

## **Abstract**

### **Objectives:**

Referrals for OE have dramatically increased but the reasons for this remain unclear. We aim to characterise management of patients both pre- and post-referral to identify areas of improvement at the primary-secondary care interface and to determine what proportion of patients could be managed in community aural care clinics.

### **Design:**

Questionnaire study from consultant-led research clinic specifically setup to prospectively analyse OE referrals.

### **Settings:**

Tertiary referral centre for Otolaryngology.

### **Participants:**

All patients referred electively with OE to the unit were triaged to this research clinic. 62 patients were included; 63% female, mean age 54 years. One was excluded (clinically not OE).

### **Main Outcomes Measures:**

Patient demographics, management undertaken in primary care, management undertaken in secondary care, assessment of suitability for community aural care clinics.

### **Results:**

Most patients had multiple primary care visits before referral (average 4 GP; 2 practice nurse). 60% had received oral antibiotics (16% multiple classes). 18% had never had ear drops. 39% were not advised to keep ears dry. 21% had dermatitis; 13% contact allergy, 30% systemic allergy, 5% diabetes. <10% had narrow canals.

36% had active discharge but <7% needed a wick. Approximately 75% appear suitable for community aural care clinics.

**Conclusions:**

OE occurs most commonly in female patients, often with associated risk factors. Patients often consult primary care many times prior to referral. Lifestyle advice and ototopical drops are frequently overlooked; instead often inappropriately treated with oral antibiotics. Most ears were anatomically normal and community aural care clinics may have a role in reducing referrals.

245 words (excluding subtitles)

**Key points:**

- Most patients with OE referred to secondary care have been treated with oral antibiotics but ototopical drops are often under-utilised in primary care
- Many patients are either not told, or fail to retain, advice regarding water precautions prior to referral
- Many patients referred with OE have associated risk factors including a medical history of dermatitis and allergies
- Most patients referred with OE have anatomically normal ears
- The majority of patients (approximately 75%) appear suitable for redirection for management in community aural care clinics

**Key words:**

Otitis Externa, primary health care, anti-bacterial agents, microbiology, referral and consultation

## **Introduction and Objective**

Otitis externa is very common; affecting 10% of the population at some time in their lives and has an annual incidence in excess of 40,000 cases in UK general practice per year (1). It most frequently comprises a short-lived episode of otalgia and ear irritation with or without ear discharge (2).

Locally we have witnessed a rapid rise in referrals from primary to secondary care for OE. This is mirrored in UK nationwide data which demonstrates a rise in inpatient admissions with OE between 2002-2017 of 63.1% (3). There was also a 599% increase in admissions nationally with necrotising OE over the same interval. The reasons for these recent increases remain poorly understood.

Our aim is to better understand disease presentation and management both prior to and after secondary care referral, which might identify areas where improvements in practice could improve patient care pathways.

## **Design, Setting and Participants**

All new elective referrals from primary to secondary care were triaged to a consultant-led (JAW) OE research clinic between November 2018 – March 2019. Anonymised data on patient demographics, relevant risk factors, and primary care management were collected using a standardised proforma in the clinic. The quality improvement project was registered with the Newcastle upon Tyne Hospitals NHS Foundation Trust Clinical Audit and Effectiveness department. Cases which were referred to the clinic but not clinically otitis externa were excluded.

## **Outcomes, Measures and Results**

### Patient demographics

62 patients were seen in 11 elective clinic sessions. One patient (1 year old female) was excluded due to not having otitis externa. The mean patient age was 54 years (range 16-88 years). The majority (38/61) of patients were female. 13/61 patients had a concurrent diagnosis of eczema and 3/61 reported a diagnosis of diabetes mellitus (2 Type 2; 1 Type 1). Shampoo was used on average 3.9 times/week. 8/61 reported contact allergies and 18/61 reported systemic allergies.

### Management prior to referral

Patients had seen their GP on average 4.3 times (range 0-25) and practice nurse 2.0 times (range 0-40) prior to ENT referral. Management received prior to secondary care referral is demonstrated in Table I.

### Clinical examination findings

A notable proportion (11) of 61 patients were found to have eczematous changes to the pinna. Six had markedly narrow external auditory canals (EAC). Twenty-one had actively discharging ears when attending clinic. Two patients were incidentally found to have aural polyps in the ear canal – both were listed for removal. One patient was found to have exposed bone in the EAC (though not clinically necrotising OE). One patient was found to have a false fundus. One patient had removal of incidental foreign body.

### Management in Secondary Care

All patients were counselled about risks of water ingress and given appropriate advice in the form of a self-help sheet. The 22 patients with active discharge underwent microsuction of the external auditory canal (EAC) in clinic, 20 having swabs taken from the discharge. Fourteen had Betnovate-C™ ointment

(betamethasone valerate 0.1% / clioquinol 3%) instilled into their EAC. Four patients required insertion of a Pope wick for successful treatment with ototopical agents. Five were prescribed sodium bicarbonate drops for impacted wax. Three were advised to use moisturisers. One patient underwent cautery of granulation tissue of the EAC in clinic. Fourteen patients with were brought back for follow up (including the two listed for aural polypectomy).

## **Discussion**

### Summary

The burden of OE in both primary and secondary care is considerable. Nationally the UK has experienced a concerning 63% rise in OE admissions in the last 15 years, with a disproportionate 599% rise in necrotising OE admissions (3). Locally we have observed a large increase in outpatient referrals for OE but the reasons for this remain unclear.

Through an ENT consultant-led research clinic we have characterised a cohort of patients referred electively for OE and identified important factors which, if targeted by specific interventions, may reduce the incidence and severity of OE.

### Strengths and limitations

This study benefitted from a representative sample of patients prospectively assessed by a single experienced consultant ENT surgeon using a standardised proforma. Limitations are inability to comment on regional variations— particularly with regard to primary care management and referral guidelines to secondary care. The study also relied on patients accurately recalling the content of advice in primary care consultations, typically some several months previously.

### Comparison with existing literature and implications for practice

The patient demographics highlight particular groups are at risk. Most - 77% - of patients were over 40 years old and the majority were female – in keeping with previous data from primary care (1). The reasons for this female preponderance remain unclear. In terms of comorbidities, many of our patients had concurrent diagnoses of eczema (13.1%) or systemic allergies (29.5%); notably higher than the population in general (4) (5). Allergic otitis externa is an important distinct entity, as otological preparations containing antimicrobials may sensitise the ear canal skin and worsen allergic OE (6). At review in the ENT consultant-led clinic a substantial proportion (11/61) of patients had eczematous features on examination of their pinna. This figure is approximately double the upper estimate of prevalence of atopic eczema in the UK adult population in general (7); emphasising the high relative risk of OE in patients with known atopy. Any suspicion of allergic eczema should prompt allergy testing for avoidance of triggers in favour of persistent antimicrobial therapy.

Similarly, recognition of comorbidities is important in assessment of clinical risk. Diabetes mellitus is well recognised to impair immunity and therefore could be expected to be over represented in OE; however only 3/61 (4.9%) of patients in this series had either Type 1 or Type 2 diabetes mellitus, similar to the background UK prevalence of 5.8% (8). In contrast diabetes mellitus may permit progression to more severe necrotising OE, with which it is well associated (9).

It is clear that most patients are seen many times by their primary care provider prior to referral; on average seeing their GP over 4 times and nurse practitioner twice prior to referral to ENT. Almost one in five had never received otological drops from their primary care provider yet over 60% had received at least one course of oral antibiotics, more even than the 44% identified in a prior study (10). Ten received

multiple different classes of oral antibiotics prior to referral, with added risk of multi-drug resistance (11), or fungal superinfection.

Efforts to limit these sequelae are provided nationally through the NICE Clinical Knowledge Summary and also via local guidelines (12). It has however been specifically demonstrated that the provision of guidelines for the treatment of OE does not translate into changes in clinical practice (13). This is reflected in our data which identified that use of topical acetic acid as first line treatment (as recommended by NICE for localised OE) was rarely seen in practice; with only 5/61 patients having received this. The reasons for this remain unknown. Interestingly, the use of topical creams (of which there was substantial variation, but often containing either steroid or anti-fungal agents) was commonplace, with 33/61 patients having been prescribed one prior to referral – despite not appearing in NICE guidelines.

These trends in antimicrobial prescribing in OE witnessed locally appear to be replicated nation-wide; a multilevel logistic regression analysis of over one million UK primary care consultations identified that otitis externa had the highest rate of inappropriate prescribing of any of the common infections analysed - 67.3% prescriptions being deemed inappropriate. This study, like ours, identified overuse of amoxicillin in particular for OE. Interestingly, a proportion (8%) of these inappropriate prescriptions for OE were attributed to clustering effects at the practice level – highlighting an opportunity to improve prescribing through targeted education for particular practices (14).

Amongst antibiotic containing topical therapies Otomize™ (neomycin sulphate 0.5%/ dexamethasone 0.1% / acetic acid 2.0%) spray was the most frequently prescribed agent (38/61) in our cohort. This is perhaps not surprising as previous studies have identified a more reproducible volume of delivery using the pump spray of Otomize™,

as compared with commonly used drop preparations, even when patients are appropriately counselled on the use of ototopical drops – which may in part explain its popularity (15).

When ototopical drops were used, Gentisone HC™ (gentamicin 0.3% / hydrocortisone acetate 1.0%) was the most frequently prescribed. Some non-specialists hesitate to use topical aminoglycosides due to risks of ototoxicity, however, even where an underlying perforated tympanic membrane or infected grommet cannot be ruled out expert consensus suggests that short courses (i.e. under two weeks) are acceptable (16).

Regardless of selected pharmacological treatment, many patients (24/61) denied being offered simple advice regarding water precautions, which potentially misses a cost-effective and side effect-free option for treatment. This may also go some way towards explaining recurring symptoms once treatment has been completed.

Two thirds of patients had no active ear discharge when seen in clinic. Those with active discharge (22/61) underwent aural toileting in the form of microsuction, which has been shown to be feasible in the community (17). Therefore, even for patients with active discharge in the EAC requiring suction clearance the provision of community aural care clinics have potential to free up outpatient appointments within ENT departments and may also offer a shorter interval from referral to treatment.

A minority of patients (14/61) were brought back for follow up – including those listed for removal of Pope wicks, aural polypectomy, review of severe disease, or for other incidental findings described above. The remaining 77% appear suitable for community aural care clinics.

## **Conclusion**

We have demonstrated through an ENT consultant-led research clinic that despite prior reports, overuse of oral antibiotics, and underuse of ototopical drops continues. Many patients have failed to receive – or retain - advice on keeping ears free from water. These factors are easily reversible and should form part of the educational material in primary care including guidelines, primary care training programmes, and continued professional development teaching. The majority of aural toilet and topical therapy can be delivered in the community, which may offer a timelier and more cost-effective patient pathway.

## References:

1. Rowlands S, Devalia H, Smith C, Hubbard R, Dean A. Otitis externa in UK general practice: A survey using the UK General Practice Research Database. *Br J Gen Pract* [Internet]. 2001 Jul [cited 2019 Oct 4];51(468):533–8. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/11462312>
2. Hajioff D, MacKeith S. Otitis externa. *BMJ Clin Evid* [Internet]. 2015 Jun 15 [cited 2019 Sep 17];2015. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/26074134>
3. NHS. Hospital Episode Statistics (HES) - NHS Digital [Internet]. NHS Digital. 2019 [cited 2019 Oct 23]. Available from: <https://digital.nhs.uk/data-and-information/data-tools-and-services/data-services/hospital-episode-statistics>
4. Nutten S. Atopic dermatitis: Global epidemiology and risk factors. *Ann Nutr Metab* [Internet]. 2015 [cited 2020 Feb 24];66(1):8–16. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/25925336>
5. Gupta R, Sheikh A, Strachan DP, Anderson HR. Time trends in allergic disorders in the UK. *Thorax* [Internet]. 2007 Jan [cited 2020 Feb 24];62(1):91–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/16950836>
6. Sood S, Strachan DR, Tsikoudas A, Stables GI. Allergic otitis externa. *Clin Otolaryngol Allied Sci* [Internet]. 2002 Aug [cited 2019 Oct 4];27(4):233–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/12169122>
7. Cork MJ, Danby SG, Ogg GS. Atopic dermatitis epidemiology and unmet need in the United Kingdom. *J Dermatolog Treat* [Internet]. 2020 Oct 21 [cited 2019 Oct 23];31(8):801–9. Available from: <https://www.tandfonline.com/doi/full/10.1080/09546634.2019.1655137>

8. Diabetes Prevalence 2018 | Diabetes UK [Internet]. 2018 [cited 2019 Oct 4]. Available from: <https://www.diabetes.org.uk/professionals/position-statements-reports/statistics/diabetes-prevalence-2018>
9. Mills R. Malignant otitis externa. *Br Med J (Clin Res Ed)* [Internet]. 1986 Feb 15 [cited 2019 Oct 4];292(6518):429–30. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/3081109>
10. Pabla L, Jindal M, Latif K. The management of otitis externa in UK general practice. *Eur Arch Oto-Rhino-Laryngology* [Internet]. 2012 Mar 15 [cited 2019 Sep 17];269(3):753–6. Available from: <http://link.springer.com/10.1007/s00405-011-1687-7>
11. WHO. Global Action Plan on Antimicrobial Resistance [Internet]. Vol. 10, *Microbe Magazine*. 2015 [cited 2019 Oct 23]. 354–355 p. Available from: [www.paprika-annecy.com](http://www.paprika-annecy.com)
12. National Institute for Health and Care Excellence. NICE Clinical Knowledge Summary: DMARDs [Internet]. NICE Clinical Knowledge Summary: Otitis Externa. 2016. Available from: <http://cks.nice.org.uk/dmards#!scenario:8>
13. Bhattacharyya N, Kepnes LJ. Initial impact of the acute otitis externa clinical practice guideline on clinical care. *Otolaryngol - Head Neck Surg* [Internet]. 2011 Sep 29 [cited 2019 Sep 22];145(3):414–7. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/21531870>
14. Nowakowska M, Van Staa T, Mölter A, Ashcroft DM, Tsang JY, White A, et al. Antibiotic choice in UK general practice: Rates and drivers of potentially inappropriate antibiotic prescribing. *J Antimicrob Chemother* [Internet]. 2019 Nov 1 [cited 2019 Oct 23];74(11):3371–8. Available from:

<https://academic.oup.com/jac/article/74/11/3371/5552321>

15. Lancaster J, Mathews J, Williams RS, Thussey C, Kent SE. Comparison of compliance between topical aural medications [Internet]. Vol. 28, *Clinical Otolaryngology and Allied Sciences*. 2003 [cited 2019 Oct 10]. Available from: <https://onlinelibrary.wiley.com/doi/pdf/10.1046/j.1365-2273.2003.00715.x>
16. Phillips JS, Yung MW, Burton MJ, Swan IRC. Evidence review and ENT-UK consensus report for the use of aminoglycoside-containing ear drops in the presence of an open middle ear. *Clin Otolaryngol* [Internet]. 2007 Sep 19 [cited 2019 Oct 10];32(5):330–6. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/17883551>
17. Lewis C. Is a community-based mastoid microsuction service feasible: The audit of a pilot project. *J Laryngol Otol* [Internet]. 1995 Oct [cited 2019 Oct 23];109(10):971–4. Available from: <http://www.ncbi.nlm.nih.gov/pubmed/7499951>