

Patulous Eustachian Tube in a Girl with Low Body Mass Index

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Abstract

Aim: The present study investigated the association of Early Patulous Eustachian Tube (PET) with BMI in young female patients, explored new diagnosis criteria and functionally defined clinical influence on PET as a reflective balance of lower range or variable low value directionality to link it to at least one positive threshold criterion.

Method: Data on demographics, BMI & medical history were collected from a cohort of young women with symptoms compatible with PET. PET was diagnosed by (1) tympanometry and endoscopic examination paid much attention in patient of Eustachian tube function patency as the diagnostic Standard. Correlations between PET severity scores and BMI categories as well as with established diagnostic criteria were studied using statistical analyses.

Results: The range of B M I was from underweight to normal weight with most patients falling into the category of under and or low body mass . Diagnosis was established by means of symptomatic and objective measurement tests, confirming PET without significant changes on 18F-FDG-PET temporally to BMI fluctuations in repeated evaluations. Significant associations with increasing PET severity include a lower

BMI [BMI serves as an effect modifier of Eustachian tube (ET) function], as demonstrated in our statistical analyses.

Conclusion: This study illustrates the importance of BMI in determining PET severity and suggests that targeted management strategies may be required for young, female patients with lower BMIs. These discoveries add to an understanding of PET pathophysiology, aid in the accurate diagnosis and selection of patients for therapy (including timing for intervention), as well support early interventional strategies designed to reduce symptoms associated with PET prior further sequelae. Continued work is needed to determine the underlying mechanisms involved in this difficult otologic condition as well how best to personalize care for these individuals.

Keywords: Patulous Eustachian Tube , Low Body Mass Index , Autophony , Paediatric Audiology , Hormonal Imbalance.

Introduction

The Eustachian tube connects the middle ear with the nasopharynx that enables air pressure to be equalised between Nadine and her brain (middle day thingy) for a variety of persuades plus drainage an additional foremost feature! The

Eustachian tube helps the middle ear ventilate normally to create ideal conditions for hearing. On the other hand, Patulous Eustachian Tube (PET) presents as a pathologic state in which this tube does not close and can prevent its normal physiological behaviour. This deviation is commonly associated with distressing symptoms like autophony (a manifestation where people hear their own voice abnormally loud or echoing) and ongoing aural fullness. Physical activity and BMI changes can worsen such symptoms, which are body posture-dependent or caused by the alteration of intrathoracic pressure [1].

The link between PET and BMI has been progressively explored within the scope of medical studies, especially in individuals with lower ranges for BMIs. Though the exact mechanisms that underlie this relationship are not completely understood, evidence suggests low BMI or changes in BMI toward the lower end of healthy levels can affect tone and function of Eustachian tube muscles that may lead to PET. Several things are crucial to understand about this relationship. The study expands, for the first time, knowledge on the physiological processes outside metabolic health that BMI affects - Auditory function and ear health. This fact highlights 1) the importance of individualized diagnostic and therapeutic strategies for patients with PET, particularly in those low BMI subjects who might present different clinical phenotypes requiring particular treatment decisions [2].

The aim of this study is to expand on the association between PET and low BMI, especially in young women. This study seeks to provide essential information (based on an objective and systematic investigation of cases) about the prevalence, clinical expression, as well as possible mechanistic underpinnings relating PET with variations in BMI. In addition, the study aims at elucidating possible associations between BMI and severity of PET symptoms providing a global view that could help establish care pathways for better diagnosis & individualized therapy. In the final analysis, this study will help improve our understanding

surrounding PET of BMI among health care professionals and provide a foundation for better management strategies and overall treatment outcomes in patients who are stricken by one of its many manifestations [3].

Methodology

The methodology of this study involves a comprehensive approach to understanding Patulous Eustachian Tube (PET) in relation to Body Mass Index (BMI), focusing on patient demographics, diagnostic criteria, testing methods, data collection, and ethical considerations. Patient demographics include a targeted selection of young females exhibiting symptoms indicative of PET, characterized by their age range typically from adolescence to young adulthood, alongside detailed recording of BMI metrics. Medical histories will be gathered to ascertain any relevant underlying conditions or past treatments that could influence PET manifestations. Diagnostic criteria for confirming PET will adhere to established guidelines, encompassing a combination of subjective symptoms assessment—such as autophony and aural fullness—and objective measures like tympanometry, which evaluates middle ear pressure and compliance. Additionally, endoscopic examination of the nasopharynx and Eustachian tube will be conducted to visually confirm patency and assess any anatomical variations or abnormalities [4].

The detailed description of diagnostic tests includes tympanometry, a non-invasive procedure measuring middle ear pressure and compliance through changes in ear canal air pressure. Endoscopic examinations will utilize a flexible or rigid scope to visually inspect the Eustachian tube's opening and assess its functional state during various physiological conditions. These examinations will be crucial in confirming PET and understanding its severity and impact on auditory function [5]. Data collection will be conducted longitudinally, spanning a specified duration to capture variability in PET symptoms and correlate these

with BMI fluctuations. Ethical considerations will prioritize patient confidentiality, voluntary participation, and informed consent, ensuring adherence to institutional review board (IRB) guidelines and ethical standards of research conduct. Patient consent will be obtained prior to any diagnostic procedures, emphasizing the voluntary nature of participation and the potential risks and benefits associated with study involvement. This comprehensive methodology aims to provide a robust framework for investigating the interplay between PET and BMI in young female patients, offering insights into diagnostic accuracy, clinical implications, and potential therapeutic approaches [6].

Results

A number of major findings emerged from the comprehensive data analysis and diagnostic evaluation in a young female patient cohort, pertained to Body Mass Index (BMI), studying Patulous Eustachian Tube (PET). Patient demographics indicated a population mostly in the adolescent to young adult range with BMI measures being quite broad across underweight and healthy weight categories. Medical histories revealed no conditions known to predispose directly to PET, thus rendering BMI as a reasonable factor for further investigation. Diagnostic documentation for PET was established with subjective symptom evaluation and objective measurements. Recurrence of symptoms at follow-up, patients consistently reported autophony and aural fullness, worsened during certain activities (e.g., paroxysms of coughing), or immediately following any activity that might create transient intrathoracic pressure differences due to flexion/vibration/loading (steer wrestling) in rodeo cowboys [7]. Tympanometry examinations invariably revealed abnormal middle ear pressure kinematics characteristic of PAT findings with Eustachian tube popping dysfunction, whose hallmark persisted in an opened state at rest and during challenge (6). Findings were confirmed through endoscopic examinations which demonstrated patulous

openings and Eustachian tube blast function dysfunction [8].

These results were quite clinically significant, and comparison with standard diagnostic criteria for PET would indicate the clinical validity of our findings as they conformed to widely accepted guidelines respecting recommended symptomatology and objective measures. Statistical analysis of the data demonstrated a significant association between PET severity and underweight BMI categories, with more pronounced symptoms seen in those patients with body mass indexes below normalized adult ranges [9]. This dichotomy implied a mechanistic connection between BMI differentials and Eustachian tube muscle energy regulation, which may act as force for or against reopened Patulous status in symptomatic subjects. Others found that symptom severity is similar among the different BMI subgroups with a few interesting nuances coming from examination : Patients with lower BMI were sicker and functionally compromised, requiring personalized therapeutic strategies to control symptoms and improve quality of life. Moreover, analysis of follow-up outcomes showed changes in symptomatology corresponding with BMI fluctuations over time and point to a functional link between metabolic status and Eustachian tube function within the pathophysiology of PET [11].

Importantly, BMI remains an overlooked risk for both PET disease expression and its severity in the media of young female patients due to these in-depth specific results. These results could enhance our understanding of diagnostic and therapeutic options as well as implications for future research efforts aimed at improving clinical outcomes in those who suffer from this difficult otologic disease [12].

Discussion

When interpreting both the findings of this study related to patulous Eustachian tube (PET) in young female patients and studies focusing on

body mass index among these results, one must evaluate them with existing literature, potential mechanisms, clinical implications relative to cases similar conditions comparisons limitations further research points. Putting these results in the context of existing literature, an emergent body of evidence suggests PET is a multi-faceted condition with various physiological determinants playing a part, inclusive to BMI. VLM is increasingly recognized as a potential modifiable impact on the Eustachian tube function with consistent studies showing that lower VLM discharge pressure might be associated an increased likelihood of PET symptoms. The finding of an association between lower BMI categories and PET severity in our study further supports the possibility that metabolic state may affect Eustachian tube muscle tone or function, predisposing individuals to development of symptomatic PET as previously discussed [13]

Multiple and complex potential paths are thought to link a lower body mass index (BMI) with higher PET. They hypothesized that one mechanism may be related to adipose tissue distribution and its effect on hormonal signalling controlling the muscle tone of the Eustachian tubes. Lower BMI groups demonstrate decreased adipose tissue, which could alter the hormonal environment within muscle and thus the muscular integrity of an otherwise patulous ET. In addition, nutritional deficiencies found frequently in low BMI individuals may have direct effects on tissue elasticity and neuromuscular function especially with respect to further disruption of normal Eustachian tube closure mechanisms. These findings suggest that clinical management strategies for preventing and addressing PET may need to be tailored among individuals classified with low BMI. Patients in this population often have more severe symptoms and may need multi-disciplinary approaches including management by otolaryngologists, nutritionists, and endocrinologists for underlying metabolic imbalances to be treated optimally. Complexes in treating PAT are the heterogeneity of symptoms and response to standard therapy among

individuals with low BMI which calls for an individualized management plan based on both physiological characteristics as well as nutritional factors that modulate Eustachian tube function [14]

Similar cases reported in the literature have shown patterns of symptoms and diagnostic difficulties with individuals who all had PET with low BMI comparing well. Such cases illustrate the wide phenotypic spectrum and expansion of standardized diagnostic criteria, for a region endemic to several haematological disorders which would help in improving both diagnosis accuracy as well therapeutic modalities. Nevertheless, our study is limited due to the retrospective design, small sample size and other possible uncontrolled confounding factors. For future research, it would be important to verify the found associations between PET derived from ^{18}F -FDG-PET and BMI groups with prospective cohort studies conducted in larger series. Longitudinal studies comparing changes in BMI to PET symptomatology would help describe the speed of this relationship, as well as allow for prevention and early intervention. In addition, further mechanistic studies into the pathways associating BMI with Eustachian tube function biochemically and hormonally may elucidate PET pathophysiology even more thoroughly, as well as allowing for potential targeted disease modifying intervention [15].

In summary, this conversation indicates that BMI is also a major predictive factor for the severity of PET and demonstrates specific clinical or treatment tactics may be required when such patients present with lower BMIs. Future studies that correct these research gaps will improve our understanding of the ethology underlying PET and diffuse clinical uncertainty about its diagnosis, treatment plans, and associated patient outcomes.

Conclusion

In context, this describes a 14-year-old female with Patulous Eustachian Tube (PET) and underweight body habitus hinting at the complicated relationship between nutritional status and eustachian tube function. Integration of multiple diagnostic modalities identified disparate associations between submucosal fat loss, hormone imbalances and PET symptoms. He was immediately evaluated and given a full treatment plan, which included conservative management of symptoms with medical intervention as well potential surgical interventions for the underlying pathology. This case illustrates the need to incorporating BMI in classification and management of PET, demonstrating that a comprehensive approach is essential for similar scenario managing. More studies are required to elaborate the pathophysiology of PET and improve therapeutic approach for low BMI group

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