



Evaluating Emergency ENT Admissions In Two Scottish Teaching Hospitals

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Abstract

Introduction: Ear, Nose and Throat (ENT) emergencies are common in all communities, with significant regional variations in published literature. Early diagnosis and prompt management results in reduction in morbidity and mortality. The management of ENT emergencies requires significant financial resources for admissions and surgical interventions. An awareness of the pattern of admissions will facilitate strategic planning of a department's activity.

Objective: To evaluate the pattern of emergency ENT admissions to our department. Our objectives were to register the common admission diagnoses; record the equipment required in the ward treatment room and to identify training requirements for nursing and medical staff involved in their management.

Methods: Retrospective analysis of a prospectively maintained departmental database. All emergency admissions to our department over 8 years were recorded. The data collected included patients' demographics and admission diagnoses. **Results:** The total patients identified were 3878 with 56% (2185) male and 44% (1693) female. The majority of the patients admitted had a diagnosis in the head and neck sub group (58%). Over the study period on average 41 emergency admissions were recorded per month. The commonest emergency requiring admission was epistaxis, followed by acute sore throat. **Conclusions:** The most common adult ENT emergencies requiring admission to our unit are epistaxis, quinsy and post-tonsillectomy complications.

Keywords: ENT emergency. Inpatient admission. Management.

Introduction

Ear Nose and Throat (ENT), is a specialist area that covers a wide variety of clinical and pathological entities. ENT emergencies account for a large volume of admissions in the UK with over 376,707 emergencies presenting to Accident and Emergency in 2015 [1]. This is important from an epidemiological and financial perspective. including pharmacological expenses, departmental resourcing and hospital admissions due to the severity with which certain symptoms can manifest.

Prevalence of ENT emergencies varies worldwide. This is dependent on the socio-economic status, demographic features, industrialisation and cultural revolution [2,3]. The severity clinical presentation ranges from acute tonsillitis to deep neck space infections, as well as epistaxis requiring anterior nasal packing but occasionally requiring surgical intervention.

A Ghanaian teaching hospital, concluded that the most common causes of admission were foreign bodies in the oesophagus, epistaxis, throat infections and stridor [2]. A Spanish study found that epistaxis and infectious processes were the principal causes of admission [4]. The Scottish audit of surgical mortality had shown that nearly half of all mortality in an ENT ward originated from emergency admissions [5]. Therefore, early diagnosis and prompt management of such conditions could reduce morbidity and mortality.

To our knowledge no UK based study has characterised the pattern of emergency ENT admissions, by doing so we hope that we can highlight strategic planning of departmental activity including provision of appropriate training and equipment to medical and nursing staff.

Methods

Study Design

This descriptive retrospective study of a prospectively maintained departmental database was conducted at two tertiary Scottish centres.

Ethics Approval

The institutional approval for the study was received from the Quality Improvement and Assurance (QIA) Team.

Data Collect

Electronic data for all emergency admissions to the ENT department at Ninewells Hospital (NH) over 3 years (2010-2013) and Aberdeen Royal Infirmary (ARI) over 5 years (2015-2020) were reviewed. The data collected included patient demographics, date of admission, diagnosis and duration of hospital stay. Cuchi's aetiological classification [6], with modification was used.

Statistical Analysis

Collected data was tabulated and analysed using SPSS software. Descriptive analysis was done and results were presented in tabular forms and charts.

Results

A total of 3878, adult patients (over 18 years of age) were identified over a study period of 94 months (7 years 10 months). This study period was divided into 3 phases, 34 months in Dundee (Table 1), with 24 months (Table 2) followed by 36 months (Table 3) in Aberdeen royal infirmary. The senior author worked in both institutions, whereby he collected and maintained the database with input from all co-authors.

Table 1. Part 1 Dundee work, duration of study 01/08/2010 to 31.05.2013 (34 months) 48 new admissions per month during the study period.

	Total	H&N	Rhinology	Otology
<i>Male</i>	1635	1004	514	117
<i>Female</i>	942	595	284	63
	693	409	230	54

Table 2. Part 2 ARI work, duration of study 01/04/2015 to 31/03/2017 (24 months) 33 new admissions per month during the study period.

	Total	H&N	Rhinology	Otology
	780	414	330	36
<i>Male</i>	424	232	178	14
<i>Female</i>	356	182	152	22

Table 3. Part 3 ARI work, duration of study 01/04/2017 to 31/03/2020 (36 months) 41 new admissions per month during the study period.

	Total	H&N	Rhinology	Otology
	1463	845	538	80
<i>Male</i>	819	491	286	42
<i>Female</i>	644	354	252	38

Out of the 3878 patients identified, 56% (2185) were males and 44% (1693) females. The majority of the admitted patients had a diagnosis within the head and neck subspecialty (58%) followed by Rhinology (36%) and Otology (6%) (Table 4).

Table 4. Total study population with male: female predominance.

	Total	Head and neck (58%)	Rhinology (36%)	Otology (6%)
	3878	2263	1382	233
<i>Male</i>	2185 (56%)	1318 (58%)	748 (54%)	119 (51%)
<i>Female</i>	1693 (44%)	945 (42%)	634 (46%)	114 (49%)

Over the study period on average 41 emergency admissions were recorded per month. Comparing the two institutions there were 48:37 admissions per month in Dundee and Aberdeen respectively. 53 patients who were planned admission pre and post operatively in Dundee, were excluded from the study. Similarly, all planned admissions to the ward in Aberdeen were excluded.

Also, ten percent (387), of our emergency admissions were related to post-operative complications; 347 of these cases are attributed to head and neck surgery complications, with post tonsillectomy bleeding being the leading cause 245/347 (71%). Further head and neck complications are detailed below (Table 5). Similarly, the admissions for post-operative complications in rhinology were 32 in total, while only 8 cases were in otology group.

The commonest specific condition requiring

admission was epistaxis 1252/3878 (32.2%), followed by Quinsy 493 (12.7%) and further specific conditions (H&N, Rhinology & Otolaryngology) are detailed below (**Tables 6,7 and 8**).

Table 5. Detailed illustration highlighting head and neck post-operative complications.

Emergency admissions with head and neck post-operative complications = 347

Diagnosis	Number (%)
<i>Post-tonsillectomy bleeding</i>	245 (71%)
<i>Post-op neck wound infection</i>	42 (12%)
<i>Post-tonsillectomy odynophagia</i>	36 (10%)
<i>Post-op neck haematoma</i>	11 (3%)
<i>Other post-op problem</i>	13 (4%)

Table 6. Head and neck emergency admissions.

Emergency head and neck admissions = 2263

Diagnosis	Number
Throat infections	904
Quinsy	493
Tonsillitis	277
Glandular fever	75
Peritonsillar cellulitis	59
Airway issues	331
Stridor	177
Supraglottitis	88
Angioedema	29
Tracheostomy issues	23
Speech valve issues	14
Dysphagia	320
Cancer related dysphagia	159
Oesophageal food bolus obstruction	137
Oesophageal foreign body	24
Neck infections	208
Neck abscess	150
Parotitis	58
Cancer issues	102
Neck trauma	51
Postop complications	347

Table 7. Rhinology emergency admissions.

Emergency Rhinology admissions = 1382

Diagnosis	Number
<i>Epistaxis</i>	1252
<i>Facial cellulitis</i>	42
<i>Periorbital cellulitis</i>	22
<i>Facial pain</i>	17
<i>Facial trauma</i>	7
<i>Brain abscess</i>	4
<i>CSF rhinorrhea</i>	2
<i>Nasal foreign body</i>	2
<i>Septal haematoma</i>	1
<i>Septal abscess</i>	1
<i>Postop complications</i>	32

Table 8. Otology emergency admissions.

Emergency Otology admissions = 233

Diagnosis	Number
<i>Ear infection</i>	191
<i>Vertigo</i>	17
<i>Ear trauma</i>	8
<i>Ear foreign body</i>	6
<i>Facial palsy</i>	2
<i>Hearing loss</i>	1
<i>Postop complications</i>	8

In the otology subgroup Otitis externa was the commonest condition closely followed by pinna cellulitis (61, 58 respectively out of the total 191 ear infections), according to **Table 9**.

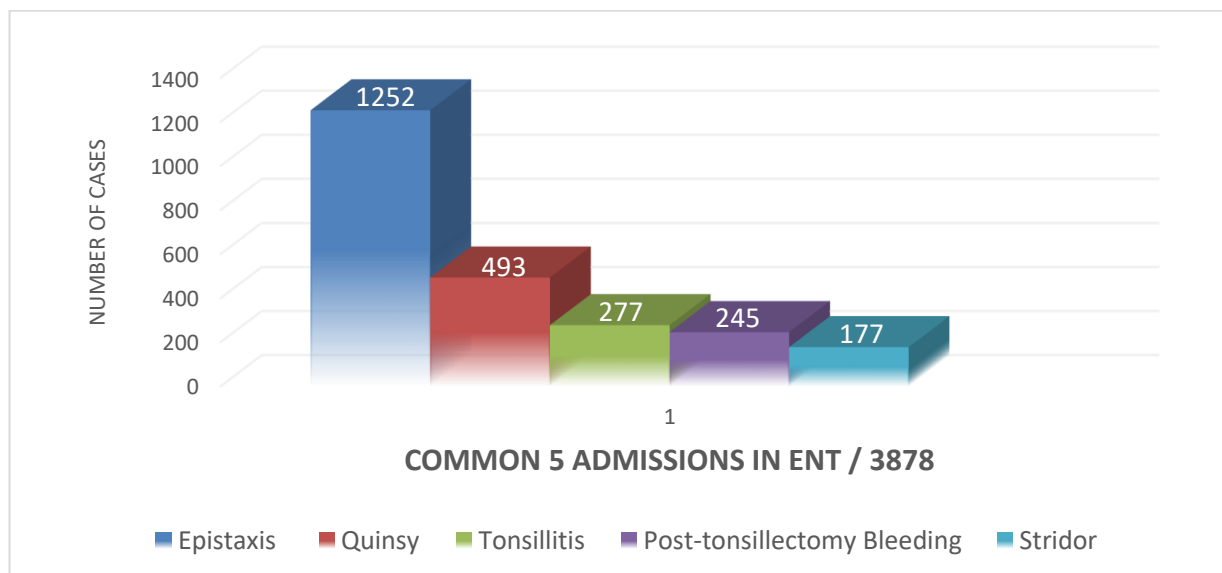
Table 9. Further categorisation of ear infections.

Emergency admissions with ear infections = 191

Diagnosis	Number (%)
<i>Otitis externa</i>	61 (32%)
<i>Pinna cellulitis</i>	58 (30%)
<i>Malignant otitis externa</i>	32 (17%)
<i>Otitis media</i>	18 (9%)
<i>Mastoiditis</i>	15 (8%)
<i>Ramsay Hunt Syndrome</i>	7 (4%)

We aimed to summarize the top 5 most common conditions requiring ENT admission, thus helping to facilitate appropriate management strategy and training for medical and nursing staff (**Figure 1**).

Figure 1. Commonest ENT admission presentation.



Discussion

Our study shows the range of conditions admitted as emergencies to two tertiary referral UK ENT departments, and attempts to quantify the resulting workload. The two main source of referrals were from

Accident & Emergency (A&E) or General practice (GP). The majority of our cases were assessed in an appropriately equipped and maintained ENT treatment room with the assistance of ENT trained nursing staff. This has become common practice in ENT and reflects both the variable facilities found in A&E departments for

the initial ENT examination, and the universal need for an ENT ward treatment room, fully equipped with a suction machine, microscope, head-light, flexible and rigid nasendoscopes, dissolvable and non-dissolvable nasal packing, and other ENT instruments.

Within the initial phase of this study we believed it was necessary to introduce an unequivocal, standardised diagnostic nomenclature to facilitate subsequent analysis of the data. Therefore, from April 2015 in ARI, we introduced a single excel folder; accessible from the hospital shared drive. This was used to maintain our in-patient hand-over list which facilitated data extraction for further analysis.

Over the study period of 94 months, we identified a total of 3878 adult admissions, slightly more male admissions compared to females. Previous studies have shown mixed results, with some reporting percentages higher for females [7,8]. The commonest causes of ENT admission under the heading of the three main domains were H&N followed by rhinology and otology respectively. With the three most common diagnoses being epistaxis, throat infection which included (Quinsy, tonsillitis, glandular fever and peritonsillar cellulitis) and post-tonsillectomy complications. Our findings contrast the findings of other studies published including Kitcher et al [2], who found the commonest admission was secondary to oesophageal foreign body ingestion followed by epistaxis and sore throat. Another study concluded that the commonest admission was epistaxis then ear infections [9].

The difference between our study and other published series may reflect differences in the socio-economic and cultural environment of the patients studied. Regional variation is also an important consideration. Studies reporting a high rate of epistaxis such as Prerez et al [9], Tismit et al [10], and the current study were conducted in European countries. This is contrasted by studies which were conducted in Ghana and India, Kitcher et al [2] and Somnath et al [11]. Whereby, they report higher instances of foreign body impaction. Therefore, it is possible that this apparent regional disparity is secondary to socio-economic and cultural factors.

Our work was a two-centre study and the results obtained derive from the analysis of electronic data. Despite the limitations of the study, we can conclude that a large percentage of patients presenting required minor surgical interventions, and that vast majority of these are treated effectively with conservative measures. Our work also highlights the clinical implications on our service. The common prevalence of epistaxis, features the need for relevant equipment such as nasal packs (dissolvable vs non-dissolvable), chemical and electrocautery, relevant topical ointments,

adrenaline and local anaesthetic preparations, appropriate personal protective equipment for donning and doffing. Although there is a large amount of literature published on causes and management of ENT emergencies, few articles looked at the economic burden these admissions have on health care.

In the current economic climate, the NHS in Scotland predicts there will be an increase in spending in health and social care to around £20.6 billion by 2023/24 [12], it is vital to review and reflect on our current practice and redesign our existing service. According to the Scottish Health Service Cost published by Information Service Division (ISD), the average cost of ENT in-patient stay excluding long stay (2018/2019) was £2,848 per case (range from £891 to £3729) with an average length of stay of 2.1 days [13]. A 3.7% increase from £120 to £124.46 in the unit price of blood cells has also been implemented after 2017 due to universal hepatitis E virus screening [14].

This will have cost implication for patients requiring blood transfusion for resuscitation. In the case series published in 2012 by Keane et al. on management of epistaxis in Ireland, 83.4% of their 434 patients admitted were managed non-operatively and 3.4% patients required surgical intervention. The average length of stay was 2.5 days. The approximate cost for conservative management without nasal packing was €2926.73 and in excess of €3500 with nasal packing depending on type of packing used. Surgical intervention would be in excess of €6000 per patient [15]. In England, 34,417 patients were treated between 2015 and 2016, an increase of 17% compared to the year before with an average stay of 1.9 days, for epistaxis amounting an average cost of £497.17 per patient and a total financial burden of £14 million to the NHS annually [16,17].

A retrospective analysis of large insurance database in USA on outpatient tonsillectomy between 2002 and 2007 identified 19.7% of 36,210 patients had at least 1 complication within 14 days of surgery. These include haemorrhage, 6.2%; dehydration, 2.0%; and ENT pain, 11.5%. Nearly 10% had an emergency department visit, and 1.6% were admitted as an inpatient within 14 days of surgery. Patients who experienced complications post-tonsillectomy had significantly higher mean expenditures than those without complication; \$6,388 (range \$323-\$50,322) versus \$3,832 (range \$251-\$12,0548) in the case post-tonsillectomy haemorrhage, \$5,753 for dehydration and \$4,708 for post-op pain [18]. Additional costs include, single use instruments, dissolvable nasal packing and the cost of sterilization and operating theatre utilization. Further resources should also be allocated for the treatment of tonsillar pathologies such as quinsy and

post-tonsillectomy complications, both of which have a globally high prevalence. Adequate training of medical and nursing staff will also aid in efficient and effective treatment of these patients.

In today's ENT practice, nurse practitioners (NP) are integral part of the outpatient, ward emergency treatment room and on-call service. Utilization of NP in delivering emergency care may be a cost efficient and sustainable service in an ENT department. In 2018/2019, a consultant outpatient cost an average £141 per attendance compared to £53 for a nurse led clinic [13]. In a recent systematic review Whiteford et al., found all studies reported evidence of effectiveness of nurse-led clinics in service delivery and outcomes in adults with chronic ear, nose and throat complaints. However, details on financial outcomes were lacking to conclude a cost benefit in nurse-led clinics [19] and further work in this area is proposed.

To become an ENT NP, a registered nurse will need to work 3 years in an ENT setting before sitting for Otorhinolaryngology Nursing Certification exam. Nurse practitioners have to attend regular teaching sessions and hands-on competency-based training with departmental consultants on how to deal with basic ENT emergencies. They also attained competencies in venesection, cannulation and prescribing [20]. In a prospective service evaluation by Vijendren et al., NPs were reported able to perform a wider range of interventional procedures compared to the FY2 and GPST working in the same unit, and provide a consistently safe and effective ENT emergency service [21].

Thus, we believe the strength of this study is its large dataset of emergency admissions. To our knowledge no similar study has been carried out and published from an ENT department in the United Kingdom.

Conclusion

The most common adult ENT emergencies requiring admission to our units were epistaxis, quinsy and post-tonsillectomy complications. The management of ENT emergencies commands significant financial resources and an understanding in the pattern of admissions, as highlighted in this study. Our aim was to aid strategic and financial planning of a department's activity and provide guidance for an appropriately trained workforce.

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Ethics approval

The institutional approval for the study was received from the Quality Improvement and Assurance (QIA) Team.

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Data sharing statement

No additional data are available.

Conflict of interest

The authors declare no conflict of interest.

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