Patulous Eustachian Tube Obliteration Using Endovascular Coils: A Novel Technique

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Introduction:

- Patulous Eustachian tube (PET) is a condition in which the eustachian tube (ET) remains patent leading to symptoms of autophony and aural fullness.
- There is a female predominance, with an incidence of 0.3 – 6.6%, and a mainly idiopathic aetiology.
- Other causes include rapid weight loss in bariatric surgery or pregnant patients, muscular atrophy related to neurological pathology and medications for example, diuretics.^{1,2}
- Medical therapy includes conservative management and nasal preparations, with those resistant to medical therapy undergoing surgical intervention.
- Various surgical modalities are described within literature, ranging from grommets to autologous fat injections into the ET cushions.
- We describe a novel surgical technique and provide a review of current alternative surgical management.

Review of Current Management:

- Method 1: A prospective trial of 11 patients analysing **submucosal graft implantation** was shown to provide lasting relief of symptoms (15.8 months follow up) and a 7% failure rate.²
- Method 2: A new approach using **laser assisted curvature inversion** technique in 11 patients provided a success rate of 81.8% with a 24 month mean follow up.³
- Method 3: A retrospective review of 52 PET patients whom underwent **nasal instillation of saline** showed a 63.5% success rate, more in males than females.⁴
- Method 4: **Botulinum toxin A injected into the paratubal muscles**, in a professional musician whom was symptomatic for 20 years, provided symptomatic relief for 9 months.⁵
- Method 5: A further series reports **ligation of the pharyngeal orifice** of the ET in 15 patients. Over half of the patients reported a good to excellent outcome.⁶
- Method 6: Occlusion of the ET by insertion of a **silicone plug** through a transtympanic incision to the tympanic end of the ET to obstruct the isthmus provided a 71.4% success rate in 42 ears (mean follow up 38.9 months).⁷
- Method 7: Another report involved 2 cases of **autologous fat grafting** after **cauterisation of the ET** at the nasopharyngeal opening with **myringotomy and placement of grommet** (1 year follow up) – aiming for permanent stenosis of the ET.⁸
- Method 8: An update on the condition in 2005 showed that an **endoscopic approach to seal tubal lumen** was effective but further research was needed.⁹

Figures 1 and 2: Endoscopic guided insertion of guide wire into the left ET

Figures 3 and 4: Marker at 1.5cm and VortX™ Diamond coil being deployed

Figure 5: Immediate post-operative CT performed to confirm placement

Surgical Technique:

- Equipment required:
 - Standard Functional Endoscopic Sinus Surgery set.
 - 70 degree Relieva sinus guide catheter from a balloon sinuplasty set.
 - 0 degree rigid endoscope.
 - 3 x 3.3mm VortX™ Diamond coil.
- The ET patency is confirmed with a light pipe from sinuplasty set and an assessment of the tympanic membrane is made using an operating microscope.
- The 3 x 3.3mm VortX™ Diamond (fibred platinum coil) coil is deployed 1.5 cm from the ET orifice in Ipost nasal space (under guidance by a consultant neuro-radiologist.)

Future Aims:

- No Cochrane review or guidelines are available and many of the case series have small numbers.
- Although our limited series have demonstrated positive outcomes to date, a larger case series is required to permit comparison of long-term outcomes with current methods described within literature.
- Further extensive research and trials are required to demonstrate significant benefit, although early follow-ups have been favourable.

References:

- www.emedicine.medscape.com
- Diagnosis and management of the patulous eustachian tube. Poe DS. Otolaryngology & Neurology. 28(5):668-77, 2007 Aug.
- Curvature inversion technique: a novel tuboplasty technique for patulous Eustachian tube--a preliminary report. Yanez C. Pirron JA. Mora N. Otolaryngology - Head & Neck Surgery. 145(3):446-51, 2011 Sep.
- Nasal instillation of physiological saline for patulous eustachian tube. Oshima T. Kikuchi T. Kawase T. Kobayashi T. Acta Oto-Laryngologica. 130(5):550-3, 2010 May.
- Successful treatment of autophonia with botulinum toxin: case report. Olthoff A. Laskawi R. Kruse E. Annals of Otolaryngology, Rhinology & Laryngology. 116(8):594-8, 2007 Aug.
- Ligation of eustachian tube for intractable patulous eustachian tube: a preliminary report. Takano A. Takahashi H. Hatachi K. Yoshida H. Kaieda S. Adachi T. Takasaki K. Kumagami H. Tsukasaki N. European Archives of Oto-Rhino-Laryngology. 264(4):353-7, 2007 Apr.
- Trans-tympanic silicone plug insertion for chronic patulous Eustachian tube. Sato T. Kawase T. Yano H. Suetake M. Kobayashi T. Acta Oto-Laryngologica. 125(11):1158-63, 2005 Nov.
- Autologous fat grafting for the refractory patulous eustachian tube. Doherty JK. Slattery WH 3rd. Otolaryngology - Head & Neck Surgery. 128(1):88-91, 2003 Jan.
- Update on eustachian tube dysfunction and the patulous eustachian tube. Grimmer JF. Poe DS. Current Opinion in Otolaryngology & Head & Neck Surgery. 13(5):277-82, 2005 Oct.