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OTOLOGY

A retrospective cohort study of telephone versus face-to-face clinics for the management of new otology referrals

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Abstract

Purpose To compare outcomes of telephone and face-to-face consultations for new otology referrals and discuss the wider use of telemedicine in otology.

Methods Retrospective cohort study including new adult otology referrals to our unit, sampled consecutively between March 2021 and May 2021, seen in either a face-to-face or telephone clinic. Primary outcome measure was the proportion of patients with a definitive management outcome (discharged or added to waiting list for treatment) versus the proportion of patients requiring follow-up for further assessment or review.

Results 150 new patients referred for a routine otology consultation (75 telephone, 75 face-to-face) were included. 53/75 patients (71%) undergoing a face-to-face consultation received a definitive outcome following initial review, versus 22/75 (29%) telephone patients ($\chi^2 < 0.001$, OR 5.8). 52/75 (69%) telephone patients were followed up face-to-face for examination. The mean (SD) number of appointments required to reach a definitive outcome was 1.22 (0.58) and 1.75 (0.73) in the face-to-face and telephone cohorts, respectively ($p < 0.001$).

Conclusions Telephone clinics in otology have played an important role as part of the COVID19 response. However, they are currently limited by a lack of clinical examination and audiometry. Remote assessment pathways in otology that incorporate asynchronous review of recorded examinations alongside audiometry, either conventional or boothless, may mitigate this problem; however, further research is required.

Keywords Otology · Telemedicine · Telephone consultations · Remote assessment · Service design

Introduction

Background and rationale

Telephone clinics in otorhinolaryngology have become increasingly common in response to the novel coronavirus 19 disease (COVID19) pandemic; driven by a need to reduce footfall within the hospital environment, optimise clinic capacity and manage increasing waiting times [1]. Indeed, there is evidence to suggest that many routine otorhinolaryngology referrals can be managed over the telephone without a face-to-face assessment [2]. The pandemic has put considerable strain on the National Health Service (NHS), as evidenced by the impact on planned service delivery, where there are now 6 million patients on the waiting list, compared to 4.4 million prior to the pandemic [3]. As part of the ongoing pandemic recovery, it is vital that patients are triaged and reviewed promptly, and therefore, telemedicine in some form is likely to remain part of practice in otorhinolaryngology. This is compounded by ongoing uncertainties surrounding COVID19, such as the emergence of new variants. In addition, the potential for staff absences and self-isolation may necessitate flexible working, whereby remote clinics can be conducted from an off-site location, rather than deferring care. Whilst telephone consultations can be effective, a visual inspection of the ear, via either an otoscope or a rigid endoscope, alongside a pure-tone audiogram and tympanogram is usually an essential component of routine outpatient assessment for most otology patients. This is likely of higher priority in the assessment of new referrals, who have not been examined previously, compared

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to follow-up appointments. To date, there is nothing in the published literature looking at the utilisation of telephone consultations for the management of new otology referrals and whether outcomes are comparable to more traditional face-to-face assessments. These data are important to further our understanding of telephone consultations in otology, to better inform service design and to optimise patient care.

Objectives

This retrospective cohort study aims to compare the utilisation of telephone versus face-to-face consultations for new otology referrals with respect to clinic outcomes, and discuss wider issues regarding the use of telemedicine in otology.

Materials and methods

Reporting guideline

The STROBE Statement.

Study design

Retrospective observational cohort study

Setting

UK secondary/tertiary referral unit.

Participants

All new adult otology referrals to our unit, from any source, sampled between March 2021 and May 2021, were included. Patients were allocated to a face-to-face or a telephone clinic by the administration team at our unit, based on date of referral and clinic availability. The exception to this was any referrals triaged by the consultant in charge who specifically requested a face-to-face review. Therefore, the referral source (e.g., GP, audiology) did not determine whether the patient was seen in either a face-to-face or telephone clinic. Given the retrospective nature of this study, no randomisation was possible. Patients were excluded if seen as follow-ups, referred with a non-otological complaint or referred to a specialist clinic (e.g., cochlear implant clinic). The retrospective methodology meant management decisions were not influenced by the study. Sample size was calculated based on a 95% confidence interval and a power of 80%. In the absence of previous literature, it was the authors' consensus that a primary outcome difference of 25% between groups should be detected, and therefore, the minimum sample size was 55 patients in each group.

Data source

Data were collected retrospectively from the digital patient records system at our institution, including patient demographics, referral source, waiting time, clinic outcome, treatments, and investigations. Follow-up data were collected for patients in the telephone clinic cohort who were brought back for a face-to-face review, in addition to follow-up data for all patients to ascertain the total number of clinic appointments required to reach a definitive outcome. Where patients did not attend their follow-up appointments, they were excluded from this analysis.

Outcome measures

The primary outcome measure was the proportion of patients with a definitive management outcome (discharged or added to waiting list for treatment) versus the proportion of patients requiring follow-up.

Data analysis

Data were entered into a standardised spreadsheet for analysis. Referral reasons were coded from the referral letter to allow more concise representation of data. Descriptive statistics were performed to analyse patient demographics, referral source, waiting times and clinic outcomes. Chi squared and odds ratios were calculated comparing the primary outcome between groups. Independent sample *t* test was conducted to compare the mean number of appointments required for definitive management between the two cohorts. All statistical analysis was performed using IBM SPSS Statistics (Version 28).

Ethical considerations

The study was prospectively registered as a service evaluation and approved by our institutional review board.

Results

A total of 150 patients were included in the analysis (75 telephone, 75 face-to-face). There were 71 (47%) females and 79 (53%) males. Mean age was 55 years (range 19–91). Mean waiting time from referral to review was 12 months (range 0–24). Patient characteristics of the two

Table 1 Summary of patient characteristics

	Clinic cohort	
	Face-to-face	Telephone
Number of patients	75	75
Mean age (range)	56 years (19–91)	54 years (20–91)
Female/Male	30/45	41/34
Mean time from referral to review (range)	9 months (0–22)	14 months (3–24)

Table 2 Summary of the number of patients with a definitive outcome (discharged or added to waiting list for intervention) versus number of patients followed up for face-to-face and telephone clinics (Chi squared < 0.001, Odds ratio 10.97)

Clinic type	Outcome		
	Number of patients definitively managed	Number of patients followed up	Total number of patients
Face-to-face clinic	53	22	75
Telephone clinic	22	53	75
	$\chi^2 < 0.001$, OR 5.8		

cohorts are summarised in Table 1. The outcomes between the two cohorts are compared in Table 2.

Face-to-face consultations

Of the 75 patients included in the face-to-face cohort, the mean age was 56 years (range 19–91) with patients waiting a mean of 9 months from referral to clinic review (range 0–22). Referral sources included GP (40), Audiology (14), internal referrals from a different otorhinolaryngology subspecialty (9), external otorhinolaryngology departments (2), Neurosurgery (3), Oral and Maxillofacial surgery (2), Accident and Emergency (2), Neurology (1) and Dermatology (1). In one patient, we were unable to locate the referral information. Presenting symptoms for patients in the face-to-face cohort are summarised in Table 3. A definitive outcome was reached in 53/75 patients (71%), where they were either discharged (47, 63%) or added to a waiting list for treatment (6, 8%), following initial review. Follow-up was scheduled for 22/75 (29%) patients with 16 booked for further face-to-face follow-up and 6 booked for telephone follow-up. Indications for face-to-face follow-up included a review following a trial of medical therapy and/or investigations (12/16) and further microsuction (4/16). Indications for telephone follow-up included review of progress following treatment (3/6) and discussion of scan results (3/6). 39/75 (52%) of patients were seen by a consultant in clinic and 36/75 (48%) were seen by a registrar.

Table 3 Summary of referring complaints in the face-to-face clinic cohort

Presenting symptom	Frequency (%)
Hearing loss	21 (28%)
Ear infection	10 (13%)
Tinnitus	10 (13%)
Hearing loss and tinnitus	6 (8%)
Dizziness	4 (5%)
Cerumen impaction	4 (5%)
Otalgia	4 (5%)
Cholesteatoma	3 (4%)
Lesion of external ear	3 (4%)
Hearing loss and dizziness	3 (4%)
Dizziness and tinnitus	3 (4%)
Tympanic membrane abnormality	2 (3%)
Temporal bone fracture	1 (1%)
Hyperacusis	1 (1%)

Table 4 Summary of referring complaints in the telephone clinic cohort

Presenting symptom	Frequency (%)
Hearing loss	24 (32%)
Tinnitus	11 (15%)
Hearing loss and tinnitus	11 (15%)
Ear Infection	8 (11%)
Otalgia	6 (8%)
Tinnitus (pulsatile)	2 (3%)
Facial numbness or spasms	2 (3%)
Cholesteatoma	2 (3%)
Cerumen impaction	2 (3%)
Hearing aid problem	2 (3%)
Incidental CT finding	1 (1%)
Dizziness	1 (1%)
Otitis media with effusion	1 (1%)
Tympanic membrane abnormality	1 (1%)
Mastoid cavity problem	1 (1%)

Telephone consultations

Of the 75 patients included in the telephone clinic cohort, the mean age was 54 years (range 20–91), with patients waiting a mean of 14 months from referral to review (range 3–24). Referral sources included GP (68), internal otorhinolaryngology referrals from a different subspecialty (2), external otorhinolaryngology departments (1), Audiology (2), Renal Medicine (1) and Neurosurgery (1). Presenting symptoms for patients in the telephone cohort are summarised in Table 4. 22/75 patients (29%) were discharged, with no patients added to a waiting list for

treatment. Outcomes for the discharged patients are summarised in Table 5. Follow-up appointments were arranged for 53/75 (71%) of patients. 52/75 follow-up appointments were face-to-face for clinical examination, hearing tests or microsuction. One patient was offered telephone follow-up to discuss the results of a CT scan. 64/75 (85%) of patients were seen by a consultant in clinic and 11/75 (15%) were seen by a registrar.

Telephone patients brought back for face-to-face review

Of the 52 patients offered a face-to-face review following the initial telephone consultation, 46 (89%) had been seen at the time of data collection. 31/46 (67%) were discharged at their first face-to-face review. 12 patients had imaging arranged with a plan to write with the results and none of these patients required a further appointment following their investigations. One patient was added to a waiting list for surgery. 14/46 (30%) patients were offered additional face-to-face follow-up, for reasons such as further microsuction (5/14), to discuss surgical management (3/14), to discuss imaging results (2/14) or for review (4/14).

Number of appointments required for a definitive outcome

At the time of data collection, 64 (85%) patients who had undergone an initial face-to-face consultation and 59 (79%) patients who had undergone an initial telephone consultation, had received a definitive outcome. The remaining patients were receiving ongoing follow-up. The mean (SD) number of appointments required to reach a definitive outcome was 1.22 (0.58) in the face-to-face cohort versus 1.75 (0.73) in the telephone cohort ($p < 0.001$).

Table 5 Summary of clinic outcomes for those discharged following initial telephone consultation

Clinic outcome	Frequency
Resolved infection—no treatment required	3
Symptom free—no treatment required	2
Patient reviewed at alternative hospital	3
Referral for hearing aid assessment	5
Imaging arranged—write with results	3
Referral for tinnitus therapy	3
Audiology arranged—write with results	2
Military patient—referred for follow-up with military clinician	1

Discussion

This retrospective cohort study includes 150 new otology referrals to a busy UK teaching hospital, comparing outcomes of patients reviewed remotely in a telephone clinic to patients seen face-to-face. To the authors' knowledge, this is the first published study looking at the use of telephone clinics in otology which utilises a comparative face-to-face clinic group. Delivery of healthcare in the UK has been shaped by the COVID19 pandemic, with telephone clinics widely implemented to reduce footfall in the hospital environment whilst preserving our ability to manage patients [4–7]. This trend has been followed in otorhinolaryngology, where utilisation of telephone clinics has been central to our pandemic response. An analysis of 400 otorhinolaryngology patients undergoing telephone consultations suggested that many patients could be satisfactorily managed [2]. Just over half required a face-to-face review, and this trend was echoed in their subgroup of patients presenting with ear symptoms, where just over half of patients required face-to-face follow-up. However, in their experience, 80% of vertigo patients required face-to-face follow-up for examination. Their overall follow-up rate for otology patients is slightly lower than the 71% of patients in our telephone clinic group who required face-to-face follow-up; however, their figure includes both new referrals and follow-ups which may explain this difference. It is difficult to make comparisons between the subgroup of dizzy patients, as our numbers were small. Telephone consultations have also been employed effectively when triaging 2-week-wait suspected head and neck cancer referrals. Hardman et al. showed that use of a validated risk calculator, utilised as part of a telephone consultation, demonstrated a low risk of harm, with potential to reduce the number of unnecessary hospital attendances[8].

Patient satisfaction with telephone consultations in otorhinolaryngology has also been studied [7], suggesting that this mode of consultation is acceptable to patients. It was noted that satisfaction scores increased following an educational package for clinicians to help refine teleconsultation skills, suggesting that the utility of telephone consultations may be enhanced as clinician skill and experience improves. Swaminathan et al. [9] conducted a postal survey of 144 otorhinolaryngology patients undergoing telephone consultations, with high satisfaction rates reported alongside a willingness to participate in telephone consultations again. However, many patients felt that telephone review was inferior to a face-to-face appointment. With waiting times continuing to increase in otorhinolaryngology [1] and an ever-increasing need to streamline referrals, it is likely that telephone consultations will continue as part of the pandemic recovery.

Results from our study demonstrate that a limitation of telephone clinics when assessing new otology referrals, is the inability to perform an examination and undertake audiometric assessment. This is a key diagnostic step and contributed to over 70% of telephone consultation patients requiring subsequent face-to-face assessment. When followed-up, 67% of these patients were discharged following the first face-to-face review. These results perhaps underestimate the importance of clinical examination and audiometry as, of the 22 patients discharged following their telephone consultation, a significant number had either been reviewed at an alternative unit or stated that their symptoms had resolved by the time the consultation was undertaken. This is also indicative of the ongoing pressures with waiting lists and the length of time from referral to review. This observation does not necessarily undermine the value of the telephone consultation; for many patients, medical treatment was instigated, or investigations were requested, whilst the consultation also allowed some form of assessment and triaging. We should also consider that the time between the telephone consultation and face-to-face follow-up may simply have allowed many symptoms to resolve. However, lack of examination or audiometric assessment in the telephone cohort necessitated significantly more appointments, on average, than the face-to-face cohort, to reach a definitive outcome. In contrast, the discharge rate was greater, and the follow-up rate lower, in the face-to-face group. Furthermore, of the patients discharged following an initial telephone consultation, many reported resolution of symptoms or that they had been reviewed at an alternative unit, and therefore, no further review was indicated.

Telemedicine in otorhinolaryngology has numerous potential benefits and technological advancements such as high-quality mobile imaging and the availability of secure store-and-forward technology have made this a possibility moving forward. Remote assessment has already been employed to assist with the management of suspected head and neck cancer referrals, which utilise asynchronous review of remotely acquired nasendoscopic images to deliver consultant-led care remotely [10]. From an otological perspective, incorporating clinical examination into a remote assessment pathway would likely increase the proportion of patients managed definitively at their first appointment. Likewise, the addition of an audiometric assessment seems to be essential for most patients, either under the guise of on-site conventional audiometry, referral for an external assessment (e.g., Specsavers Optical Group Ltd) or potentially through the use of a boothless system [11], which may indeed be better suited to a remote assessment pathway. The feasibility of such a pathway has already been demonstrated [12], suggesting that it is safe and non-inferior to the traditional outpatient model of care and that it may reduce the number of hospital visits for patients. This concept is aligned with NHS England plans to streamline diagnostic pathways and transition toward community-based hubs [13]. Reducing the number of hospital visits for patients also supports patient safety in a COVID-endemic world, reduces pressure on hospital site services and may have a positive environmental impact. Hendrickson et al. suggested that telephone consultations could greatly reduce carbon emissions [5], in keeping with the Greener NHS Programme [14], which aims to reach net zero for carbon emissions by the year 2040. From a service perspective, the use of a remote-assessment pathway may offer optimised utilisation of consultant time and an increased capacity to review patients [10], which is hypothesised to positively impact waiting times; however, more long-term data are required to support this. With the potential emergence of new COVID19 variants, remote assessment pathways may also enable flexible working which could facilitate continuity of patient care in the context of staff absence or self-isolation. Qualitative work with otology referrals has also suggested that this type of pathway would be acceptable to patients, provided that the standard of their care is not compromised when compared to a face-to-face review [15].

Limitations of this study include that the reported outcomes reflect a single institution practice; it is possible that results would differ for other institutions and settings. In addition, subgroup analysis was not undertaken for different consultants or registrars to determine whether there was any variation in follow-up or discharge rates. The retrospective nature of this study precluded any randomisation, and it should be noted that there were considerably more GP referrals in the telephone clinic group, which may be a significant confounder. Nonetheless, the clinical presentations of patients in both cohorts were quite common, and as such our sample should be representative of most general otology practices. In addition, when comparing the number of clinic appointments required to reach a definitive outcome, it should be noted that, at the time of data collection, several patients had not been followed-up from their initial appointment or were under ongoing review, and therefore, they were excluded from the analysis. Whilst our sample size was calculated to detect an overall difference between the two cohorts, our numbers are too small to allow a meaningful comparison between subgroups of presenting symptoms.

Conclusions

Telephone clinics have an important role to play in the review and assessment of new otology referrals and have been a useful tool in our response to the COVID19 pandemic. However, they are limited by a lack of clinical examination and audiometric assessment. As a result, the follow-up rate is significantly higher, with fewer patients

either discharged or added to a waiting list for treatment, when compared to patients seen directly in a face-to-face clinic. Furthermore, patients require more appointments, on average, to reach a definitive management outcome. Further research is required on the role of a telemedicine pathway in otology which utilises endoscopic examination of the ear alongside audiometry, followed by asynchronous assessment by a consultant otologist. This may maximise the benefits of telemedicine whilst ensuring that a high proportion of patients receive a definitive management decision at their initial appointment whilst reducing unnecessary follow-up.

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Declarations

Conflict of interest Mr. Chris Coulson is the CEO of endoscope-I Ltd, a developer of physical adaptors and smartphone applications for mobile endoscopic imaging.

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