EFFECTIVENESS OF SURGICAL TECHNIQUE OF LARYNX MANIPULATION IN CASES OF PUBERPHONIA

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ABSTRACT

Objective: To determine the effectiveness of surgical technique of laryngeal manipulation to manage cases of puberphonia (mutational falsetto).

Methodology: Total 18 patients fulfilling the inclusion criteria were selected from ENT outpatient department of CMH Bahawalpur and Mardan. All the cases underwent laryngeal manipulation under general anesthesia. In the procedure, both vocal cords were crushed with the help of laryngeal forceps with mild force and larynx was stretched anteriorly with the help of blade of macintoch laryngoscope by placing it in the vallecule. Postoperative effectiveness was assessed two weeks and one month after the procedure. The procedure was termed effective when the voice of affected case changed from high pitched to post-pubescent low pitched variety.

Results: Age of the patients ranged from 15 to 23 years (mean 17.56 ±2.20). Out of 18 patients, 15 cases showed improvement in voice after one month; the effectiveness of this surgical technique in treating puberphonia was 83.33%. Rest of 03 cases failed to show desired improvement in voice and they were sent for speech therapy and psychological assessment.

Conclusion: The surgical technique of direct laryngoscopic larynx manipulation was found effective in treating cases of puberphonia (mutational falsetto) in majority of patients.

Key Words: Puberphonia, Larynx manipulation, Mutational falsetto

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INTRODUCTION

Puberphonia is persistence of high pitched childhood voice in puberty among males. Puberphonia is also termed as mutational falsetto, functional falsetto or persistent falsetto. It is defined as post-adolescent males continuing to have pre-adolescent voice[1,2]. The incidence of puberphonia or falsetto voice is 1 per 900000[3,4]. This condition is related to male gender and is rare in females. Few boys fail to transform high pitched voice of pre-pubescence to low pitched voice of post pubescence and adulthood in structurally normal larynx[5]. The causes of puberphonia are attributed to both organic and psychological[6,7]. Organic etiology is linked to increase in length of cords and increase in muscle tension. Psychological causes include failure to accept new voice, immaturity and embarrassment of newly achieved pitch[8]. The increase in length of Adam's apple at puberty attributes to organic etiology; however psychological factors have also been related in persistence of pre-pubertal voice in males. On the contrary, females retain their voice because there is no sudden increase in length of thyroid cartilage/Adam's apple. Puberphonia has psychosocial impact on the affected individual which has gross effect on his confidence, maturity and personality.

Previously, voice therapy was considered to be the main treatment for this condition but not much is reported in literature[8]. However, lately various surgical procedures (including thyroplasty procedures) were devised and are in practice[6]. Recently, laryngoscopy and manipulation has been documented as new technique for addressing puberphonia but very less is present in literature in this regard. In the present article, we performed this new method of direct laryngoscopy and manipulation procedure for puberphonia. If it is found safe, easy, non-invasive, cost effective and rapid way of treating puberphonia, this research will help in better management of patients with puberphonia.

METHODOLOGY

The study was carried out in Combined Military Hospital Bahawalpur and Mardan from January 2015 to January 2018. It was a quasi experimental study. Sample size was calculated from online Raosoft sample size calculator, where prevalence of puberphonia was taken as

1 in 900000[3,4]. Confidence level was taken as 95% and margin of error was 5%. Sample size came out to be 16. We selected 18 cases from outpatient department to cater for any case who may lose to follow up. Sampling technique used was non-probability convenient sampling. All the cases who had puberphonia and were willing for the study were selected from ENT outpatient department of the hospital. Informed consent was taken for the subject study from all the willing cases. Indirect laryngoscopy (IDL) and fibroptic nasopharyngoscopy was done in all these cases to rule out other laryngeal pathologies like vocal cord polyps, nodules etc.

Inclusion criteria were males at the age of puberty who failed to develop adult voice while individuals who had vocal cord polyps or nodules were excluded. Moreover, patients who were already under treatment for puberphonia (voice therapy etc), chronic smokers and syndromic/special individuals like Kleinfelter's syndrome and the cases who did not consented for the procedure were also excluded.

The cases underwent laryngoscopy and manipulation as elaborated. The procedure was performed under general anesthesia. Direct laryngoscopy was done and whole larynx was examined. Both vocal cords were crushed with slight force with help of laryngeal forceps. Then vocal cords were also stretched with the beak of macintoch laryngoscope with minimal force. The blade/beak of laryngoscope was placed in vallecule to apply mild anterior pressure. Postoperatively the cases were advised oral antibiotic and anti-inflammatory for 5 days along with voice rest for 7 days. The individuals were seen in outpatient department after 2 & 4 weeks to assess the effectiveness (change in voice from high pitch to lower pitch voice).

The data including age, gender, procedure carried out and outcome of surgical procedure was entered in Statistical Package for Social Sciences (SPSS) 20. Frequency, percentage, mean and standard deviation (SD) were calculated for study variables. Chi square test was applied for comparing qualitative variables. A p value <0.05 was considered significant.

RESULTS

There were 18 cases in the study. All were males. Their age range was from 15 to 23 years (mean 17.56 ±2.20). Out of 18 patients, 10 cases had dramatic improvement in their voice after two weeks and another 05 cases showed improvement in voice after one month. Rest of 03 cases failed to show improvement in voice. The effectiveness of this surgical technique in treating puberphonia was 83.33%. The 03 cases who did not improved were sent for speech therapy and psychological assessment.

Table 1: Age range of cases

Age (in Years)	Frequency	Percentage
15	3	16.7%
16	4	22.2%
17	3	16.7%
18	3	16.7%
19	2	11.1%
20	1	5.6%
21	1	5.6%
23	1	5.6%
Total	18	100%

Table 2: Outcome of procedure

Procedure	Outcome of Procedure (Effectiveness)		P Value
Larynx Manipulation	Successful	15 (83.33%)	0.001
	Unsuccessful 15	3 (16.67%)	
Total		18 (100%)	

DISCUSSION

Puberphonia is of utmost importance and concern for the boys undergoing this phenomenon. The boys not only feel under-confident but are also under social and psychological pressure. There are various treatment modalities in practice. Voice therapy has shown variable results in literature[5]. In infants, larynx is present at higher level which gradually descends to lower level. This descent is more rapid at puberty. There is also increase in the size of larynx at puberty under influence of testosterone. These changes are responsible for transformation of pre-adolescent voice to adult voice[9]. This change of voice occurs between the age of 12 to 18 years. The management options include speech therapy and surgical techniques/procedures.

In the present study, we have carried out the surgical technique for puberphonia. In this procedure we performed laryngeal manipulation under general anesthesia. It has shown very good results (83.33%). Previously only one such similar technique was done and documented by Vaidya et al[10] and they also showed promising results. They performed direct laryngoscopy and pressure was applied on vallecule internally as well as external pressure applied on thyroid cartilage with sudden improvement in pitch of voice.

There is scarcity of data in literature about larynx manipulation for treating puberphonia/mutational falsetto. However, this technique is less invasive and time saving as compared to other surgical procedures like type III thyroplasty, relaxation thyroplasty etc[11,12]. In type III thyroplasty, thyroid cartilage is exposed and 2-3 mm of vertical strips of thyroid cartilage are removed. It causes retrusion of middle portion of thyroid cartilage leading to reduction in vocal cords length[9]. Pau et al[13] have also reported another surgical procedure for correction of mutational falsetto (puberphonia) via mobilizing hyoid and superior halves of thyroid cartilage to reduce cricothyroid distance by apposing hyoid to cricoid cartilage.

CONCLUSION

The surgical technique of direct laryngoscopic larynx manipulation was was found effective in treating cases of puberphonia (mutational falsetto) in majority of patients.

REFERENCES

1. Richard M, Flint P, Haughey B, Lund V, Niparko J, Robbins K et al. Cummings Otorhinolaryngology-Head and Neck Surgery. 5th ed. NY: Elsevier; 2010.
2. Colton RH, Casper JK, Leonard. Understanding voice problems: a physiological perspective for diagnosis and treatment. 4th ed. William & Wikins, USA; 1990:82-4.
3. Chandra ST, Rao SM, Kumar AY, Murthy PSN. Puberphonia. Int J Phonosurg Laryngol 2011; 1:19-20.
4. Banerjee AB, Eajlen D, Meohurst R, Murty GE. Puberphonia: a treatable entity (abstract). World Voice Congress Oporto: Portugal; 1995.
5. Stemple JC. Voice therapy: clinical studies. St. Louis MO: Mosby Year Book 1993.
6. Dagli M, Sati I, Ascar A. Stone RE Jr, Dursun G, Eryilmaz A. Mutational falsetto: intervention outcome in 45 patients. J Laryngol Otol 2008; 122: 277-8.
7. Gokdogan C, Gokdogan O, Tutar H, Aydil U, Yilmaz M. Speech range profile (SRP) findings before and after mutational falsetto (puberphonia). J voice 2016; 30:448-51.
8. Desai V, Mishra P. Voice therapy outcome in puberphonia. J Laryngol Voice 2012; 2:26-9.
9. Chowdhury K, Saha S, Pal S, Chatterjee I. Effect of type 3 thyroplasty on voice quality outcomes in puberphonia. Philipp J Otolaryngol Head Neck Surg 2014; 29:6-10.
10. Vaidya S, Vyas G. Puberphonia: a novel approach to treatment. Indian J Otolaryngol Head Neck Surg 2006; 58: 20-1.
11. Slavit DH, Maragos NE, Lipton RJ. Physiologic assessment of Isshiki type III thyroplasty. Laryngoscope 1990; 100: 844-8.
12. Karthikeyan A, Thiagarajan B. Relaxation thyroplasty: a classic surgical approach for puberphonia. Online J Otolaryngol 2012; 2:37-47.
13. Pau H, Murty GE. First case of surgically corrected puberphonia. J Laryngol Otol 2001; 115:60-1.

CONTRIBUTORS

MAK conceived the idea, planned the study and drafted the manuscript. AA and HBU helped acquisition and interpretation of data and did literature search. MK helped manuscript writing. All authors contributed significantly to the submitted manuscript.