (60%) and 6 female patients (40%), with a male-to-female ratio of 3:2. The highest number of preauricular fistula cases was found in the age group of 12–25 years,

comprising 6 patients (40%), followed by the 0–5 years group with 5 patients (33.33%), the 6–11 years group with 3 patients (20%), and the >25 years group with 1 patient (6.67%) (Table 1).

Table 2. Characteristics of patients with preauricular fistula based on clinical signs and symptoms

Clinical signs	Total	Percentage (%)
Erythema	15	100
Edema	13	86,67
Discharge	14	93,33
Otalgia	15	100

The clinical symptoms presented by patients at admission were erythema and otalgia in 15 patients (100%), discharge from the fistula in 14

patients (93.33%), and edema or swelling at the fistula site in 13 patients (86.67%) (Table 2).

Table 3. Characteristics of patients with preauricular fistula based on fistula type

Fistula Type	Total	Percentage (%)
Classic type	13	86,67
Variant type	2	13,33
Total	15	100%

The types of preauricular fistula found in patients consisted of the classic type in 13 patients (86.67%) and the variant type in 2 patients (13.33%) (Table 3).

Table 4. Characteristics of patients with preauricular fistula based on fistula location

Fistula location	Total	Percentage (%)
Right unilateral	4	26,67
Left unilateral	3	20
Bilateral	8	53,33
Total	15	100%

The characteristics of patients with preauricular fistula based on location showed that the majority were bilateral in 8 patients (53.33%), followed by right unilateral in 4 patients (26.67%) and left unilateral in 3 patients (20%) (Table 4).

Table 5. Duration of preauricular fistula symptoms before undergoing fistulectomy

Duration of symptoms	Total	Percentage (%)
2 weeks – 2 months	8	53,33
> 2 months – 6 months	6	40
> 6 months	1	6,67
Total	15	100%

The duration of preauricular fistula symptoms prior to fistulectomy was most commonly 2 weeks to 2 months in 8 patients (53.33%), followed by more than 2 months to 6 months in 6 patients (40%), and more than 6 months in 1 patient (6.67%) (Table 5).

Discussion

Preauricular fistula is a congenital anomaly resulting from incomplete development of the first and second branchial arches, which are responsible for the formation of the external ear and part of the middle ear. This anomaly

manifests as a small pit located anterior to the ascending helix and is usually found on the anterior aspect of the external ear.^{9,12} During embryogenesis, the auricle originates from the first and second branchial arches at around the 6th week of gestation. The branchial arches are mesodermal structures covered by ectoderm and lined internally by endoderm. These arches are separated externally by ectodermal branchial clefts and internally by endodermal pharyngeal pouches. The first and second branchial arches each give rise to three protrusions, collectively known as the Hillocks of His. Three hillocks arise

from the lower margin of the first branchial arch, while the other three develop from the upper margin of the second branchial arch. These hillocks are expected to fuse during the subsequent weeks of embryogenesis.^{2,8,11,13}

Figure 1 provides a schematic of the proposed auricular components from each hillock. Complex rearrangements and fusion of the hillocks camouflage the details of their individual contributions to the ear. Nonetheless, they

become the cartilage and soft tissue of the external ear that is nearly fully developed by birth. Continued cartilage deposition and matrix formation occur after birth to create a stronger and larger auricle. By 5 to 6 years of age, the auricle is approximately 80% of its adult size, and is considered the appropriate time for surgical management of deformities without risk to future growth. Adult size is achieved by early adolescence.²

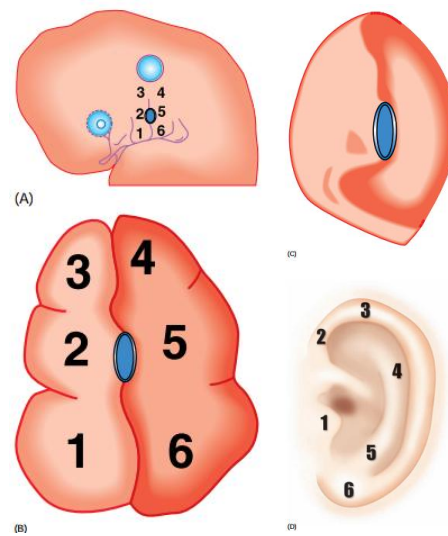


Figure 1. Development of the external ear. (A) At 4 to 6 weeks gestation, the external ear develops from six (three paired) mesenchymal condensations known as the auricular hillocks. (B) At approximately 8 to 9 weeks gestation, the hillocks rapidly fuse to form the primordia of the auricle. (C) The foundation of the future auricle is evident by 13 weeks. (D) The proposed parts of the auricle generated by the individual auricular hillocks are illustrated and are clearly seen in the 28-week embryo.

Congenital preauricular fistula results from defective fusion and closure of the first and second branchial arches derived from the Hillocks of His. Several theories regarding the formation of preauricular fistula have been proposed, including the failure of fusion between two of the six hillocks arising from the first and second branchial arches, incomplete closure of the dorsal portion of the first pharyngeal pouch, and the entrapment of isolated ectodermal folds during auricular development.^{2,8,11,13}

The sex distribution in this study showed 9 male patients (60%) and 6 female patients (40%), with a male-to-female ratio of 3:2 (Table 1). A study conducted by Song-Hwan O, et al. (2018) on 87 subjects with preauricular fistula reported 51 males (58.62%) and 36 females (41.38%), with a male-to-female ratio of 1.4:1.¹ Another study by

Aliyu DJ, et al. (2019) on 17 subjects showed 12 females (70.6%) and 5 males (29.4%), with a male-to-female ratio of 1:2.4.¹⁴ In another study by Liu C, et al. (2022) involving 40 subjects, there were 21 females (52.5%) and 19 males (47.5%), resulting in a male-to-female ratio of 1:1.1.¹⁵ These findings show both consistencies and differences compared with previous studies. The incidence of preauricular fistula in Asia is reported to be 1–10%, with no significant difference between males and females.^{9,12}

The highest number of preauricular fistula cases in this study was found in the age group of 12–25 years with 6 patients (40%), followed by the 0–5 years group with 5 patients (33.33%), the 6–11 years group with 3 patients (20%), and the >25 years group with 1 patient (6.67%) (Table 1). A study conducted by Song-Hwan O, et al. (2018)

on 87 subjects with preauricular fistula reported the highest prevalence in the 11–20 years age group, with 48 patients (55.2%).¹ In the study by Aliyu DJ, et al. (2019) involving 17 subjects, the majority of cases were in the 1–10 years age group, with 11 patients (64.7%).¹⁴ Another study by Liu C, et al. (2022) on 40 subjects reported an age range of 3 to 60 years, with a mean age of 25.34 years.¹⁵

The clinical symptoms presented by patients at admission were erythema and otalgia in 15 patients (100%), fistula discharge in 14 patients (93.33%), and edema or swelling at the fistula site in 13 patients (86.67%) (Table 2). A study by Liu C et al. (2022) involving 40 subjects with preauricular fistula reported that the most common complaints were pain (otalgia) and swelling at the fistula site, observed in 15 patients (37.5%).¹⁵ Preauricular fistulas are usually asymptomatic, isolated, and do not require treatment. However, they may become swollen and foul-smelling, and often present with recurrent acute exacerbations when infected.^{4,9} Clinically, the severity of infected preauricular fistula varies among cases. The severity can be classified into three groups: patients with no or

only mild inflammatory signs (swelling, discharge, or erythema around the sinus); patients with more severe inflammation; and patients with a history of incision and drainage or those requiring revision surgery.¹¹

The types of preauricular fistula found in this study were predominantly classic in 13 patients (86.67%) and variant in 2 patients (13.33%) (Table 3). Preauricular fistulas are usually located lateral, superior, and posterior to the facial nerve and parotid gland. There are two types of preauricular fistula: the classic and the variant. These types are classified by the pit's location relative to an imaginary vertical line. The classic type is characterized by an opening and tract located anterior to the imaginary line drawn between the tragus and the ascending helix. The variant type is further subdivided into three categories: type 1, in which the fistula penetrates the cartilage and causes postauricular swelling; type 2, in which the fistula attaches to the cartilage and results in preauricular or auricular swelling; and type 3, in which the pit is located in the upper conchal cavity (cymba concha) (Figure 2).^{11,16}

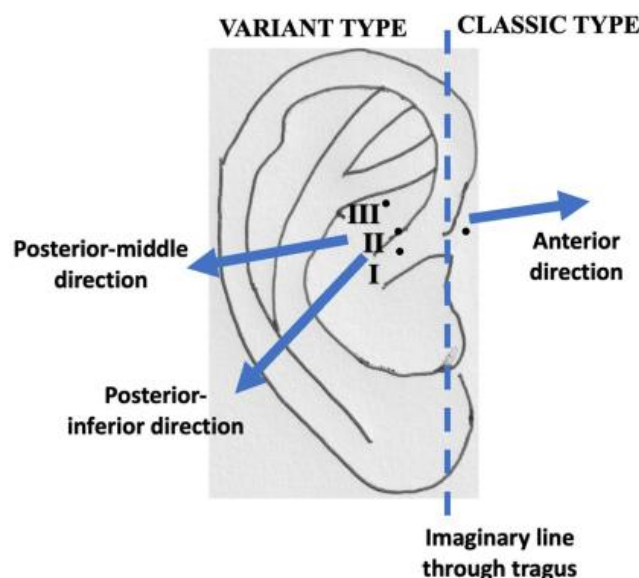


Figure 2. The schematic drawing depicts the differences among classical and variant types of preauricular sinuses and the directions of their respective fistular tracts (arrows). Classical types are characterized by pits and tracts anterior to the imaginary line between tragus and ascending helix (dashed line). The variant types are classified into pits located in the middle of the helicine crus (type 1); pits located in the superior area of the crus (type 2); and pits on the cymba concha (type 3)

The characteristics of patients with preauricular fistula in this study showed that the majority were bilateral in 8 patients (53.33%), followed by right unilateral in 4 patients (26.67%) and left unilateral in 3 patients (20%) (Table 4). A study by Song-Hwan O et al. (2018) on 87 subjects found that the most common location was left unilateral, occurring in 47 patients (57%).¹ In the study by Aliyu DJ et al. (2019) involving 17 subjects, the majority were also left unilateral in 12 patients (70.6%).¹⁴ Meanwhile, a study by Liu C et al. (2022) on 40 subjects reported the most frequent location as right unilateral in 22 patients (55%).¹⁵ Congenital preauricular fistula may appear sporadically or be inherited. This anomaly can occur bilaterally in 25–50% of cases, with bilateral preauricular fistula showing a greater hereditary tendency. Genetic analysis has reported that the chromosome associated with this anomaly is located at 8q11.1–q13.3. In unilateral cases, the left preauricular site is more frequently affected.^{11,17}

The duration of preauricular fistula symptoms prior to fistulectomy was most commonly 2 weeks to 2 months in 8 patients (53.33%), followed by more than 2 months to 6 months in 6 patients (40%), and more than 6 months in 1 patient (6.67%) (Table 5). The initial management of a first-time-infected preauricular fistula may be conservative, including antibiotic administration

and warm compresses applied to the infected sinus. In the acute phase of infection, antibiotics should be selected based on the causative bacteria and their sensitivity profile. If an abscess is present, incision and drainage are required.

The indication for surgery arises after two consecutive infections or in cases of persistent infection. Surgical intervention is performed once the acute infection has been resolved. Various surgical techniques may be employed; however, none has consistently demonstrated superior outcomes. Incomplete excision is the main cause of recurrence, with reported recurrence rates ranging from 0% to 42%.^{4,9,11}

Conclusions

The profile of patients with preauricular fistula who underwent surgery at the ORL-HNS Outpatient Department of Dr. Soetomo General Hospital during the period from January to December 2024 comprised 15 patients. The male-to-female ratio was 3:2, with the highest prevalence in the 12–25 years age group. The most common clinical symptoms were pain and erythema at the fistula site. The majority of cases were classic preauricular fistulas. Bilateral location was the most frequently observed. The most common symptom duration prior to surgery ranged from 2 weeks to 2 months.

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