Case Report
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Reconstruction of Pharyngeal Defect with Prelaminated Pectoralis Major Pedicled Flap

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Pharyngeal reconstruction remains a considerable challenge in head and neck surgery. Defects of pharynx combined with anterior neck soft tissues deficiency require both external skin and lining for their reconstruction. Flap prelamination is a powerful method, which can provide two epithelial surfaces simultaneously.

Here we describe pharyngeal reconstruction by prelaminated pectoralis major flap. Two clinical cases are presented.

We performed a two-stage reconstruction, which included implantation of skin graft under pectoralis major muscle and subsequent transfer of a myocutaneous flap onto the neck, where the grafted surface was used for pharyngeal lining. A functionally consistent pharyngeal tube and satisfactory anterior neck coverage have been achieved.

Although more clinical experience is needed, the prelamination of pectoralis major myocutaneous flap can be an alternative for reconstructions of complex pharyngeal defects, as shown in our cases.

Keywords: pharyngeal, defect, reconstruction, prelaminated, pectoralis, major, flap, anterior, neck

Introduction

Pharyngeal reconstruction presents clinical challenge because of the complexity of the region, poor health state of the patients and relatively high percentage of complications, including flap failure, fistula formation, stenosis, etc. [1, 2].

The most common cause of pharyngeal wall defects is a surgical resection of the larynx alone or in combination with the pharynx for cancerous affections.

Nowadays many methods of pharyngeal reconstructions have been proposed. These can be classified into reconstruction with local fasciocutaneous and muscle flaps (platysma, sternocleidomastoideus and infrahyoid), regional flaps (trapezius, pectoralis major) and free flaps (jejunum, radial forearm). Nevertheless, defects of pharynx combined with soft tissue deficiency of the neck require substantial efforts for successful reconstruction [1, 6]. The classic option is a muscle flap together with skin graft for anterior neck resurfation. However, graft coverage is known to be prone to unstable scar formation, color and texture mismatch and lack of sufficient bulkiness to provide normal neck contour [2]. Although additional flap can be used to provide skin cover for neck, this definitely adds donor site morbidity and prolongs time of operation. Insufficiency in insurance cover and all consequences that follows should also been taken in consideration. As a result, even though we perform all kinds of microsurgical procedures in our clinic, we decided to use a non microsurgical technique on our patients, because they and their family members insisted on the use of a procedure with no risk of total flap failure.

Here we present post pharyngectomy patients with deficient anterior neck soft tissue who were successfully treated by prelaminated pectoralis major pedicled flap technique.

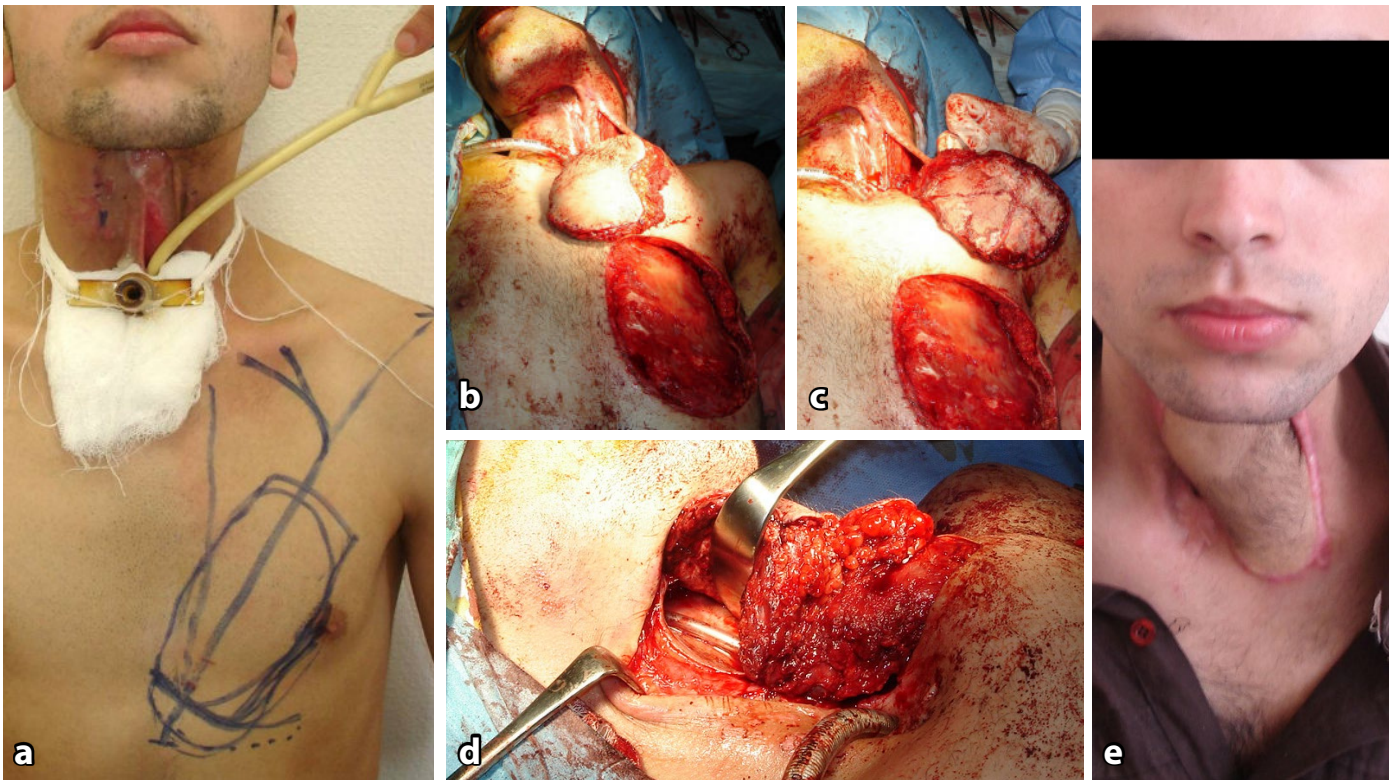

Figure 1. a - Pre-op neck contour; **b -** Pectoral flap, skin surface ; **c -** Prelaminated lining (skin graft) on undersurface of the pectoralis flap; **d -** Suturing of the lining to remnant of posterior pharyngeal mucosa; **e -** Final neck contour.

Case 1

A 26-year-old male was referred to our clinic for the treatment of a neck disfigurement. He underwent total laryngectomy and subtotal pharyngectomy with subsequent course of chemo and radiotherapy in another clinic, for low grade pharyngeal carcinoma (T3N0M0). According to an oncologist's report, the patient had been free of disease for two years at the time of admission (13.02.2012).

Physical examination showed a soft tissue defect on anterior neck surface with narrow strip of pharyngeal mucosal remnant in its depth. (Fig. 1 a).

We planned the operation in two stages. The first stage included skin grafting on the undersurface of the left pectoralis major muscle (i.e. prelamination). Three strips of split thickness skin graft obtained from the left thigh were fixed by absorbable sutures to the dermis of the skin island and through the substance of the pectoralis muscle The second stage was performed 3 weeks later and consisted of the transfer of prelaminated myocutaneous pectoralis major flap onto the neck (Fig. 1 b, c and d).

A mucocutaneous junction between the posterior pharyngeal remnant and neck skin was released and circumferential suturing of the skin graft to the edges of the mucosal remnant was performed. We used Donatti sutures piercing through both epithelial and muscle layers. After the completion of mucosal suturing, the muscle portion of the flap was anchored to the muscles of the neck.

The postoperative course was even. After the second operation the patient was placed on nasogastric feeding for a 4 weeks. A small fistula on the right superior edge of the flap closed spontaneously.

Finally, partial debulking of the muscle and division of the flap pedicle were performed. Hypertrophied scars of donor area were injected by steroid solution at the same time.

As of the last control, the patient had normal oral feeding and satisfactory anterior neck contour (Fig 1 e). In addition, he had esophageal speech. His psychological condition had become better as apparent from his own statements and reports of family members.

Endoscopic examination by means of flexible endoscope reveals moistened and white-coated surface of the skin graft and normal act of swallowing (Video 1).

Some asymmetry in the nipple position and hypertrophic scarring has occurred on the donor area, which is currently treated by additional procedures.

Case 2

A 63 years old male patient referred to us with neck infection. He previously was diagnosed larynx carcinoma, stage T4N1Mx and underwent total laryngectomy. Reconstruction was done by right-sided pectoralis major flap. Clinical examination showed dehiscence of sutured hemi- Apron incision on the right side of the neck together with offensive discharge from the wound (Fig. 2 a) General state of patient was severe; with great fatigue, malaise, malnourishment, elevated WBC count and anemia. First of all, we performed debridment of all necrotic tissues and opened pharyngostoma. Then, taking in account fragile general state of the patient, we planned two stage reconstruction and got

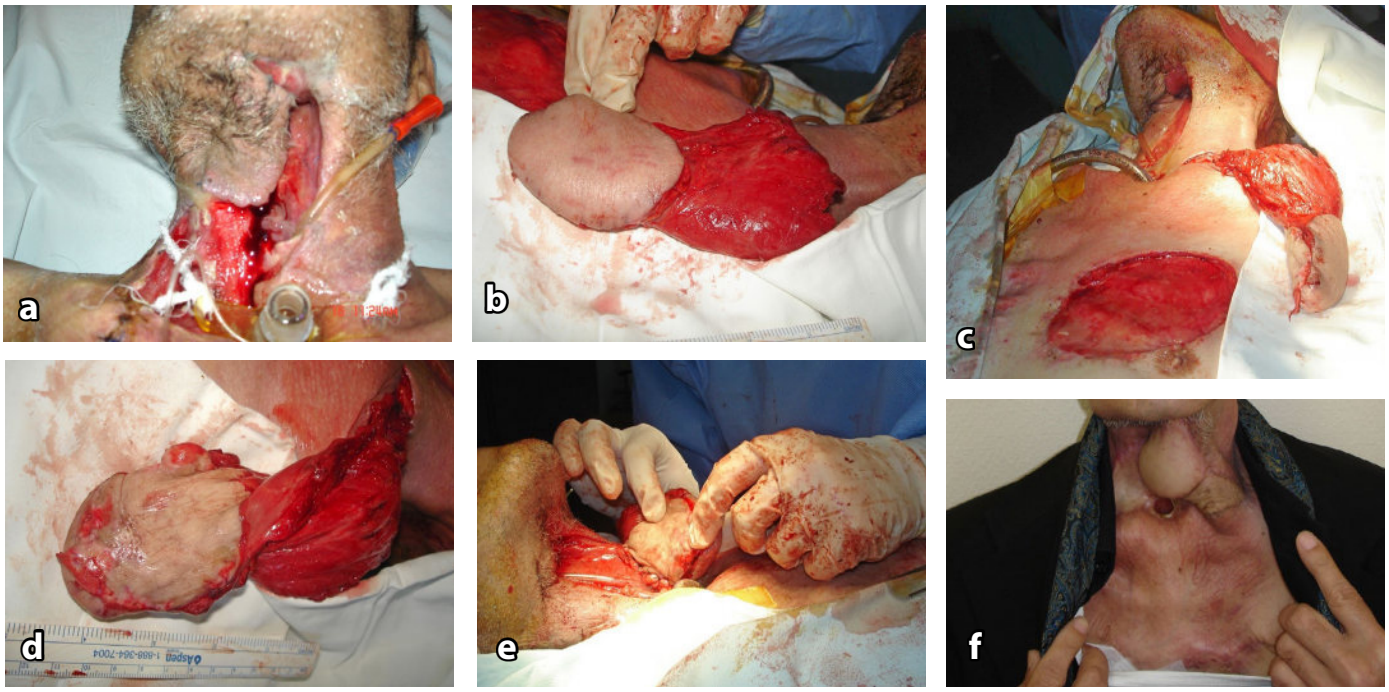

Figure 2. a - Pre-op neck contour; **b -** Pectoral flap, skin surface; **c -** Pectoral flap elevated with both side (i.e. skin and grafted-surface) visible; **d -** Prelaminated lining (skin graft) on undersurface of the pectoralis flap; **e -** Suturing of the lining to remnant of posterior pharyngeal mucosa; **f -** Final neck contour.

informed consent from the patient and his relatives.

First, the left pectoralis major musle was grafted by full thickness skin graft (obtained from left groin) on its undersurface.

After 3 weeks the musculocutaneous flap was transferred to the neck so that the grafted surface was used for reconstruction of the wall of pharynx and the native skin of the flap was used fot coverage of the neck (Fig. 2 b, c, d, e)

The postoperative course was even. A small fistula on the superior edge of the flap closed spontaneously in 1 week period. Oral feeding began at 5th week and flap pedicle was divided 2 months later. As of the last control, the patient had normal oral feeding and satisfactory anterior neck contour (Fig 2 f). He also has developed esophageal speech. Endoscopic examination by means of flexible endoscope reveals moistened and white-coated surface of the skin graft and normal act of swallowing (Video 2).

Discussion

Pharyngeal wall defects constitute a clinical challenge. The main goals of pharyngeal reconstruction include restoration of the continuity of digestive tract and maintenance of speech production [1, 2, and 6]. Pharyngeal defects generally occur after oncological resections in the form of partial pharyngectomies, total laryngectomy with subtotal pharyngectomy and total laryngopharyngectomy.

Today the use of free microvascular flaps and pedicled pectoralis major flap are considered among the most reliable options for the reconstruction of subtotal and total pharyngeal defects [2].

The pectoralis major flap, despite of wide use of microsurgical techniques, is still considered a work-horse in the head and neck reconstruction. It can be used for closing partial pharyngeal defects as well as in total pharyngoplasties. Because of a relatively high rate of complications, the use of a tubed flap has been replaced by use of a U-flap [1, 4]. Also local cutaneous flaps, platysma, infrahyoid and sternocleidomastoid muscle flaps can be used for small to medium pharyngeal defects [5, 6]. However, there is no standard treatment in cases where a pharyngeal defect is combined with a defect in the soft tissues of the neck. The use of skin grafting for anterior neck can be an option; however it leaves the skin poorly matched and lacking sufficient bulk. Anterior neck can also be reconstructed by additional flaps: supraclavicular, local cervicoplatysmal or even free ones [2, 6]. Nevertheless, this adds technical challenges, prolongs the operational time and creates additional donor site morbidity.

Flap prelamination is defined as a two-stage procedure, which allows the addition of different tissue layers into the axial vascular territory. After maturation of the added tissues, the composite structure is transposed on the original pedicle to cover the defect (3). Prelamination allows the added layers to heal properly with less chance of breaking down, which is particularly useful in the formation of functional units like neo-urethra or neo-esophagus. In the case of a free flap reconstruction of the esophagus, prelamination was reported as tubing of radial foramen and TFL flap “in situ” with subsequent transfer after formation of the tubular structure [3, 6].

We used prelaminated myocutaneous pectoralis major flap for reconstruction of the nearly total pharyngeal defect combined with soft tissue deficiency of the anterior neck. Our patients had major disfigurement of the neck, inability to sustain normal oral feeding and constant discharge challenging daily life. Thus, there was need in both functional and aesthetic restoration. After the discussion of the available options we chose the usage of the prelaminated flap. As a result, we achieved wa-

ter-tight pharyngeal wall closure together with anterior neck restoration.

Our method provides simultaneous reconstruction of a pharyngeal defect and cervical skin insufficiency. The prelaminated "sandwich"-like structure of the flap allows the use of both of its sides and eliminates the need in a second flap for neck skin. We believe that our method, being both simple and effective, can be included in the armamentarium of surgeons engaged in pharyngeal reconstruction.

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