Round Table S.I.O. National Congress

Recovery of swallowing function following surgery for advanced buccopharyngeal carcinoma

Recupero della funzione deglutitoria dopo chirurgia per carcinoma orofaringeo localmente avanzato

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SUMMARY

More than 20 years have passed since the introduction of surgical techniques based on distal myocutaneous flaps or microvascular flaps in the reconstruction after head and neck cancer resections. The experience gained from the beginning of these techniques until today, has improved the possibility to better predict functional impairment of swallowing in patients and its possible recovery. This contributes to a better counselling of the patient and better prediction concerning his/her quality of life. Despite the time passed and good progress in the development of microsurgical techniques, the literature shows that many differences still remain among Authors concerning choice of flap and its inset in relation to the anatomical sites and the extent of resection. Many other variables may condition post-operative swallowing (pre- or post-operative radiotherapy, general conditions of the patient …) thus contributing to a more difficult comparison of the different series reported in the literature. Personal experience is based upon surgical treatment in >60 patients with advanced bucco-pharyngeal cancer, all of whom evaluated post-operatively by video-endoscopy and video-fluoroscopy. In summary, data collected both from personal experience and the literature show that difficulties still remain in correct evaluation of swallowing in these patients. This is mainly due not only to lack of a commonly accepted scheme of classification to quantify the anatomical defect but also to differences between Authors concerning choice of the type of flap and the mode of inset.

KEY WORDS: Buccopharyngeal cancer • Surgical treatment • Free flap reconstruction • Swallowing function • Functional results

RIASSUNTO

I più di 20 anni trascorsi dall'introduzione delle tecniche di ricostruzione basate sull'impiego, dapprima dei lembi peduncolati e successivamente liberi, nella chirurgia oncologica del distretto cervico-cefalico hanno consentito la progressiva acquisizione di informazioni che riguardano l'entità delle sequele connesse alla funzione deglutitoria. L'evolversi di tale esperienza ha permesso di migliorare progressivamente la possibilità di previsione del danno funzionale residuo permettendo, indirettamente, anche una migliore informazione del paziente circa la qualità della sua vita residua riguardo a tale funzione. Nonostante i progressi attuati nella messa a punto delle diverse metodiche ricostruttive non si può tuttavia ancora affermare di poter disporre di soluzioni tecniche universalmente condivise dai differenti AA. A ciò si associa la presenza di numerose variabili difficilmente valutabili in maniera rigorosa (entità della resezione tumorale, tipo di ricostruzione attuata, capacità compensatoria del paziente, effetti della radioterapia pre- o post-operatoria …) che rendono ulteriormente difficile confrontare i risultati delle differenti casistiche. In questa esposizione gli AA. riferiscono le proprie opinioni basate su un'esperienza di valutazione videoendoscopica e videofluoroscopica alla quale, più recentemente, è stato associato anche uno studio radiologico derivato dall'elaborazione di dati acquisiti tramite tomografia computerizzata spirale. Questo permette una fedele ricostruzione tridimensionale degli spazi aerei delle prime vie aerodigestive e quindi delle cavità orofaringee ricostruite tramite lembo. Le conclusioni riguardano principalmente la difficoltà che ancora rimane nel definire un sistema classificativo del danno tissutale da tutti condiviso e la chiara identificazione delle metodiche ricostruttive utilizzate, intese, non solo come scelta del lembo ottimale da impiegare, ma anche come tencica di disposizione (ricostruzioni tridimensionali vs. ricostruzioni mono- o bi-planari).

PAROLE CHIAVE: *Carcinoma orale • Carcinoma faringeo • Trattamento chirurgico • Ricostruzione con lembo libero • Funzione deglutitoria • Risultati funzionali*

The introduction of surgical techniques based on distal myocutaneous flaps or free flaps has increased the surgical options in the management of head and neck cancer. Despite the advantage of the possibility of maximally extensive resections, this type of surgery can severly compromise swallowing and speech function. The experience gained in the 20 years since the beginning of these techniques to the present day, offers the possibility to better predict functional impairment and recovery perspectives concerning swallowing and is thus helpful for better patient counselling. The major, but not the only, factors that affect functional outcome are the site and extent of resection as well as the type of reconstruction [1-3]. Our previously described experience concerning this challenge [4], now accounting on more than 60 patients, is based on videoendoscopy (VE) and videofluoroscopy (VF) evaluation to quantify the degree of post-operative swallowing impairment and its relationship with the extent of the resection and the type of reconstruction. The VE and VF parameters analysed are outlined in Table I.

Table I. Parameters analysed with VE and VF.

VE	VF
Type of reconstruction	Type of reconstruction
Reduction of sensitivity	Oral pooling
Alteration of latency	Pharyngeal pooling
Pre-swallowing bolus drop	Inhalation
Pharyngeal residue	Reduction of pharyngeal contraction
Pooling of saliva	Rhino-pharyngeal reflux
Inhalation	

More recently, we have started to adopt a relatively new computed tomography (CT) technology with the aim to define the outlines of the pharyngeal cavities in order to study the quality of the anatomical three-dimensional (3D) reconstruction and related functional results. The system uses software to obtain volume data from the imaging technique (high speed helical CT scans) and to reconstruct three-dimensional internal anatomical cavities in the context of the surrounding anatomical structures (view of the related CT sections).

This technology has provided more realistic 3D reconstruction of the pharyngeal tract anatomy that can be used to better examine the results of the surgical reconstruction (Fig. 1).

Figure 1 shows that in relation to a vertical median plane (corresponding to A-B axis), we can consider the pharyngeal muscular contractile walls as divided into two symetrical and independent muscular systems. We can argue that surgical reconstruction of one of these two hemi-pharyngeal systems, permits effective bolus transit through the pharynx when an adequate pharyngeal lumen is maintained. Surgical resection getting over the above-mentioned median vertical plane leads to an impairment in swallowing function related to the lack of caudal bolus propulsion with hypopharyngeal pooling and consequent aspiration. Even if this concept does not take into consideration other factors, such as sensory restoration and hyo-laryngeal elevation, it can provide predictive guidance based on the relation between pharyngeal wall resection and expected swallowing function. This predictive guidance can be easily confirmed by VF. The major variables conditioning post-operative swallowing function are listed in Table II.

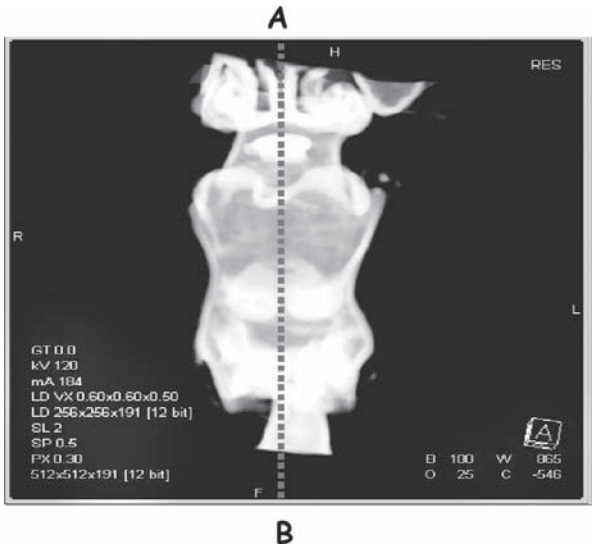

Fig. 1. 3D reconstruction of pharyngeal tract.

Table II. Major variables conditioning swallowing function.

1. Site and extent of resection
2. Maintenance of motor function and oral region sensitivity
3. Type of reconstruction
4. Alteration of hyoid/larynx elevation
5. Previous and complementary radiotherapy
6. Elements of general character

One of the problems which still remains to be elucidated concerns the variability regarding adequate definition of the tissue defect resulting from surgical resection. Among the different classifications proposed for tissue defect [5 6], every effort must be made to ensure the use of a commonly accepted scheme. This problem, together with the differences in choice of the type of flap between different Authors, makes it difficult to compare functional results. On the other hand, it is realistic to accept that even adopting common criteria in the tissue defect description and in the choice of the flap, important differences will still remain among surgeons as far as concerns the mode of the flap inset (3D versus monoplanar reconstruction; lobed tailoring versus linear contour of the skin paddle).

These considerations, associated with our experience, led us to summarize some functional aspects related to the tumour site, the type of resection and the reconstruction performed.

Site: Anterior 2/3 of the tongue and corresponding buccal pelvis (Fig. 2)

Extensive resections including the anterior 2/3 of the tongue and corresponding buccal pelvis, reconstructed by a premodelled free fascio-cutaneous flap [7], allow good results to be obtained as far as concerns both swallowing and the phono-articulatory profiles, provided it is possible to spare

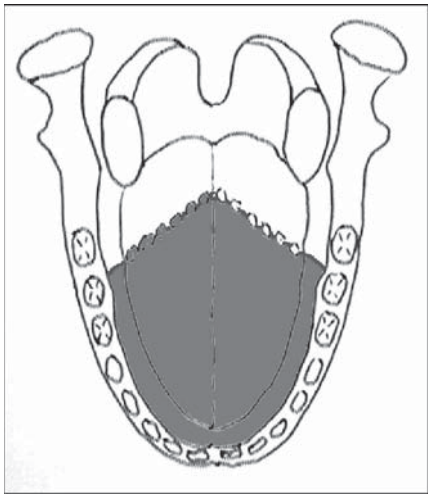

Fig. 2. Anterior 2/3 of tongue and corresponding buccal pelvis.

the hypoglossal nerves. This would appear to indicate that the musculature of the tongue base remnant is sufficient to determine, with the help of a facilitatory position, good bolus propulsion towards the oro-pharynx.

Site: Base and hemibase of tongue (Fig. 3)

Resection of the tongue hemibase, repaired with a direct suture, does not appear to lead to any particular functional alterations, which, however, become more evident with progressive extension to the entire tongue base. In such situations, given an identical preservation of sensory and motor innervation, we observed no significant differences between those cases in which a free flap was used and those in which a direct suture was performed. Use of a free flap, compared with direct suture, probably maintains better speech due to the lesser traction, on the residual body and tip of the tongue.

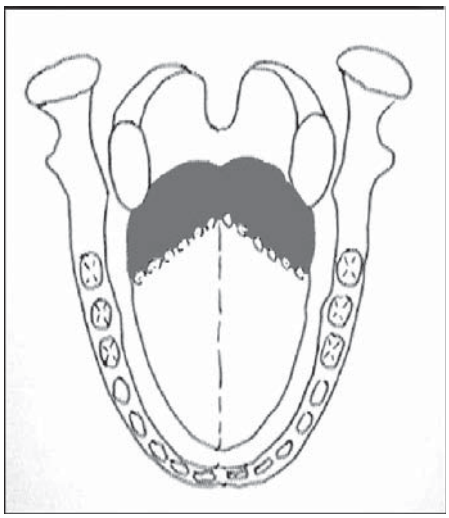

Fig. 3. Base and hemibase of tongue.

Site: Amygdalo-glosso-palatine region (Fig. 4)

When resection involved the amygdalo-glosso-palatine region, no substantial differences were observed in the cases submitted to composite resection followed by direct suture compared with those treated with a conservative trans-mandibular approach with free flap reconstruction. The functional defect, always observed, but with different degrees, becomes more significant when resection is pushed forward to involve the tongue hemibody or when resection of the lateral pharyngeal wall is particularly extensive towards the midline.

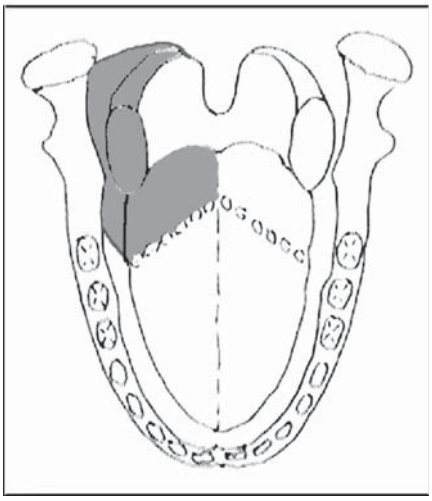

Fig. 4. Amygdalo-glosso-palatine region.

Site: Posterior wall of pharynx (Fig. 5)

Resection of the entire posterior pharyngeal wall (oropharynx with possible extension to rhino- or hypo-pharynx) followed by reconstruction with free flap led to marked bolus aspiration due to the absence both of reflex and pharyngeal propulsion.

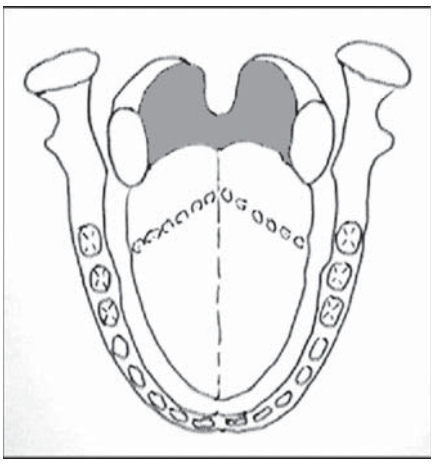

Fig. 5. Posterior wall of the pharynx.

The last considerations on this subject concern the effects of post-operative radiotherapy (RT). Like other Authors, we experienced a deterioration in swallowing function when VF and VE were repeated 3 or more months after the end of post-operative RT. The effects of RT on swallowing, in head and neck cancer patients, have been exhaustively described in the literature [8-12] and consist in a decrease in tongue strength, tongue base and palate mobil-

ity, hyoid displacement and pharyngeal wall contraction that together can lead to a lack of complete obliteration of the pharynx during swallowing with possible pharyngeal residue which may be inhaled. It has also been shown that these changes in swallowing impairment can present within 12 months of the end of RT.

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