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Paediatric Eustachian tube balloon dilatation: the first UK experience

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Abstract

Background. Eustachian tube balloon dilatation is a minimally invasive procedure to treat Eustachian tube dysfunction. Although widely adopted in adults, there are no published UK paediatric series. This project evaluated outcomes of balloon dilatation for Eustachian tube dysfunction in children treated at our tertiary ENT paediatric unit.

Methods. A retrospective review was conducted of paediatric patients undergoing balloon dilatation for Eustachian tube dysfunction over a three-year period. Eustachian Tube Dysfunction Questionnaire-7 scores were recorded pre-operatively and at six weeks and three months post-operatively.

Results. Sixteen patients underwent balloon dilatation and 46 per cent of patients had concurrent procedures. The mean pre-operative Eustachian Tube Dysfunction Questionnaire-7 score was 27.1, improving significantly to 12.4 at 6 weeks and 11.25 at 3 months ($p < 0.0001$). All patients demonstrated symptomatic improvement, including those with repaired cleft palate who had undergone repeated ventilation tube insertion previously.

Conclusion. Balloon dilatation significantly improved patient-reported outcomes in paediatric Eustachian tube dysfunction and this study represents the first reported UK paediatric series.

Main Article

Sunil Dutt Sharma takes responsibility for the integrity of the content of the paper

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Introduction

Eustachian tube balloon dilatation is a minimally invasive procedure for the treatment of paediatric Eustachian tube dysfunction. Indications for its use in children include persistent otological symptoms of aural pressure and/or fullness. Eustachian tube balloon dilatation may be offered for the treatment of paediatric Eustachian tube dysfunction in children with persistent symptoms despite conventional management such as ventilation tube insertion or intranasal corticosteroid sprays, or in the treatment of otitis media with effusion.[1,2]

Outcome assessments following treatment include tympanometry, audiometry and quality of life questionnaires such as the Eustachian Tube Dysfunction Questionnaire-7.[3] The Eustachian Tube Dysfunction Questionnaire-7 can be used in patients with Eustachian tube dysfunction to self-score the severity of their symptoms in seven domains with a score from 1 (no problem) to 7 (severe problem). Although the questionnaire has been validated in the adult population, there are currently no validated questionnaires for the paediatric population.[3]

Although widely adopted in adults, Eustachian tube balloon dilatation in paediatric patients remains comparatively limited. Early experience of paediatric Eustachian tube balloon dilatation was reported in Europe, where Tisch *et al.* demonstrated through a multicentre analysis that the procedure was technically feasible in paediatric anatomy and was associated with high rates of symptomatic improvements, satisfaction and consistent safety profiles.[4] However, there are currently no UK published series on the use and outcomes of Eustachian tube balloon dilatation in paediatric patients despite it being approved by the National Institute for Health and Care Excellence for the treatment of chronic Eustachian tube dysfunction.[2] The aim of this project was to evaluate the outcomes of Eustachian tube balloon dilatation in children treated at our UK tertiary paediatric ENT unit.

Materials and methods

This was a retrospective review of electronic records of patients who had undergone Eustachian tube balloon dilatation over a 3-year period at our unit from 2023 to 2026. The hospital is one of Europe's largest paediatric hospitals, treating over 450 000 children annually, and is a tertiary ENT unit based in the north-west of England. Patients were identified through coded surgical procedures and diagnoses.

Eustachian tube balloon dilatation was performed under general anaesthetic using a 0° and 30° 4-mm rigid nasal endoscope and a Spiggle and Theis TubaVent® Overath, Germany.

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Eustachian tube balloon catheter advanced transnasally under direct endoscopic vision into the Eustachian tube, as described by Tisch *et al.*[5] The balloon was inflated as per the manufacturer's guidelines and the procedure was repeated contralaterally.

Electronic records were reviewed for patient demographics, indications for surgery, symptomology, concurrent procedures, pre-operative tympanometry, and Eustachian Tube Dysfunction Questionnaire-7 scores pre-operatively and at 6 weeks and 3 months post-operatively. Eustachian Tube Dysfunction Questionnaire-7 scores are self-reported across seven domains with the total score ranging from 7 (no problem) to 49 (severe problem).[3] Ethical approval was not sought for the project as it formed part of a service evaluation project. The project was registered with the local clinical governance department at Alder Hey Children's Hospital Trust and Caldicott Guardian approval was sought.

Results and analysis

Sixteen patients underwent Eustachian tube balloon dilatation over the 3-year period. All patients underwent bilateral Eustachian tube balloon dilatation. The mean age at the time of the procedure was 13 years (range, 9–16 years), 56 per cent of patients were male and 50 per cent were children with co-morbidities including neurodevelopmental conditions (3 patients), previous cleft palate repair (2 patients), asthma (2 patients) and Down's syndrome (1 patient).

The most common patient-reported pre-operative symptoms were popping of ears (6 patients), nasal obstruction (6 patients) and/or ear pain (5 patients). Three children (19 per cent) had a history of recurrent otitis media with effusion. Pre-operative tympanometry was type A in 8 patients (50 per cent), type C in 5 patients (31 per cent) and type B in 3 patients (19 per cent). Twelve children (75 per cent) had undergone previous treatments including auto-inflation nasal balloons (Otovent®) (7 patients), intranasal corticosteroids (6 patients) and/or ventilation tube insertion (3 patients). Seven children (44 per cent) underwent more than one previous treatment, for example auto-inflation and intranasal corticosteroids. All three children who underwent ventilation tube insertion had a history of Down's syndrome or previous cleft palate repair and had undergone a minimum of two ventilation tube insertions previously. Seven children (44 per cent) underwent concurrent procedures at the time of balloon dilatation; this was most commonly turbinate reduction (3 patients), followed by adenoidectomy (2 patients) and septoplasty (2 patients).

Patient-reported outcome scores using the Eustachian Tube Dysfunction Questionnaire-7 were recorded pre-operatively, and at six weeks and three months post-operatively. The mean pre-operative Eustachian Tube Dysfunction Questionnaire-7 score was 27.1 (range, 18–36), improving significantly to 12.4 (range, 8–22) at 6 weeks and 11.25 (range, 7–24) at 3 months ($p < 0.0001$), demonstrating improvements in patient symptomatology, including aural fullness and otalgia. There were no post-operative complications reported. Two patients required bilateral re-dilatation because of the return of their initial symptoms post-operatively.

Discussion

Paediatric Eustachian tube dysfunction is a common and challenging condition. Chronic dysfunction may result in recurrent otitis media with effusion, tympanic membrane retraction and reduced quality of life. This study demonstrated significant improvements in patient-reported outcomes following Eustachian tube balloon dilatation in a paediatric population. Mean Eustachian Tube Dysfunction Questionnaire-7 scores improved from a mean of 27.1 pre-operatively to 12.4 at 6 weeks and 11.25 at 3 months post-operatively. These findings support the growing body of literature that reports Eustachian tube balloon dilatation as a safe and effective intervention for chronic paediatric Eustachian tube dysfunction.

In addition, our results provide evidence of its used in patients with complex co-morbidities such as repaired cleft palate and Down's syndrome, who were often excluded from previous studies into the role of paediatric Eustachian tube balloon dilatation.[6] These patients typically represent a difficult subgroup to manage because of persistent Eustachian tube dysfunction and repeated middle-ear disease despite multiple prior interventions. In the present series, all children who had previously undergone repeated ventilation tube insertion demonstrated symptomatic improvement following balloon dilatation. This finding is clinically important as it suggests a potential role for Eustachian tube balloon dilatation in reducing repeated surgical interventions in selected high-risk groups.

A notable feature in our patient cohort was the frequency of associated nasal symptoms and concurrent nasal surgery. Nasal obstruction was among the most commonly reported presenting complaint in 37.5 per cent of patients, and 44 per cent of patients underwent concurrent procedures including turbinate reduction, adenoidectomy or septoplasty. This reflects the recognised relationship between nasal airflow, nasopharyngeal inflammation and Eustachian tube function. Previous studies have suggested that optimisation of nasal and nasopharyngeal pathway may improve Eustachian tube dysfunction and enhance outcomes. However, the contribution of these concurrent procedures to Eustachian Tube Dysfunction Questionnaire-7 scores post-operatively is difficult to determine, and future prospective studies with larger cohorts would be required to determine how sole balloon dilatation affects patient-reported outcome measures.

The safety profile of Eustachian tube balloon dilatation in this cohort was favourable. No post-operative complications were identified, although two patients required revision balloon dilatation, suggesting that while the majority of patients achieve symptomatic benefit, a subset may experience recurrent or incomplete resolution of symptoms. Longer-term follow up with a larger patient cohort and a randomised controlled trial is required to better understand the durability of symptom improvements and rates of revision in paediatric populations. In particular, the role of Eustachian tube balloon dilatation in treating tympanic membrane retractions is not fully understand and requires further evidence.[7]

This study represents, to the authors' knowledge, the first published UK paediatric series evaluating paediatric Eustachian tube balloon dilatation outcomes. As Eustachian tube balloon dilatation becomes increasingly adopted within paediatric otolaryngology, UK-specific outcome data are important. The findings of this study therefore contribute valuable preliminary evidence supporting the feasibility and effectiveness of Eustachian tube balloon dilatation within a UK tertiary paediatric setting.

- Balloon dilatation can be used in paediatric patients with Eustachian tube dysfunction
- Eustachian tube balloon dilatation significantly improved symptoms and Eustachian Tube Dysfunction Questionnaire-7 scores in paediatric patients
- Benefits were sustained at both six-week and three-month follow ups

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- Improvement could be seen in complex cases, including children with repaired cleft palate and previous repeated grommet insertion
- This represents the first reported UK paediatric series evaluating Eustachian tube balloon dilatation

Conclusion

This study demonstrates that Eustachian tube balloon dilatation is a safe and effective treatment option for paediatric patients with persistent Eustachian tube dysfunction. Significant improvements in patient-reported outcomes were observed at six weeks and three months following intervention, including in children with complex co-morbidities. The procedure was well tolerated, with no significant post-operative complications identified. These findings contribute important preliminary evidence supporting the use of paediatric Eustachian tube balloon dilatation within a UK tertiary ENT setting and represent, to the authors' knowledge, the first published UK paediatric series.

Competing interests. None declared.

References

1 Aboueisha RA, Attia AS, McCoul ED, Carter J, *et al*. Efficacy and safety of balloon dilation of the eustachian tube in children: a systematic review and meta-analysis. *Int J Pediatr Otorhinolaryngol* 2022;**154**:111048
2 National Institute for Health and Care Excellence (NICE). *Balloon dilation for chronic eustachian tube dysfunction*. Health Technology Guidance HTG534. London: NICE, 2019
3 McCoul ED, Anand VK, Christos PJ. Validating the clinical assessment of Eustachian tube dysfunction: the Eustachian Tube Dysfunction Questionnaire (ETDQ-7). *Laryngoscope* 2012;**122**:1137–41
4 Tisch M, Maier S, Preyer S, Kourtidis S, Lehnerdt G, Winterhoff S *et al*. Balloon Eustachian tuboplasty (BET) in children: a retrospective multicenter analysis. *Otol Neurotol* 2020;**41**:647–53
5 Tisch M, Maier H, Sudhoff H. Balloon dilation of the Eustachian tube: clinical experience in the management of 126 children. *Acta Otorhinolaryngol Ital* 2017;**37**:509–12
6 Luukkainen V, Kivekäs I, Silvola J, Jero J, Sinkkonen ST. Balloon Eustachian tuboplasty: systematic review of long-term outcomes and proposed indications. *J Int Adv Otol* 2018;**14**:112–26
7 Huisman JML, Verdam FJ, Stegeman I, de Ru JA. Treatment of Eustachian tube dysfunction with balloon dilation: a systematic review. *Laryngoscope* 2018;**128**:237–47

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