PATTERN OF CAUSES AND MANAGEMENT OF PERMANENT LOSS OF VOICE STUDIED AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: *To determine the frequency of causes of hoarseness leading to permanent loss of voice and discuss their management.*

Methodology: *This descriptive study was carried out at the department of ENT, Head and Neck Surgery, Lady Reading Hospital Peshawar from January 2009 to December 2011. All these patients were evaluated in terms of detailed history, thorough examination and relevant investigations. Biopsy from laryngeal mass was taken in case of tumours. Total laryngectomy was performed in patients with advanced laryngeal tumours provided with preoperative counseling regarding postoperative handicaps. The patients with laryngeal narrowing due to trauma were subjected to laryngeal stenting. The data was analyzed using SPSS 15.*

Results: *Out of 16 patients 10 were male and 6 were female with male: female ratio of 1.6:1. The ages ranged from 09-75 years with mean age of 43.68 $\pm$ S.D 18.65 years. Majority of patients (68.75%) had low socioeconomic status. Main presentation of these patients was hoarseness (100%). The commonest cause of change of voice was laryngeal carcinoma (n-6, 37.5%), followed by blast injury (25%). Endolaryngeal stenting was the commonest (43.75%) procedure performed for traumatic laryngeal stenosis followed by total laryngectomy. Most of the patients gained good esophageal speech.*

Conclusion: *It is concluded that beside laryngeal cancer, trauma to the larynx is a common cause of permanent loss of voice resulting due to increased incidence of violence in our set up. Esophageal speech can be easily and successfully instituted in laryngectomized patients among other voice rehabilitative options.*

Key Words: *Hoarseness, Dyspnea, Laryngectomy, Tracheostomy, Airway Obstruction*

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INTRODUCTION

Voice, a powerful tool and a blessing of Allah Almighty, is the primary means of communication for humans. Proper diagnosis of change of voice through a detailed history and thorough examination is paramount. Treatment is individualized depending on the diagnosis and individual needs of the patients[1]. The causes of laryngeal trauma include vehicle accidents, sports injury, clothesline injury, suffocation, kick and punch, strangulation and hanging which may lead to permanent loss of voice if the larynx is severely damaged which cannot be repaired[2]. The gold standard protocol of ABC must be ensured and attention must be drawn to the stabilization of neck, spine and larynx before embarking on other reparative procedure. The stabilization of larynx depends upon the grade and severity of injury. The interior of larynx may be dealt with a variety of stents like McNaught, Silicone keel, Aboulker stent, Swiss roll and silastic stents. If these stents are not effective, then other procedure like grafting, resection of stenotic part or permanent tracheostomy may be utilized[3]. Change of voice may result from thyroid surgery, if there is vocal card palsy. In such condition the treatment options available are trans-oral carbon dioxide (CO_2) laser endoscopic arytenoidectomy, endoscopic laser cordotomy, extra laryngeal arytenoidectomy, arytenoids lateralization and posterior crico-arytenoid muscle reinnervation. The non-traumatic cause of permanent loss of voice is advanced carcinoma larynx treated by total laryngectomy.

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Total laryngectomy not only leads to loss of voice but there is also loss of nasal function, poor cough, difficulty in swallowing, changed lung function, tracheostomal complications and lifelong psychological and socio-cultural consequences. All those patients surviving with tracheostomy due to severe non-repairable laryngeal trauma or laryngeal carcinoma need rehabilitation of all the disabilities resulted from trauma or tumour[4]. Rehabilitation of laryngectomized patient is a multidisciplinary team work that can be achieved with help of a panel representing the fields of neurology, speech-language pathology, professional voice teaching, family medicine, pulmonology, geriatric medicine, nursing, internal medicine, otolaryngology-head and neck surgery, pediatric medicine, social services, employment office and the employer, insurance companies and psychotherapist[5]. The various options for voice rehabilitation include esophageal speech, primary or secondary tracheo-esophageal puncture, voice prosthesis and electro-mechanical speech aid. Other rehabilitative measures include shower shield, swimming tube, an alarm bell and respiration tube. Olfactory rehabilitation can be obtained by nasal airflow inducing manoeuvre (NAIM). In this technique repeated extended yawing movement is performed, lowering the jaw, floor of mouth, base of tongue, and soft palate while keeping the lips closed.[6] About 50% patients can acquire olfaction through this manoeuvre. Laryngectomized patient can be rehabilitated socially by eliminating ignorance, prejudices and anxieties of relatives and friends on one hand and preserving employment or procurement of new job on the other hand. Psychological rehabilitation of these patients starts with intensive counseling prior to surgery and its aim is gaining of self confidence[7].

Besides laryngeal tumours, trauma to the larynx is a common problem in our part of the world due to bad geopolitical situation that give rise to permanent loss of voice, that's why this study is planned to know about the causes and management of permanent voice loss.

METHODOLOGY

This prospective and a descriptive study was carried out at the department of Ear, Nose, Throat, Head and Neck Surgery, , Lady Reading Hospital Peshawar from January 2009 to December 2011. All the patients of any age and either sex who presented to ENT department with long standing hoarseness were recruited in the study. The patients with advanced malignant lesions of larynx subsequently subjected to total laryngectomy with permanent tracheostomy were included in the study. All those patients having permanent tracheostomy due to severe laryngeal trauma where reparative procedures were ineffective were also included in the study. The patients having benign lesions responsible for hoarseness were excluded from the study. All these patients were evaluated in terms of detailed history and thorough examination. The investigations carried out were FBC, HBs Ag, HCVAb, HIV, LFTs, RFTs, RBS, CXR, ECG, Echo, USG Neck and Abdomen, CT scan or MRI Neck if needed accordingly. The patients were assessed regarding fitness for general anesthesia by anesthetist. A well informed consent was taken from adult patients themselves or from parents/relative in case of children with severe laryngeal trauma explaining the procedure, its risks, benefits and associated complications and publishing the pictures of patients in this study if needed. Study was approved by the hospital ethical committee. These patients were subjected to direct laryngoscopy under general anesthesia. Biopsy was taken from laryngeal lesions. The biopsy specimen was examined by histopathologist. Detailed counseling of the patients was carried out explaining handicaps after laryngectomy especially loss of voice and its rehabilitation. Total laryngectomy was performed in patients with advanced laryngeal tumours and those patients having recurrent laryngeal tumour after irradiation. The patients with laryngeal narrowing due to trauma were subjected to laryngeal stenting. Laryngeal stent was removed after six months and tracheostomy was closed while those patients who suffered from respiratory distress leading to cyanosis after removal of laryngeal stent and closure of tracheostomy were allowed to have tracheostomy which is labeled as permanent tracheostomy. Tracheostomy was carried out in these patients either on emergency basis or elective depending upon the severity of airway obstruction. The data was collected on a preformed proforma and statistical analysis was performed using the statistical program for social sciences (SPSS version 15).

RESULTS

Sixteen patients were enrolled in this study. There were 10 male and 6 female patients, with male: female ratio of 1.6:1. The age of the patients ranged from 09-75 years with mean age of 43.68 $\pm$ S.D 18.65 years. Nine patients (56.25%) had age above 50 years and 7 patients (43.75%) had age below 50 years. Among these patients 8 were farmer, 5 were laborers and 3 were teacher by profession. Five patients (31.25%) were addicted to snuff, 4 patients were smokers and 7 patients (43.75%) had no addiction. Majority of patients (68.75%) had low socioeconomic status. Main presentation of these patients was hoarseness (100%) (Table 1). The commonest cause of change

of voice was laryngeal carcinoma (n-6, 37.5%), followed by blast injury (25%) (Table 2). Endolaryngeal stenting was the commonest (43.75%) procedure performed for traumatic laryngeal stenosis followed by total laryngectomy performed in 4 cases (25%) having advanced stage of laryngeal cancer (Table 3). Hypopharyngeal carcinoma was found in 2 cases (12.5%). One of them was subjected to total laryngopharyngoesophagectomy. Two patients with carcinoma larynx and one patient with hypopharyngeal carcinoma had prevertebral soft tissue involvement by the tumour and metastasis in liver. They were offered palliative therapy in form of tracheostomy and feeding jejunostomy (Figure 1). Seven patients had laryngeal stenosis due to trauma and they were treated with placement of endolaryngeal stents. Among these patients 4 cases (25%) were treated successfully with endolaryngeal stents and 3 patients (18.75%) failed to respond to stents, thus surviving with permanent tracheostomy (Figure 2). Lateralization of right vocal card was performed in one patient having bilateral abductor palsy resulted from thyroid surgery. Voice rehabilitation was

Table 1: Clinical features of patients (n=16)

Clinical Features	No of patients	Percentage
Hoarseness	16	100%
Laryngeal mass	8	50%
Breathlessness	8	50%
Neck injury	6	37.5%
Dysphagia	5	31.25%
Odynophagia	4	25%
Weight loss	3	18.75%
Fever	4	25%
Hypopharyngeal mass	2	12.5%

Table 2: Causes of permanent loss of voice in this study (n =16)

Disease		No of patients	Percentage
Advanced Laryngeal carcinoma		6	37.5%
Hypopharyngeal carcinoma		2	12.5%
Laryngeal Trauma	Blast injury	4	25%
	Road traffic accident	2	12.5%
	Firearm injury	1	6.25%
Other Causes	Thyroid surgery	1	6.25%

Table 3: Surgical procedures performed in this study (n =16)

Procedure	No of patients	Percentage
Laryngeal Stenting	7	43.75%
Total laryngectomy	4	25%
Vocal card lateralization	1	6.25%
Laryngopharyngoesophagectomy with stomach pull up	1	6.25%
Palliative tracheostomy	2	12.5%
Palliative Feeding jejunostomy	1	6.25%

Figure 1: Picture of the laryngectomized patient having permanent tracheostomy with tracheostomy tube in situ and there is alopecia due to chemoradiation

Figure 2: Picture of the patient having permanent tracheostomy due to laryngeal trauma, where endolaryngeal stent failed to prevent subglottic stenosis

obtained by training the patients with esophageal voice by speech therapist in all laryngectomized (100%). Olfactory rehabilitation was achieved with nasal airflow inducing manoeuvre by most of the patients.

DISCUSSION

In this study males were predominant with male to female ratio of 1.6:1 that is comparable to study of Ahmad and colleagues reporting male dominance with male: female ratio of 1.8:1. Regarding age nine patients (56.25%) had age above 50 years in this study simulating Ahmad's study where majority of patients were in 5th decade of life.[8] Malignancy is more common in aged people while people of middle age are more prone to trauma. We found that five patients (31.25%) were addicted to snuff, 4 patients (25%) were smokers and majority of patients (68.75%) had low socioeconomic status which is in agreement to the results of Waleem where voice abuse and smoking were the commonest risk factors for hoarseness and 70% patients had low socioeconomic background[9]. In current study hoarseness was the commonest (100%) clinical feature of the patients followed by laryngeal mass (50%) which is in accordance to the study of Banjara, where hoarseness was the commonest (100%) presentation, followed by throat pain (23%)[10]. In present study 50% patients had advanced laryngeal cancer resulted in permanent loss of voice after laryngectomy. We experienced laryngeal trauma in 37.5% patients that is in accordance to results of Kummer who carried out a study on airway trauma and found that 68 patients (56.38%) were victims of penetrating trauma and 36 patients (34.16%) were victims of blunt trauma larynx[11]. Likewise Gilyoma also carried out emergency tracheostomy in 80.4% patients and elective tracheostomy in 19.6%, while 86.0% patients had temporary tracheostomy and 14.0% had permanent tracheostomy required for curative management[12]. In 7 cases (43.75%) laryngeal stenting was done as Hemen-Ackah and Bell also recommended

endolaryngeal stenting in patients sustaining severely comminuted fracture that are not amenable to routine external fixation, extensive laceration of mucosa within the larynx[13,14]. Although there are different treatment techniques for bilateral abductor palsy, vocal fold lateralization was performed in one case with bilateral abductor palsy (6.25%) due to thyroid surgery in this study[15,16]. However Finck advocated endoscopic laser cordotomy for bilateral abductor palsy[17]. This study is at variance from Pinto who performed CO2 laser subtotal unilateral arytenoidectomy in 17 cases (94.4%), and micro trapdoor flap technique in eight patients (47%)[18]. Similarly Gandhi also reported good results with CO_2 laser Subtotal/partial arytenoidectomy with posterior cordectomy for bilateral abductor palsy[19]. Hilgers narrated that total laryngectomy/shattered laryngeal trauma profoundly alters speech, respiration and sense of smell and taste[20]. Olfactory rehabilitation was achieved by majority of patients with nasal airflow inducing manoeuvre method in this study which is comparable to the study of Finck, where one third of patients were benefited with so-called Nasal Airflow Inducing Manoeuvre ("Polite Yawning"). In current study esophageal voice was developed by all the patients (100%). Similarly Rizzo and colleagues reported that patients in advanced stage of laryngeal cancer had good prognosis with esophageal voice after laryngectomy[21]. Attieh and colleagues carried out a study on rehabilitation of laryngectomized patients and observed that degree of voice handicap in these patients could be improved by providing a functional means of communication in form of tracheoesophageal puncture[22]. Koscieny also favoring that the use of voice prostheses is on increase. If surgical voice restoration is impossible or unsuccessful, oesophageal voice replacement and electronic voice support are realistic alternative[23].

CONCLUSION

It is concluded that beside laryngeal cancer, trauma to the larynx is also a common cause of permanent loss of voice resulting from increased violence in our set up. Laryngeal reconstructive procedures showed poor success rate and tracheostomy is the ultimate option for survival. Esophageal speech can be easily and successfully instituted in laryngectomized patients among other voice rehabilitative options.

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CONTRIBUTORS

FIW conceived the idea, planned and prepared the manuscript of the study. QK & AK did the data collection & analyzed the study. IAK supervised the study. All the authors contributed significantly to the research that resulted in the submitted manuscript.