Improving the management of pinna abscess – A case series

Abstract

Introduction

If auricular perichondritis is left untreated or sub optimally managed the development of a subperiosteal abscess with potential cartilage loss and gross cosmetic defect may ensue.

Materials and Methods

A retrospective review was conducted to identify the cause, microbiology, management and outcome of patients presenting with pinna abscess over a 5 year period at a tertiary hospital.

Results

All 17 patients underwent incision and drainage of their abscess at least once. 14 patients had microbiology samples; 10 culture-positive. The commonest pathogen was Pseudomonas aeruginosa (5). A range of initial empirical therapy was used; appropriately in only one case. 8 patients developed complications.

Discussion and Recommendations

Pseudomonas aeruginosa is associated with pinna abscesses, particularly caused by high piercings. Suboptimal antimicrobial management was associated with poor outcomes. We recommend clinicians review their empirical treatment of pinna abscesses and have systems to act on microbiology results. Clinicians must consider Pseudomonas aeruginosa when managing resistant cases of abscesses or due to high piercings.

Keywords

Pinna, abscess, pseudomonas aeruginosa, microbiology, management.
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Information was taken directly from the medical case notes for the 17 cases of pinna abscess, including patient demographics, date of episode, aetiology, date of any incision and drainage, documentation of culture results and post treatment complications. Data on microbial culture was taken from the medical case notes, the online patient results service and microbiology laboratory computer system. Data on antimicrobial therapy was taken directly from the patient’s drug chart and discharge letter. The results of the study were analysed using descriptive statistics.

Results
A summary of the 17 cases can be seen in Appendix 1.

<table>
<thead>
<tr>
<th>No</th>
<th>Age/ Sex</th>
<th>Underlying cause</th>
<th>LA / GA</th>
<th>Micro culture results</th>
<th>Culture results documented (day post sample)</th>
<th>Initial antimicrobial therapy</th>
<th>Changes to antimicrobial therapy (days post original I&amp;D)</th>
<th>Complications (days post original I&amp;D)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>9/F</td>
<td>Unknown</td>
<td>LA</td>
<td>Anaerobic gram negative bacillus</td>
<td>No</td>
<td>PO penicillin V</td>
<td>PO penicillin V + PO flucloxacillin day 2</td>
<td>Repeat I&amp;D LA day 2</td>
</tr>
<tr>
<td>2</td>
<td>9/M</td>
<td>Unknown</td>
<td>GA</td>
<td>No growth</td>
<td>No</td>
<td>Co-flumucipal + erythromycin</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>11/M</td>
<td>Unknown</td>
<td>GA</td>
<td>No growth</td>
<td>Yes</td>
<td>Unknown</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>13/F</td>
<td>Post high piercing</td>
<td>GA</td>
<td>PA</td>
<td>Yes (day 18)</td>
<td>PO amoxicillin</td>
<td>IV benzylpenicillin + flucloxacillin + metronidazole day 17, oral ciprofloxacin day 18</td>
<td>Repeat I&amp;D GA day 17, long term gross cartilage necrosis</td>
</tr>
<tr>
<td>5</td>
<td>13/F</td>
<td>Post high piercing</td>
<td>GA</td>
<td>PA</td>
<td>Yes (day 5)</td>
<td>IV clarithromycin + metronidazole</td>
<td>IV ceftazidime day 5, oral ciprofloxacin day 6</td>
<td>Repeat I&amp;D GA day 2 + repeat I&amp;D GA day 5, long term gross cartilage necrosis</td>
</tr>
<tr>
<td>6</td>
<td>14/F</td>
<td>Post high piercing</td>
<td>GA</td>
<td>PA</td>
<td>Yes (day 4)</td>
<td>IV flucloxacillin + benzylpenicillin</td>
<td>IV ciprofloxacin day 4</td>
<td>Readmission day 4</td>
</tr>
<tr>
<td>7</td>
<td>17/F</td>
<td>Post high piercing</td>
<td>LA</td>
<td>PA</td>
<td>Yes (day 12)</td>
<td>PO amoxicillin</td>
<td>IV co-flumucipil day 3, IV flucloxacillin day 8, PO ciprofloxacin day 12</td>
<td>Repeat I&amp;D GA day 4 + repeat I&amp;D LA day 8 + repeat I&amp;D LA day 9 + cartilage loss</td>
</tr>
<tr>
<td>8</td>
<td>18/M</td>
<td>Unknown</td>
<td>LA</td>
<td>No sample</td>
<td>No</td>
<td>PO amoxicillin + flucloxacillin</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>20/M</td>
<td>Unknown</td>
<td>LA</td>
<td>No growth</td>
<td>No</td>
<td>IV flucloxacillin benzylpenicillin</td>
<td>PO augmentin day 4</td>
<td>Repeat I&amp;D LA day 4</td>
</tr>
<tr>
<td>10</td>
<td>21/M</td>
<td>Unknown</td>
<td>LA</td>
<td>No sample</td>
<td>No</td>
<td>PO amoxicillin</td>
<td>PO flucloxacillin day 2</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>28/F</td>
<td>Unknown</td>
<td>LA</td>
<td>CoNS and Enterococcus</td>
<td>No</td>
<td>PO flucloxacillin</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>29/M</td>
<td>Unknown</td>
<td>LA</td>
<td>No sample</td>
<td>NA</td>
<td>PO flucloxacillin</td>
<td>None</td>
<td>Repeat I&amp;D LA day 5</td>
</tr>
<tr>
<td>13</td>
<td>29/M</td>
<td>Unknown</td>
<td>LA</td>
<td>No growth</td>
<td>No</td>
<td>Unknown</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>14</td>
<td>45/M</td>
<td>Trauma</td>
<td>LA</td>
<td>SA, GAS</td>
<td>No</td>
<td>IV augmentin</td>
<td>None</td>
<td>Cartilage necrosis</td>
</tr>
<tr>
<td>15</td>
<td>46/M</td>
<td>Unknown</td>
<td>GA</td>
<td>CoNS</td>
<td>No</td>
<td>PO erythromycin</td>
<td>None</td>
<td>None</td>
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<tr>
<td>16</td>
<td>61/F</td>
<td>Unknown</td>
<td>GA</td>
<td>Coliform and anaerobe</td>
<td>Yes (day 4)</td>
<td>IV flucloxacillin</td>
<td>None</td>
<td>None</td>
</tr>
<tr>
<td>17</td>
<td>83/F</td>
<td>Unknown</td>
<td>LA</td>
<td>PA</td>
<td>Yes (day unknown)</td>
<td>IV cefuroxime + metronidazole</td>
<td>None</td>
<td>Pyogenic granuloma + chronic pain</td>
</tr>
</tbody>
</table>

Appendix 1: Summary of patient demographics, aetiology, management, causative organism and any complications.
M, male; F, female; LA, local anaesthetic; GA, general anaesthetic; CoNS, coagulase negative Staphylococcus; PA, Pseudomonas aeruginosa; SA, Staphylococcus aureus; GAS, group A Streptococcus; IV, intravenous.
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**Patient demographics**
Nine of the patients investigated with pinna abscess were male (52.9%), eight were female (47.1%). The average age on presentation was 27.4 years, range (9 years – 83 years). However, the average age of patients who developed an abscess post high ear piercing was much younger (14.3 years).

**Risk factors for pinna abscess**
No underlying cause for pinna abscess formation was recorded in the case notes of twelve cases (70.6%). In four cases (24%) the patient had undergone a recent high ear piercing in the affected ear within the previous month, all were female. In one case the affected ear had been traumatised during a fight two weeks prior to abscess formation (Figure 1).

**Initial treatment**

**Surgical**
All patients underwent surgical drainage of their pinna abscess. Following abscess drainage the skin of the pinna was held in place by a pressure bandage typically utilising dental roles and through and through sutures (Figure 2). In seven cases patients (41.2%) required a general anaesthetic in theatre, whereas ten patients (58.8%) were managed using local anaesthetic in the hospital ward environment. The size of the abscess was not documented nor the reason for local versus general anaesthetic.

**Microbiology**
Only 14 of the 17 patients had operative samples sent (10 pus swabs and four pus samples), 10 (70%) were culture positive. Culture results for each case are shown in Appendix 1. The commonest pathogen grown from the pus swab at incision and drainage was *Pseudomonas aeruginosa* (5 cases (31.3%)). In two patients, the *Pseudomonas* was mixed with coliforms. All four cases of abscess post high ear piercing grew *Pseudomonas aeruginosa*. One patient with a clear history of local trauma grew *Staphylococcus aureus* and a group A *Streptococcus*, two patients grew gram negative anaerobes, two patients grew coagulase negative staphylococci, one mixed with enterococci. It is unclear whether antimicrobial therapy prior to surgery affected culture results in those cases where cultures were negative.

In seven of the seventeen cases (41.2%) was there documentation in the medical case notes that a clinician looking after the patient had reviewed the culture results. The median time to laboratory reporting of results was three days.

**Antimicrobial therapy.**
A wide range of antimicrobial agents was used as initial adjunctive therapy to surgical drainage. Nine patients (52.9%) were treated initially with oral antibiotics. Three of these were treated with oral amoxicillin, two of these were treated with oral flucloxacillin, one with oral phenoxymethylpencillin, one with oral erythromycin, one with co-fluampical and erythromycin and one with amoxicillin and flucloxacillin.

Six patients (35.3%) were initially treated with intravenous antibiotics (iv). This included two patients with iv flucloxacillin and benzylpenicillin, one patient with iv flucloxacillin, one patient with iv cefuroxime and metronidazole, one patient.

![Figure 1: A patient with a pinna abscess post trauma.](image1)

![Figure 2: Post drainage of a pinna abscess with dental rolls sutured through to maintain pressure.](image2)
with iv clarithromycin and metronidazole and one patient with iv augmentin.

In two of the patients the choice of initial antimicrobial agent was not documented. None of the 17 patients were started empirically on an antimicrobial with activity against *Pseudomonas aeruginosa*.

Seven out of the seventeen patients (41.2%) had their initial antimicrobial therapy changed to a different agent at some point during admission, but this often did not reflect culture results and the rationale was unclear. Appropriate antimicrobial therapy in this analysis was considered to be an agent with in vitro activity against the pathogen concerned and could therefore only be assessed for the 10 culture positive cases. On this basis, six patients, including two with infection caused by *Pseudomonas aeruginosa* never had appropriate therapy. Nine out of the ten culture positive cases did not have appropriate empirical therapy and five of these required further incision and drainage. It took an average of 7.3 days (range 4-12 days) for patients with *Pseudomonas aeruginosa* infection to be converted to appropriate antimicrobial regimens.

An iv antimicrobial being changed to oral form on discharge was not counted as an antimicrobial change.

**Complications**

Of the seventeen cases, there was no documented complication in eight (47.1%). Three of the non pseudomonal cases represented post discharge and required a repeat incision and drainage under local anaesthetic. All three cases had initial I&D performed under a local anaesthetic. There was no documented long term cosmetic deformity in any of these three cases. Case 14 had developed an infected haematoma post pinna trauma and subsequently developed a ‘cauliflower ear’ (Figure 3). None of the patients undergoing I&D under general anaesthetic required a second surgical intervention in the non pseudomonal group.

Of the 5 cases where *Pseudomonas aeruginosa* had been cultured, all five developed a post operative complication: This ranged from pain, repeated incision and drainage to gross cartilage necrosis and disfigurement requiring specialist plastic surgery referral.

**Discussion**

Despite the small number of cases our results confirm that perichondrial infection of the pinna is associated with significant morbidity in terms of hospital admission and potential long term cosmetic deformity. The perichondrium is responsible for the provision of blood supply to the underlying cartilage. Thus disruption of the perichondrium can result in necrosis and destruction of the cartilage with, often irreversible, cosmetic deformity.

Of the seventeen cases of pinna abscess, we were only able to identify a reason for developing the abscess in five of the patients. Four patients had undergone recent high trans cartilage piercings and one had experienced local trauma to the pinna.

Fourteen patients had microbiological investigations and 10 of these (71%) were positive, indicating that microbiological investigation is both reliable and worthwhile for this clinical indication. A range of pathogens including aerobes and anaerobes were cultured. *Pseudomonas aeruginosa* was the most common causative organism in this series and was almost exclusively associated with high piercings. In one case, a pure growth of coagulase negative *Staphylococcus* was cultured; although commonly considered a contaminant, these bacteria are increasingly recognised as pathogens, even in the absence of prosthetic material. *Pseudomonas aeruginosa* has previously been documented as a causative organism in the development of perichondritis and pinna abscesses as well as *Staphylococcus aureus.* Where a transcartilage piercing has been undertaken *Pseudomonas aeruginosa* has been reported as the responsible organism in 95% of the cases. However, the possibility of *Pseudomonas aeruginosa* as a causative organism in pinna abscesses following high piercing is not well known among medical practitioners and Otolaryngology surgeons, judging by the empirical antimicrobial therapy used for the patients in our study.

All seventeen patients were commenced on either oral or intravenous empirical antibiotics. In only one case was the initial empirical therapy active against the pathogen(s) subsequently cultured. There was also a significant delay (7 days) in responding to culture results and initiating appropriate antimicrobial therapy, which could not be accounted for by delayed reporting of results.

The entire cohort of patients required at least one incision and drainage of their pinna abscess and a high proportion of patients developed complications. Fifty percent of patients that were initiated on inappropriate antimicrobial therapy required further surgical intervention. However patients in the non pseudomonal group required only one surgical intervention if this was performed under a general anaesthetic compared to 33% of patients requiring a second surgical procedure if drained under a local anaesthetic.

“Cauliflower ear” is recognised as a serious and disfiguring deformity leading to psychosocial distress to the patient and occurred in two of our patients. Other potentially life
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threatening complications such as endotoxic shock have also been reported in the literature. All five of the cases which grew *Pseudomonas aeruginosa* had complications ranging from pain to cosmetic deformity leading to specialist plastic surgery referral.

We conclude that *Pseudomonas aeruginosa* is the common pathogen in the aetiology of pinna abscesses associated with high trans cartilage piercings. It is also evident that medical practitioners, including Otolaryngology surgeons, overlook this fact. Inappropriate empirical antimicrobial therapy is associated within an increased length of hospital stay, repeated interventions and also places them at risk of potential complications. Although it is not known whether earlier appropriate therapy would reduce the likelihood of a poor outcome, it seems reasonable to recommend that all pinna abscess associated with high piercings have microbiological sampling and empirical antibiotic therapy that covers *Pseudomonas aeruginosa*. We recommend using ciprofloxacin which has the same bioavailability orally as it does intravenously. Given the range of pathogens encountered in pinna abscesses not associated with high piercing, and a need to avoid unnecessary use of quinolones, we suggest co-amoxiclav for this situation. Patients with pinna abscess have a better outcome if treated by incision and drainage performed under a general anaesthetic. Otolaryngology departments need to develop robust systems for early review and action based on microbiology results.

**Conflict of Interest**

All authors have no conflict of interest to declare. No extraneous funding was obtained.

**Summary**

- Auricular perichondritis is a common condition that can lead to abscess formation and gross cosmetic disfigurement if inappropriately managed.
- The most common organisms responsible for the infection are *Staphylococcus aureus* and *Pseudomonas aeruginosa*. However the role of the latter is not well known amongst otolaryngologists.
- *Psuedomonas aeruginosa* is the most likely pathogenic organism following "high, trans-cartilage" ear piercing in our experience.
- Microbiology investigations are both reliable and worthwhile in directing appropriate antimicrobial therapy and should be used in all cases.
- Inappropriate antimicrobial therapy leads to longer inpatient stay, prolonged patient distress and potential cosmetic defects.
- All cases of pinna abscesses post high trans cartilage ear piercings can be managed as out patients following incision and drainage on oral antibiotics, namely ciprofloxacin.
- For cases not related to high trans cartilage piercings we recommend the use of co-amoxiclav.

**References**