

LOCOREGIONAL RECONSTRUCTIVE SOLUTIONS IN ADVANCED
PHARYNGOLARYNGEAL CANCERS

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ABSTRACT

Advanced pharyngolaryngeal tumors represent a challenge when taking into discussion the therapeutical aspects. In order to achieve good functional and at least minimal aesthetic outcome, different types of reconstructive solutions were taken into consideration over time. Depending on the features of the defect that needs to be covered after resecting the tumor with safety margins the surgeon can choose the type of flap that is proper to be used. This paper aims to review some of the reconstructive solutions a surgeon can use to reconstruct the defect in advanced pharyngolaryngeal tumours. This type of surgery transforms inoperable cases into patients that could be surgically approached with good functional outcomes. However, the recovery of the patients up to disease free status is difficult and performing this type of intervention requires experience and hospital equipped with “state of the art” standars of care.

KEYWORDS: *locoregional flaps, reconstructive solutions, advanced pharyngolaryngeal cancers*

INTRODUCTION

Specialty literature describes an incidence of 7-8% of pharyngolaryngeal cancer in Romania. Unfortunately, most of the cases that come to the ENT specialist are in advanced tumoral stages requiring either radio/chemotherapy, the adoption of an emergency medical course by making a tracheostomy to provide the patient with an adequate airflow or extensive tumor resections that imply adjacent reconstructive methods.

All endocavitary cancers have a slow onset of symptoms which is why the patient presents in advanced stages, when the tumor has already infiltrated adjacent structures. In many cases the patient is examined when already suffering from dysphagia which is caused by a large volume of

the tumor.

Frequently extensive tumors require large resections which determines the need for reconstructive solutions. The advancements in surgical techniques and technologies have made tumors that were considered inoperable eligible for large resections with further reconstructions using various flaps [1].

This type of interventions remain a challenge for the surgeon, due to the need to balance a large resection with negative safety margins with the desire of keeping as much covering tissue as possible to avoid the appearance of areas that could be at risk of necrosis, superinfection or even local tumor recurrence. Over time, reconstructive solutions have been improved so that viable flaps could be obtained to cover large areas left uncovered after wide

tumor resections. Furthermore, different types of flaps were conceived depending on the features of the local defect and its surroundings, so that the surgeon could easily choose between using a free flap with microvascular anastomoses, locoregional flaps or even an association of multiple flaps in case of complex defects [2].

MATERIAL AND METHOD

The aim of the paper is to review some of the reconstructive solutions a surgeon can use to reconstruct the defect in advanced pharyngolaryngeal tumours.

The surgical treatment in advanced pharyngolaryngeal cancer has two steps. First, the ablative step that consists in removing the tumour in a block with the larynx and a part from the pharynx and neck dissection. The second step reconstructs the pharyngeal defect and to achieve the functional rehabilitation of the deglutition and voice [3],[4].

The functional objective of the surgical treatment is to rehabilitate deglutition, prevent aspiration, rehabilitate phonation, achieve primary healing, obtaining a good functional and esthetic result. We have to restore sensibility is possible.

The preoperative evaluation is crucial in achieving good results. The parameters that we have to take into account are:

- Histology and staging the tumour
- Dimension of the defect
- Types of tissue involved
- Peripheral vascular disease
- Diabetes mellitus
- Smoker/ alcohol abuse
- Associate medication
- Nutritional status

The histology and the staging of a tumour will give us the prognostic of the patient because the only real parameter that will quantify the effectiveness of our treatment is patient survival [5].

The nutritional status of our patients is crucial in achieving primary healing. Because most of our patients have problems with deglutition, most of them must be balanced preoperatively from the nutritional point of view. If not, the extended surgery that we will perform will not achieve primary healing, and

our patient will develop pharyngocutaneous fistulas that will take more time to heal so that the radiotherapy treatment will be postponed.

As reconstructive solutions in the head and neck area, we can use in case of small defects split skin grafts or free flaps. In our case where important defects must be covered, we can use locoregional flaps or free flaps with microvascular anastomosis [6],[7].

We will present some locoregional reconstructive methods that we usually use in cases of advanced pharyngolaryngeal cancers.

The locoregional flaps have a rate of success of more than 95%

They can be used to reconstruct complex defects quantified in volume and shape.

One advantage is that the skin has the same texture and colour as the reconstructed area, in that way right esthetic results can be achieved.

The locoregional flaps are easy to be harvest, but we must respect the vascular anatomy and identify the pedicle every time to achieve success.

The operating room time is decreased compared with the free flaps with microvascular anastomoses.

The surgeon can associate multiple types of flaps in case of complex defects.

The locoregional flaps are robust to radiotherapy.

Before choosing the reconstructive flap that must be used we have to analyse the defect properly. We must take into account the shape, surface and volume of the defect, what kind of tissue is involved (skin, muscle, mucosa).

In cases of advanced pharyngocutaneous carcinoma we can categorise the defect:

- defect located at the level of pharyngeal mucosa - insufficient material to restore the pharyngeal tube
- defect located in the anterior cervical area - missing skin and muscle
- the pharyngeal tube is missing in cases of total circular pharyngo-laryngectomy.

The surgical locoregional solutions that we use in that cases are:

- sternocleidomastoidian flap
- deltopectoral flap
- pectoralis major flap

In small to medium defects of the pharyngeal mucosa when we do not have enough material to reconstruct the pharynx, we will use the

sternocleidomastoidian flap.

In complex defects as anterior cervical area defects of total circular pharyngo-laryngectomy, we will use deltopectoral or pectoralis major flap [8].

Owens described the sternocleidomastoidian flap in 1955. The advantage of the sternocleidomastoidian flap is that it has two vascular pedicles. The superior vascular pedicle has its origin in the occipital artery. The inferior pedicle has its origin in the thyrocervical trunk with root the superior thyroidian artery [9].

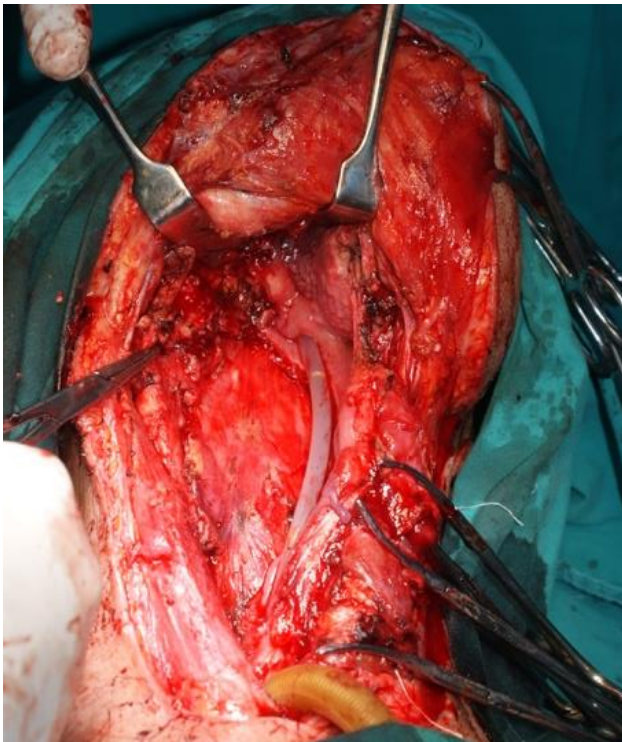


Figure 1 – Pharyngeal defect after total laryngectomy and partial pharyngectomy



Figure 2 – Harvesting the flap, preserving the superior pedicle and supraclavicular skin

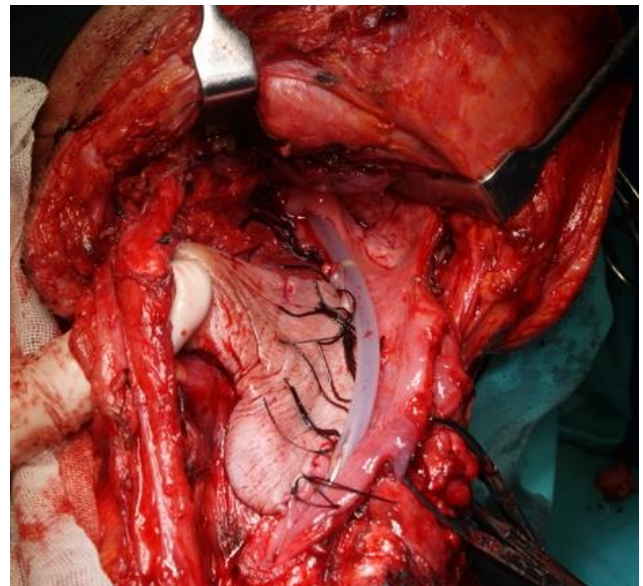


Figure 3 – Placing the skin and reconstruction of the pharyngeal tube.

The flap can be used ipsilateral.

Usually, we harvest the flap with an area of skin from the supraclavicular area, and we rely on the superior vascular pedicle of the flap in cases of pharyngeal mucosal defects.

After raising the flap, we rotate the flap, and we position it under the carotid artery and the internal jugular vein at the level of the pharyngeal defect. We reconstruct the pharyngeal tube using the sternocleidomastoidian flap placing the supraclavicular skin inside the tube. The rest of the surgical closure is normal.

The limits of this flap consist that it is unable to reconstruct important volume defects and in cases of radical neck dissection, the availability of the sternocleidomastoidian muscle is missing [10].

The deltopectoral flap was described for the first time by Aymard in 1917. Bakamjian popularises the use of this flap on large volume scale in 1960.

The vascular supply relies on the parasternal perforants arteries.

The flap can be designed lateral over the shoulder in case the surgeon needs more material. It can be harvest as a fasciocutaneous flap or as a muscularfaciocutaneous flap [11].

It can be used when we have a defect in the anterior cervical area.

The design of the flap can be bilobed and can be used as a tube with the skin inside and can be used to reconstruct the pharyngeal tube in

circular, total pharyngo-laryngectomy.



Figure 4 – defect in the anterior cervical area; design of the flap; placing the location of parasternal perforants arteries.

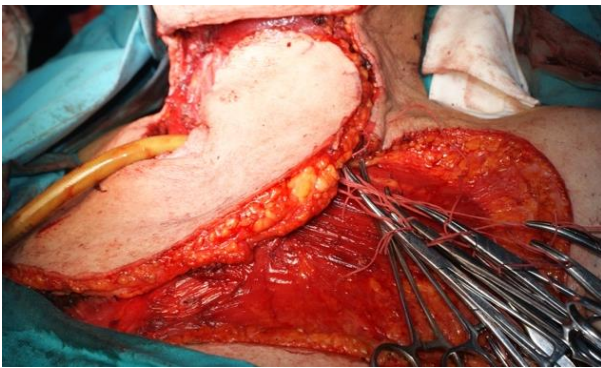


Figure 5 – Harvesting the detopectoral flap and covering the defect

It can be used to reconstruct important defects in shape and volume. One of the drawbacks of the flap is the limited rotation of the pedicles. Sometimes the donor site needs secondary repairs. The distal part of the flap is not well vascularise, so small areas of necrosis can be encountered [12].

The pectoralis major flap is a muscularfasciocutaneous flap with a vascular supply in the thoracoacromial artery. The length of the pedicle and the narrow area of the pedicle when harvested permits this kind of flap to be the most versatile flap we use. After determining the design of the flap, the dissection is carried away until pe pectoralis minor muscle is defined. From here the dissection is carried using the blunt, and the position of the vascular pedicle is determined using an imaginary line from the middle clavicular point to the xiphoid. After determining and viewing the location of the vascular pedicle, the flap insertion is dissected and narrowed to provide a good rotation [13].



Figure 6 – defect in the anterior cervical area after salvage laryngectomy



Figure 7 – Designing the pectoralis major flap

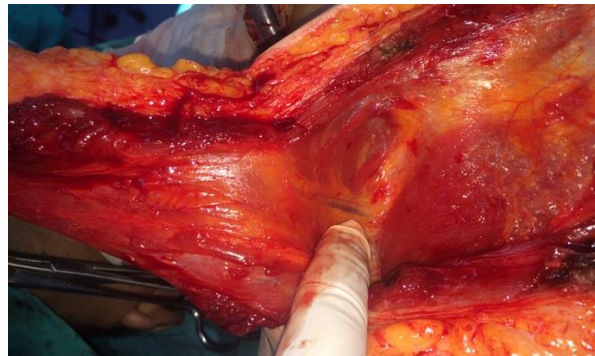


Figure 8 – Indentify the vascular supply



Figure 9 – The reconstructive defect

The flap can be used as a tube with the skin inside to reconstruct pharynx in total circular

pharyngo-laryngectomy.

One of the drawbacks of this flap is that in some cases the pectoralis muscle can be too bulky. To limit the volume of the flap, we can cut the nerves of the muscle, and in a period of 1 to 3 month, we will achieve an important decrease of the muscular volume [14].

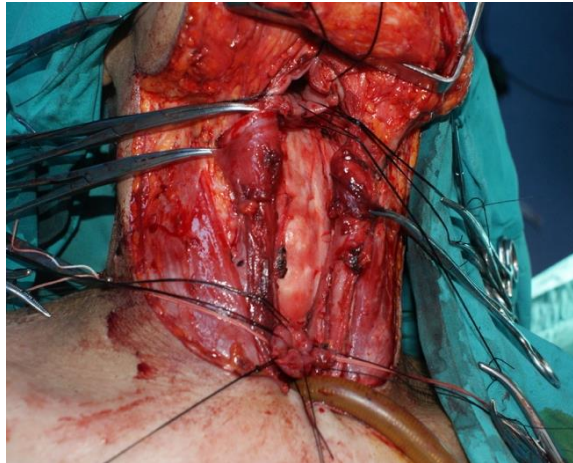


Figure 9 – important defect after circular total pharyngo-laryngectomy



Figure 10 – Harvesting the flap and identify the vascular supply

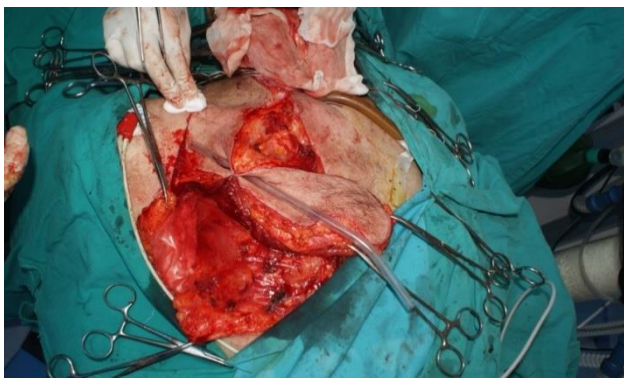


Figure 11 – tubulise the pectoralis major flap with the skin inside

In case of a young female patient, this flap can be used with limits due to the defect produced in the mammary area.

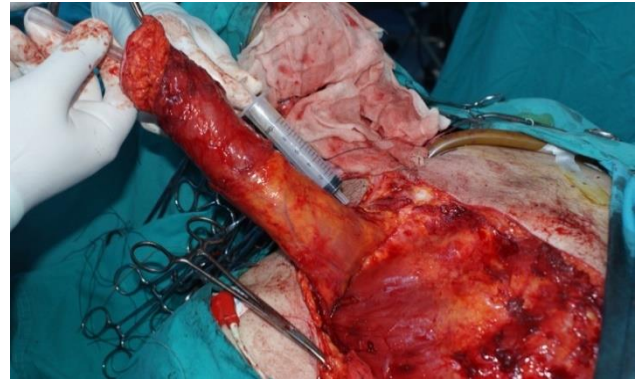


Figure 12 – The musculocutaneous pectoralis major flap used to reconstruct the missing pharynx

CONCLUSION

The locoregional flaps are an excellent reconstructive alternative in the defects of advanced pharyngolaryngeal cancers. It can reconstruct significant volume and shapes in that area. The success rate is high at 95%. The operation room time is good when we compare it with the free flaps with vascular anastomosis. The surgeon needs to have extensive knowledge of vascular anatomy to determine and visualise the vascular pedicle of the flap. We can achieve good functional and esthetic results using that flaps. After using the locoregional flaps, we can use a voice prosthesis to rehabilitate the voice of the patient.

Radiotherapy can be used after one month after healing and removing of the nasogastric tube.

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