Transfer of patients from a regional centre to a tertiary paediatric hospital for acute otolaryngology management: When is it necessary?

Original Article

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Keywords: paediatric otolaryngology, interhospital transfer, outcomes

Abstract

Aim

Transfer of patients from a regional to a tertiary paediatric facility is sometimes required for management of otolaryngologic conditions when the expertise available locally is insufficient to deal with the complexity of the case.

Methods

A retrospective analysis was carried out over a three-year period of all patients under 18 years of age who were transferred to the Royal Children's Hospital (RCH) Melbourne, primarily for otolaryngology management, from a regional hospital with an inpatient paediatric service and located 100 kilometres or more from the RCH.

Results

Thirty-nine patients (30 male, 9 female) were identified. The majority of patients (29, 74%) required surgical management, with the most common procedures being rigid bronchoscopy with or without foreign body removal (7 patients, 24%), drainage of deep neck space infection (7 patients, 24%) and bilateral choanal atresia repair (4 patients, 13%).

Conclusion

Notwithstanding the cost and inconvenience, transfer was necessary in essentially all cases in this study for either specialist surgical management or for medical management of conditions that could have otherwise escalated in acuity. By inference, it would appear that most routine acute paediatric otolaryngology conditions are managed successfully in a regional setting.

Keywords: paediatric otolaryngology, interhospital transfer, outcomes

What is already known on this topic:

- There are many paediatric otolaryngologic presentations to regional hospitals
- Most paediatric specialist otolaryngologists are centered in tertiary institutions
- Decisions to transfer paediatric patients for specialist otolaryngologic management should be judicious and considered, in order to avoid unnecessary burden on patients, families and the healthcare system.

What this paper adds:

- An overview of the patients requiring transfer for otolaryngology management to the Royal Children's Hospital, from regional centres at least 100 kilometres away
- An analysis of the operative and non-operative cases transferred and whether these transfers were justified

- As this is the first study to look specifically at paediatric patients transferred for otolaryngologic management, it addresses a current gap in the literature and will encourage further research on this topic.

Introduction

Children presenting to regional hospitals with an acute or non-acute otolaryngological condition often need to be transferred to larger centres in order to receive treatment that is not available locally. This can be a long and costly undertaking for patients, their families and health services.

Timely and adequate communication between the receiving otolaryngology team and the hospital requesting transfer is essential to ensure that transfer is appropriate.

Victorian regional hospitals vary in their availability of otolaryngology specialists, paediatric inpatient capabilities and paediatric and neonatal intensive care units. The ability to manage paediatric otolaryngology patients regionally can be difficult, due to limited resources in any of the above areas. For example, some hospitals may have an otolaryngology service available but not the ability to anaesthetise or peri-operatively manage very young children or infants.

Another scenario arises when a regional hospital has the ability to admit and medically manage a young child, but only have a limited or no otolaryngology service available.

This study aims to look at all acute paediatric patients transferred specifically for otolaryngology management to the Royal Children's Hospital, Melbourne (RCH) over a three-year period, to identify the reason for transfer and the specific otolaryngology service that was required. This would serve as an indication as to whether or not transfer was necessary.

Materials and Methods

A retrospective review was carried out of all patients transferred to the RCH from regional centres in Victoria and Tasmania specifically for otolaryngology management, over a 3-year period between 1 May 2016 and 30 April 2019. Patients were identified using the hospital electronic medical records searching for all inter-hospital transfers to the RCH during the study period.

Patients were included if they were under 18 years of age and were transferred from a regional hospital located over 100 kilometres from the RCH that had an inpatient paediatric service, regardless of whether or not an inpatient otolaryngology service was available. The study included both patients who were transferred directly from a hospital emergency department or an inpatient ward. Further, patients were included irrespective of whether they were admitted

under the RCH Otolaryngology Unit or another medical or surgical unit. Patients admitted under a unit other than otolaryngology were only included if they were seen during the first 24 hours of admission by a member of the Otolaryngology Department, and after examination of their medical record, the primary reason for their transfer was confirmed to be for otolaryngology management.

Patients for whom the reason for transfer was unclear, those who were found incidentally to have an otolaryngologic condition after transfer for another reason, and patients whose clinical information was incomplete were excluded. Patients who were transferred from hospitals without an inpatient paediatric service were also excluded.

Data extracted from the electronic medical record included patient demographics, the transferring hospital, reason for transfer and details of the otolaryngology management provided at the RCH. The study was approved by The RCH Human Research Ethics Committee (reference number QA/50505/RCHM-2019).

Results

Thirty-nine patients were included in the study, 30 males and 9 females. Patient demographics are listed in Table 1. The median age was 4.5 years ranging from one day to 12 years old. There

were 13 transferring hospitals and of those five had an inpatient otolaryngology service. Twenty-five patients were transferred from hospitals without an inpatient otolaryngology service. The proportion of patients requiring operative management was similar between transferring hospitals with and without an otolaryngology service, being 71% and 76%, respectively.

Twenty patients (51%) were admitted under the Otolaryngology Unit and the remainder were admitted under Neonatology (11), General Paediatrics (5), Oncology (1), Respiratory Medicine (1) and Burns Unit (1). The median length of admission was 35 days (range 1-69).

Twenty-nine patients (74%) required surgical management. Their details are listed in Table 2a (patients transferred from a hospital with an otolaryngology) and 2b (patients transferred from a hospital without an otolaryngology service). The most commonly performed procedures were rigid bronchoscopy with or without foreign body removal (7), drainage of deep neck space abscess (7), and bilateral choanal atresia repair (4). Nine of the 10 patients from hospitals with an otolaryngology service were under the age of 2 years, and 50% were aged 1 month or less.. The mean age of patients transferred from hospitals with an otolaryngology service was 4 years, and from hospitals without an otolaryngology service, was 10 months.

A total of 10 patients did not require surgery, and comprised four patients from hospitals with otolaryngology (Table 3a) and six patients from hospitals without (Table 3b). A summary of all non-surgical interventions is provided in Table 4. Overall, five patients underwent flexible nasendoscopy with four of these patients also undergoing overnight oximetry. One patient transferred with a post tonsillectomy haemorrhage was discharged after 24 hours of observation. Three patients received intravenous antibiotics for parapharyngeal collections and all three cases resolved with conservative treatment. One patient with known subglottic stenosis was transferred for investigation of worsening symptoms. He underwent overnight oximetry and was planned for a microlaryngoscopy and dilatation, which subsequently occurred during a separate admission the following week when a post-operative intensive care bed was available.

Discussion

The patients included in this study were all transferred from regional centres that had an inpatient paediatric service. Presumably, many regional paediatricians possess the clinical expertise to manage a variety of common inpatient non-surgical paediatric otolaryngology conditions without tertiary institutional otolaryngology input. The findings in this study provide a snapshot of those conditions that are beyond the expertise of the paediatrician or the resources of a regional centre to manage. The reasons for transfer, in addition to requiring

paediatric otolaryngology services, may have included the need for tertiary paediatric imaging, anaesthetic and intensive care services.

The 29 patients who required surgical management were transferred to undergo procedures that, in general, require subspecialty paediatric otolaryngology input and support by other specialist services. While ten patients in our study did not require surgery, including four from centres that had an otolaryngology service, transfer in a number of these patients was prudent due to the potential for clinical deterioration and possible need for specialist otolaryngology surgery. This underscores the challenges facing regional paediatricians in deciding which patients are safe to manage locally and which ones require transfer.

Whilst literature exists for acute inter-hospital transfers in paediatric critical care and surgery, as far as we are aware, there are no such studies in paediatric otolaryngology. In the field of trauma, decisions to transfer patients are protocol-based as evidence shows outcomes are improved for patients managed at specific trauma centres^{1 2}. Soundappan et al studied inter-hospital transfer of paediatric trauma patients to a tertiary paediatric trauma centre in New South Wales.³ They found that nearly a third of patients were transferred with relatively minor injuries and concluded that transfer processes could be improved to optimize patient care and resource utilization.

Sorensen et al⁴ found that the rate of transfer of minimally-injured paediatric trauma patients in their study was 49%, but argued that because outcomes for injured children are superior at level I trauma centres, these high rates of transfer are acceptable.

Vedantam et al⁵ reported similar findings in their study of clinical outcomes in paediatric neurosurgery patients transferred to a tertiary centre. Whilst the lack of neurosurgical coverage away from large centres necessitates transfer in many instances, approximately half of transferred patients had low risk neurosurgical conditions and, the authors argue, may have avoided transfer if systems such as telehealth were available.

In contrast, our study found that transfer for management of acute paediatric otolaryngology conditions was necessary in the overwhelming number of cases. This likely reflects the confidence and expertise of regional paediatricians in the management of these conditions, as opposed to other paediatric surgery subspecialties.

Limitations inherent to a retrospective study design were not avoided in this study. The sample size was small however it did provide a good representation of presentations requiring transfer, and a number of different regional areas within Victoria and Tasmania were represented.

Conclusion

To the best of our knowledge, our study is the first to describe the scope of paediatric otolaryngology cases transferred acutely to a tertiary centre. The patients who underwent surgical management generally required operations to be performed in a tertiary paediatric centre and the non-surgical cases had conditions that could have escalated and required specialist treatment so again, transfer to the RCH was necessary. This study indicates that our transfers were judicious and appropriate, and presumably indicate good communication between our institution and the referring centres in planning who to transfer. By inference, our study also indicates that routine acute paediatric otolaryngology conditions are being managed adequately at regional centres without the need for transfer.

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Table 1. Patient demographics (n= 39)

Gender		
-	Male	30
-	Female	9
Age (years)		
-	Median	4.5
-	Range	0-12
Origin hospital with ORL† (n=13)		
-	Yes	5
-	No	8
Patients from hospitals with ORL		
		14
Patients from hospitals without ORL		
		25
Ward vs ED at origin		
-	Ward	30
-	ED	9
Admitting unit at RCH		
-	ORL	20
-	Other‡	19
Length of stay (days)		
		35
-	Median	1-69
-	Range	
Operative management		
-	Yes	29
-	No	10

†ORL = otolaryngology service, ‡general paediatrics (5), neonatology (11), oncology (1), respiratory (1), burns (1)

Table 2a. Surgical management: patients from hospitals with an otolaryngology service (n=10)

Pre-transfer diagnosis	Age (mean 10months)	Management at RCH
Unilateral VC palsy, and upper airway obstruction	2 days	Rigid bronchoscopy
Laryngomalacia	28 days	Supraglottoplasty
Bilateral choanal atresia	0 days	Repair
Bilateral choanal atresia	1 month	Revision repair
Bilateral choanal atresia	4 months	Revision repair
Subglottic mass, stridor	3 months	Microlaryngoscopy, removal subglottic cyst
Inhaled foreign body	15 months	Rigid bronchoscopy + removal
Choanal atresia	0 days	Repair of piriform aperture stenosis
Pharyngeal/upper airway mass	7 years	Debulking of hypopharyngeal synovial sarcoma
Floor of mouth mass	1 month	EUA and removal sublingual vascular malformation

Table 2b. Surgical management: Patients from hospitals without an otolaryngology service (n=19)

Pre-transfer diagnosis	Age (mean 4years)	Management at RCH
Infected cochlear implant	4 years	Explant of cochlear implant
Laryngeal trauma	10 years	Tracheostomy

Parapharyngeal abscess	8 years	Incision/drainage abscess
Inhaled foreign body	1 year	Rigid bronchoscopy + removal
Neck abscess	19 months	Incision/drainage abscess
Stridor for diagnosis	7 days	Microlaryngoscopy, bronchoscopy, supraglottoplasty
Choanal atresia	0 days	Repair of choanal atresia
Upper airway obstruction	1 day	Repair of piriform aperture stenosis
Mastoiditis	1 year	Insertion ventilation tubes and drainage abscess
Inhaled foreign body	1 year	Rigid bronchoscopy + removal
Post-tonsillectomy bleed	5 years	Control of haemorrhage in theatre
Nasal abscess	10 years	Incision, drainage abscess
Inhaled foreign body	2 years	Rigid bronchoscopy + removal
Abscess of external ear	9 years	Incision, drainage abscess
Infected branchial fistula	8 years	Incision, drainage abscess
Inhaled foreign body	2 years	Rigid bronchoscopy + removal
Foreign body oesophagus	2 years	Rigid oesophagoscopy + removal
Upper airway obstruction	23 months	Microlaryngoscopy, bronchoscopy
Orbital abscess	12 years	Endoscopic + external drainage

Table 3a. Non-surgical management: patients from hospitals with an otolaryngology service (n=4)

Pre-transfer diagnosis	Age	Management at RCH
Upper airway obstruction	10 months	Respiratory consultation, monitoring in ICU
Retropharyngeal collection	6 years	Intravenous antibiotics, steroids
Unilateral choanal atresia	0 days	Flexible nasendoscopy
Parapharyngeal abscess	3 years	Intravenous antibiotics, steroids

Table 3b. Non-surgical management: patients from hospitals without an otolaryngology service – (n=6)

Pre-transfer diagnosis	Age	Management at RCH
Parapharyngeal abscess	11 years	Intravenous antibiotics, steroids
Post tonsillectomy bleed	7 years	Intravenous tranexamic acid, intravenous fluids, observation
Presumed unilateral choanal atresia	2 days	Flexible nasendoscopy (no stenosis or atresia)
Stridor for diagnosis	2 days	Flexible nasendoscopy (bilateral vocal cord paralysis)
Deep neck space infection	16 years	Flexible nasendoscopy, intravenous antibiotics, steroids.

		(retro- and parapharyngeal collection).
Deep neck space infection	14 months	Flexible nasendoscopy, intravenous antibiotics, steroids (retropharyngeal collection)

Table 4. Summary of non-surgical management

<u>Ward management (n= 10)</u>		
-	Flexible nasendoscopy	5
-	Other*	5
<u>Operative management (n = 29)</u>		
-	Rigid bronchoscopy +/- removal of foreign body	7
-	Incision and drainage of abscess	7
-	Repair of choanal atresia	4
-	Repair of piriform aperture stenosis	2
-	Supraglottoplasty	2
-	Removal of subglottic cyst	1
-	Explanation of cochlear implant	1
-	Tracheostomy	1
-	Control of post-tonsillectomy haemorrhage	1
-	Rigid oesophagoscopy and removal of foreign body	1
-	Debulking of hypopharyngeal synovial sarcoma	1
-	Excision of sublingual vascular malformation	1

* Intravenous antibiotics (3), tranexamic acid for post-tonsillectomy bleed (1), overnight oximetry (1).

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