AUDIT OF *PSEUDOMONAS AERUGINOSA* RESISTANCE TO COMMONLY PRESCRIBED ANTIMICROBIALS

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Background

Otitis externa and chronic suppurative otitis media (CSOM) are common conditions in otolaryngology clinics and are frequently caused by bacterial pathogens. The former is a common condition involving the inflammation or infection of the external auditory meatus that is typically caused by a bacterial pathogen. *Pseudomonas aeruginosa* is the most commonly identified pathogen, followed by *Staphylococcus aureus*, β haemolytic *Streptococcus* and *Candida* species^{1,2}. Additionally, *Pseudomonas aeruginosa* is the most common cause of chronic suppurative otitis media.

P.aeruginosa is a Gram negative bacteria that has the ability to either acquire resistant genes from other nearby bacteria or by gene mutations³. Ciprofloxacin, which is safe with a tympanic membrane perforation, is often used as a first line treatment topically. However, the incidence of resistance towards ciprofloxacin and other commonly used antibiotics is increasing.

Understanding the resistance pattern of this pathogen is crucial when treating patients that present with either otitis externa or CSOM.

Objectives

This study set out to identify the local resistance rate of *Pseudomonas aeruginosa* positive ear swabs to Ciprofloxacin and other common antimicrobials.

Methods

A retrospective study was carried out over a 24 month period between January 2015 and December 2016. To establish the rate of *P.aeruginosa* ciprofloxacin resistance, all positive ear swabs for pseudomonas received by the microbiology department were collated and sensitivity profiles recorded. The patient case notes were reviewed for those swabs that were shown to be resistant to ciprofloxacin. The identified ciprofloxacin resistance rate was compared to the reported literature rate.

Results: Overall Pseudomonas resistance

Antibiotic	Cipro	Gent	Tazocin	Mero	Imipenam	Ceftazidime	Colistin
Total No. of samples tested against Abx	2023	2023	2022	2023	1759	2023	2021
Sensitive	1897	1837	1674	1951	1665	1960	2014
Percentage (%)	93.8	90/8	82.8	96.4	94.7	96.9	99.7
Resistant	126	186	348	72	94	63	7
Percentage (%)	6.2	9.2	17.2	3.6	5.3	3.1	0.3

Table 1. Pseudomonas resistance to common antibiotics

Results: Demographics

A total of 2023 ear swabs cultured Pseudomonas.

Swab Side	Frequency	Percentage
Right Ear	696	47.9%
Left Ear	1026	50.7%
Undefined	28	1.4%
	2023	100.0%

Average age of patient: 44.45 years
Range: 0 – 97 years

Gender	Frequency	Percentage
Male	1043	51.6%
Female	949	46.9%
Not Stated	31	1.5%
	2023	100.0%

Table 2. Numbers of swabs collected

Table 3. Breakdown of patients by gender

Results: Resistance

Number of Abx Pseudomonas Resistant to	Frequency	Percentage
0	1436	71.0%
1	393	19.4%
2	132	6.5%
3	35	1.7%
4	12	0.6%
5	4	0.2%
6*	11*	0.5%*
7	0	0.0%
	2023	100.0%

*9 samples from same patient on different dates, 2 samples no details available and possibly from the same patient.

Table 4. The frequency and percentage of antibiotics that individual samples were resistant to

Discussion

P.aeruginosa, is becoming increasingly resistant to current topical antimicrobial agents. Lister identified the rate of ciproflxacin resistance among *P.aeruginosa* isolates in hospitals and ICU's to range between 21-35%.³ Other studies focusing on resistance rates from ear swabs, identify resistance rates to the same antibiotic ranging from 6.2-25%.⁴⁻⁶ This study identified a local resistant rate to ciprofloxacin of 6.2% which is lower compared to other geographical areas. Resistance to gentamicin and Piperacillin/Tazobactam was 9.2% and 17.2% respectfully. Additionally 1.7% of samples were resistant to three or more antibiotics. There is therefore no requirement to cease using ciprofloxacin as a first line antimicrobial to treat suspected or proven pseudomonal ear infections.

5. Conclusion

Incidence of *Pseudomonas aeruginosa* positive ear swabs to ciprofloxacin is relatively low in our area and there is no need to cease using it as a first line agent. The management for those with pathology caused by multi-drug resistant bacteria can be challenging.

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