Afr. J. Med. med. Sci. (Sept., 2014) 43, Suppl. 173-178

Surgical management of vocal cord paralysis: The need for careful patient selection

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Abstract

Background: Vocal cord paralysis is one of the challenging laryngeal clinical entities confronting the Laryngologist and indeed, thePhono-surgeon. The ability to maintain an effective balance between voice and airway function to ensure good quality of life, which is the overall surgical management strategy, requires expertise.

Method: Clinical notes of all patients that met the inclusion criteria for this study on vocal cord paralysisover a ten-year period were analysed. Data was generated from patients' case files retrieved using standard codes according to the International Classification of Diseases(ICD-10).

Results: From the 7,941 new ENT cases seen,26 patients had vocal cord paralysis (VCP) which translates to a prevalence of 0.3%.Themale to femaleratiowas1: 4.2 with a mean age of 45.7years ± 6.3. Their ages ranged from 21-80 years. Thyroidectomy was the main causal factor in 46.2% while idiopathic causes were documented in23.1%.

Twenty-three patients(88.5%) had unilateral VCP from which 21(91.3%) were abductor paralysis. The ratio of Left: Right VCP was 3:1. All the 3(11.5%) bilateral cases were abductor paralysis. Neurotropic agents only, were effective in cases of unilateral VCP. However, in those with bilateral paralysis, two had tracheostomy only, while the third had alaryngo-fissure, arytenoidoplasty and endo-laryngeal stenting in addition. All were successfully decannulated with good voice quality.

With these observations, we suggest the choice of appropriate surgical technique, timing and careful patient selection in order to preserve voice, curtail operative sequelae and achieve good health related quality of life (HRQoL) which is the overall management strategy, be borne in mind in the surgical management of vocal cord paralysis.

Keywords: *Vocal cord paralysis, Appropriate surgical technique, Timing*

Résumé

Contexte: La paralysie des cordes vocales est l'une des difficiles entités cliniques laryngées confrontant le laryngologiste et en effet, le Phono-chirurgien. La capacité à maintenir une balance effective entre la voix et la fonction des voies aériennes pour assurer une bonne qualité de vie nécessite une expertise. Cette étude est donc conçue pour mettre en valeur notre expérience sur la gestion chirurgicale de paralysie des cordes vocales.

Méthode: Les repères cliniques de tous les patients qui concordaient aux critères d'inclusion pour cette étude sur la paralysie de la corde vocale pendant une période de dix ans ont été analysés. Les données ont été générées à partir des dossiers de patients recouvrées en utilisant des codes standards selon la Classification Internationale des Maladies (CIM-10).

Résultats: Des 7941 nouveaux cas ONG (Oreille-Nez-Gorge) vus, 26 patients avaient la paralysie de la corde vocale (PCV) donnant une prévalence de 0,3%. Le ratio male : femelle était de 1: 4.2 avec un âge moyen de 45,7 années ± 6,3. Leur âge rangeait de 21 à 80 ans. La thyroïdectomie a été le principal facteur causal dans 46,2%, tandis que les causes idiopathiques étaient documentées dans 23.1%.

Vingt-trois patients (88,5%) avaient PVC unilatérale dont 21 (91,3%) étaient des paralysies ravisseuses. Le ratio gauche : droit du PVC était de 3: 1. Tous les 3 cas bilatéraux étaient des paralysies ravisseuses. Les agents neurotropes, seulement, ont été efficaces dans les cas de PVC

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unilatérale. Cependant, dans ceux avec la paralysie bilatérale, deux avaient la trachéotomie seulement, tandis que le troisième avait la fissure-laryngée, en plus des stentings aryténoïde-oplastie et endo-laryngée. Tous ont été décanillés avec succès et avec bonne qualité de voix.

Conclusion: Avec ces observations, nous suggérons que le choix de technique chirurgicale appropriée, du temps et une sélection soigneuse des patients afin de préserver la voix, réduire les séquelles opératoires et obtenir une bonne qualité de vie (QV) qui est la stratégie de gestion entière, soit garder à l'esprit.

Mots-clés: *paralysie des cordes vocales, technique chirurgicale appropriée, Temps*

Introduction

Medical and surgical management of the human voice has been an enduring area of investigations throughout the history of laryngology[1]. These advances span through the times of Bozzini, in the 19th century to Isshiki, now regarded as the father of modern phono-surgery who has described four types of procedures named after him, in the 20th and 21st centuries [2-6].

The main laryngeal functions; respiration, phonation, deglutition and sphincteric protection of the lower respiratory tree are essential to life and could adversely be affected in vocal cord paralysis (VCP).

It is estimated that over 80% of jobs in many countries are communication based [1]. Thus disturbance of phonation from VCP may have serious consequences on the socioeconomic development of the sufferer and thus the society, as this would add to the present rising trend of unemployment. Therefore, voice preservation is critical in any successful management protocol of VCP.

Various regions in the developed world have described different treatment options in the management of vocal cord paralysis but scanty documentation does exist for the developing countries of Africa. This study was therefore designed to present our experience on the surgical management of VCP in our clinical setting.

Materials and method

Clinical notes of all patients that met the inclusion criteria for this study on vocal cord paralysis over a 10-year period (January 1, 1996 - December 31, 2005) at the ENT Department of our hospital were studied and analysed.

Data was generated from patients' case files retrieved using standard codes according to the International Classification of Diseases (ICD 10). Information extracted included bio-data, socio-economic status based on Oyedeji's classification [9], clinical presentations, duration of symptoms, examination findings, investigation results, primary cause of the paralysis, treatment offered including the final outcome. Case folders within sufficient information, patients with primary vocal cord tumours and lesions were excluded from this study.

The data obtained were analysed using the SPSS version 11.0, Chicago, IL, USA.Results were presented in simple descriptive format, tables and figures.

Results

From the 7,941 new ENT cases seen, 26 patients had vocal cord paralysis(VCP) which gives a prevalence of 0.3%.There were 5 males(19.2%) and 21 females(80.8%) with a male to female ratio of 1:4.2.Their mean age was 45.7years ± 6.3 with a range from 21-80 years. The age bracket of 21-40years recorded the highest number of patients with 42.3% (Figure 1).

Nineteen patients (73.1%) were of the low socio-economic class (Figure 2).

Thyroidectomy was the main causal factor in 46.2% while idiopathic causes was documented in 23.1%.This translated to a prevalence of 1.9% of VCP post thyroidectomy. (Total patients that had thyroidectomy were 647).

This was closely followed by idiopathic causes (23.1%), goitres (15.4%), thyroid malignancies (11.5%) and neck dissection(3.8%) (Table I).

The commonest form of VCP, fortunately, was the unilateral type with 23 patients, which constitutes 88.5%. Out of this, 21(91.3%) were abductor paralysis while 2(8.7%)were adductor paralysis. Seventeen (65.4%) and 6 (23.1%) cases involved the left and right vocal cords,

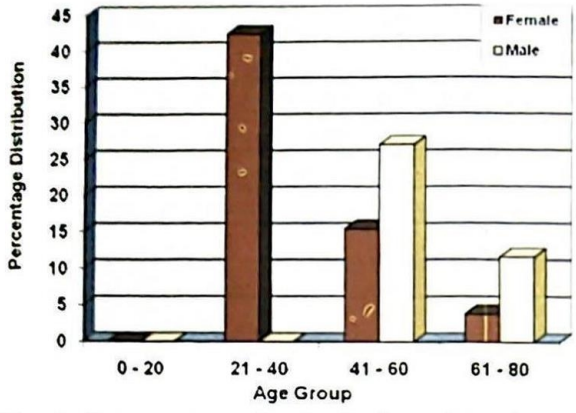

Fig. 1: Percentage gender distribution of vocal cord paralysis by age group

respectively, giving a left to right ratio of approximately 3:1. All the three patients (11.5%) that had bilateral vocal cord paralysis were abductor. (Table II).

Oral pyritinol, a neurotropic agent, was the drug used predominantly. A full return of function in most cases of unilateral paralysis as confirmed by indirect- and micro-laryngoscopy was observed.

However, all the three with bilateral abductor paralysis had surgeries in which two had tracheostomy only while the third had alaryngo-fissure, arytenoidoplasty and endo-laryngeal stenting, in addition. Vocal cord recovery was partial in the latter. Speech and chest physiotherapy were offered as well. All were successfully decannulated with satisfactory breathing. The patient who had temporal bone sarcoma with cervical nodal metastasis had excision and selective neck dissection including chemo-radiation. Adjuvant chemo-radiation was administered post-thyroidectomy to all cases of thyroid malignancies.

Following 3 years of follow-up visits, adequate contralateral compensation and ipsilateral recovery were observed in cases with unilateral VCP as confirmed on indirect laryngoscopy and micro-laryngoscopy except the case that underwent neck dissection in which recovery was partial. In those with bilateral VCP, except that with idiopathic bilateral abductor paralysis that had his tracheostomy with speaking valve in place for 10 years before decannulation, the other two were decannulated within a year. As regards voice quality, all had a good outcome except the case that had a laryngo-fissure with endolaryngeal stenting who had a fair and usable voice. All had a satisfactory health related quality of life(HRQoL).

Discussion

Vocal cord paralysis has been described by several authors worldwide and the incidence has been put at 1.5-23% [10-12] with no racial bias and no age predilection. This study recorded a prevalence of 0.3%, which is lower than that reported and virtually sparing the age group less than 20 years. This figure is certainly an underestimation as diagnosis for paediatric VCP is often difficult unless when bilateral. Congenital intracranial lesions like Arnold-Chiari malformations and meningocoeles have been implicated. They have been described as the second most common causative agents [13,14]. Furthermore, the small sample size could be a factor.

From our observation, most victims of road traffic accidents in our environment who suffer severe head injury and survive often end up with a tracheostomy on account of prolonged intubation. Decannulation is frequently difficult and in most cases, it's attributed to laryngo-tracheal stenosis, consequently, central causes of vocal cord paralysis are missed, which may co-exist. This further offers a reasonable explanation for the small sample size.

Table 1: Aetiology of vocal cord paralysis

Aetiology	Frequency	Percentage
Post thyroidectomy	12	46.2
Idiopathic	6	23.1
Goitre	4	15.4
Thyroid carcinoma	3	11.5
Neck dissection	1	3.8
Total	26	100.0

NB: Total thyroidectomy cases=647. This implies a prevalence of VCP post-thyroidectomy= 1.9%

The male gender has been reported in the literature to be more commonly affected than the female, in the ratio 8:1. Our findings recorded a reversal, as the female gender predominated in a

ratio of 1:4.2. This could be a result of the large proportion of cases in our series that were secondary to thyroid ectomy and goitres, constituting 61.6%. Goitres are hormone dependent lesions that are more prevalent amongst females [15] especially during the period of their growth spurts and reproductive age. This is in agreement with those of Beninger *et al* [16] who reported a rising incidence of iatrogenic causes of vocal cord paralysis and contrary to earlier findings of Stell and Maran who found malignant diseases as the leading cause [17].

Table 2: Vocal cord paralysis' distribution by affected side

Side	Frequency	Percentage
Left	17	65.4
Right	6	23.1
Bilateral	3	11.5
Total	26	100.0

L:R = 3:1
Abductor paralysis-21(91.3%) and Adductor paralysis-2 (8.7%)

Its prevalence in the low socioeconomic class in this study could also be explained by goitres being associated with iodine deficiency. Frequent cases of idiopathic causes, constituting 23.1% that are mostly secondary to neurotropic viruses could also buttress this fact and is closely in tandem with the reported 15.4% by Stell and Maranin their study which incriminated the Influenza A2 Hong Kong 1 68 virus.

In other studies, idiopathic causes was described as the commonest etiological factor for vocal cord paralysis for which infectious mononucleosis and the influenza viruses were found to be responsible with a prolonged period of resolution [18].

This agrees with our case that took 10 years before a successful decannulation. A rare aetiology of VCP, Orthner's cardiovocal syndrome, featured in a recent case report in our environment [19] was not observed in this study. This could be a result of the downward trend in the prevalence of hypertensive morbidity reported in a study [20].

The predominance of unilateral vocal cord paralysis consisting mainly abductor paralysis has been described by several studies [21], which is in consonance with our findings of 88.5% and 91.3% respectively, with a left to right ratio of 3:1.This is a result of the long intra-thoracic course of the left recurrent laryngeal nerve including its close relation to the aortic arch and the left atrium amongst others, making it vulnerable to injuries at these points.

The main objectives in the treatment of vocal cord paralysis, especially, bilateral, are to achieve an adequate airway, preservation of voice quality and laryngeal competence [2] which are difficult to attain and therefore requires expertise.

In their report, Gentile and colleagues [23] suggested no surgical intervention for unilateral VCP, as recovery is usually satisfactory and further highlighted their operative experiences. Careful patient selection via comprehensive investigations and appropriate timing for at least 6-12 months would give better results [7].

In our study, we went a step further and administered neurotropicagents, oral pyritinol mainly, along with speech therapy. A satisfactory outcome, judged from good voice quality, was observed within one year, which was complete in three years except in the case that had a selective neck dissection who had partial recovery. Our scientific argument for administering neurotropic agents was an attempt to shorten the period of resolution as it took eleven years in a study [23]. We may wish to speculate that the normal natural history of neural recovery post injury could also be a factor in our observations.

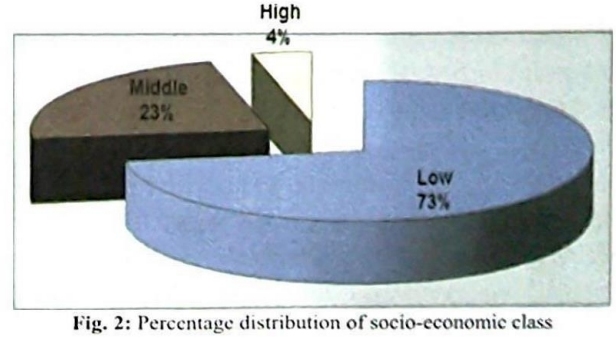

Fig. 2: Percentage distribution of socio-economic class

However, the authors submit that the reduced period of recovery within one year in our

series requires a prospective study to confirm. Our approach avoided surgical techniques of medialization in unilateral adductor VCP with calcium hydroxyl apatite injections with its irreversibility or lateralisation procedures in abductor VCP described by several authors [8,22,24,25] because of the controversies and unpredictability that accompany some of these techniques.

All the cases of bilateral paralysis, which incidentally were abductor, had emergency tracheostomy along with speech and chest physiotherapy. One of the patients had additional arytenoidoplasty via a laryngo fissure with stent insertion in contrast to other reports [21, 26]. This, notwithstanding, provided a good outcome as all were successfully decannulated and voice quality was adequate. This study's decannulation rate stands at 100% though with a long waiting period as seen in the idiopathic case, nevertheless, it's a better result compared with 68% reported by Triglia and co-workers [27]. The index case is a medical practitioner still practicing to this moment. All our patient had a satisfactory HRQoL.

With these observations, we suggest the choice of appropriate surgical technique, timing and careful patient selection in order to preserve voice, curtail operative sequelae and achieve good health related quality of life, which is the overall management strategy, be borne in mind in the surgical management of vocal cord paralysis.

Acknowledgments.
Data analysis and writing of this paper was supported by the Medical Education Partnership Initiative in Nigeria (MEPIN) project funded by Fogarty International Center, the Office of AIDS Research, and the National Human Genome Research Institute of the National Institute of Health, the Health Resources and Services Administration (HRSA) and the Office of the U.S. Global AIDS Coordinator under Award Number R24TW008878. The content is solely the responsibility of the authors and does not necessarily represent the official views of the funding organizations.

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