

## Free jejunal flap reconstruction of the cervical oesophagus in a patient with laryngeal cancer recurrence after laryngectomy and radiotherapy – a case report

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*We present the case of a 66-year old man treated for laryngeal cancer recurrence with infiltration of the cervical oesophagus and the skin of the neck. The tumour was excised within healthy tissue margins, as confirmed by intraoperative histopathological examination. Reconstruction of the oesophagus was performed using a free jejunal flap and the skin defect was reconstructed with a pedicled myocutaneous pectoral flap. Recovery was uneventful. On the 14<sup>th</sup> postoperative day the patient was administered liquids by mouth and on the 30<sup>th</sup> day – solid food. On follow-up examination seven months after the procedure there is no evidence either of recurrence or of distant metastases.*

*The basic treatment method applied in patients with laryngeal cancer recurrence after laryngectomy and radiotherapy is salvage surgery. Such factors as clinical staging of the recurrence, histopathological grading, evidence of metastases, time lapse between treatment completion and diagnosis of recurrence and previous irradiation of the head and neck region affect the success of the treatment and should be considered carefully. It is not a mistake to operate patients with an advanced recurrence. In such cases, however, it is necessary to excise important structures of the head and the neck and perform complicated reconstructions. The method of choice for reconstructing the cervical oesophagus is a free jejunal transplant, while for the excised skin of the neck a pedicled flap should be considered in order to avoid excess tension.*

### Chirurgia ratująca z rekonstrukcją wolnym przeszczepem jelita cienkiego u pacjenta ze wznową raka krtani po laryngectomii i radioterapii

*W pracy przedstawiono przypadek 66-letniego mężczyzny leczonego w Klinice Nowotworów Głowy i Szyi z powodu wznowy raka krtani, naciekającej skórę i przełyk szyjny. Guz wycięto wraz z zajętej tkankami. Przełyk zrekonstruowano za pomocą wolnego przeszczepu jelita cienkiego. Ubytek powłok szyi pokryto uszypułowanym płatem piersiowym. Przebieg po operacji bez powikłań. Po 14 dniach pacjent rozpoczął odżywianie doustne, po 30 dniach rozpoczął przyjmowanie pokarmów stałych. Po 5 miesiącach w trakcie ambulatoryjnego badania kontrolnego nie stwierdzono cech odrostu guza i przerzutów.*

**Key words:** head and neck cancer, laryngeal cancer, recurrence, laryngectomy, salvage surgery, esophageal reconstruction, free jejunal transplant

**Słowa kluczowe:** nowotwór głowy i szyi, rak krtani, wznowa, laryngektomia, chirurgia ratująca, rekonstrukcja przełyku, wolny przeszczep jelita

### Introduction

Salvage surgery is the method of choice in patients with head and neck cancer, who present with recurrence or unsuccessful treatment after radical treatment combined with radiotherapy. Treatment planning after recurrence, or in case of the lack of loco-regional control, differs

from that undertaken during primary tumour therapy. The choice of primary treatment method is aimed not only at the best oncological results, but also at preserving vital structures and providing the best possible functional and cosmetic effect. In view of these factors usually the method of choice in primary treatment is radiotherapy (alone, or in combination with other methods), and resections, though oncologically radical, are performed sparingly. In case of recurrences and lack of loco-regional control such methods cannot be advocated, as it is necessary to excise entire infiltrated organs. In case of laryngeal cancer salvage surgery usually consists of total laryngectomy, both in patients who were initially treated

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by radiotherapy alone or by sparing resections and adjuvant radiotherapy. Salvage surgery must also be considered in patients, in whom the disease recurs after total laryngectomy. Clinically this last possibility poses the greatest problems for the surgeon, as in such cases infiltrations of the skin, the hypopharynx and the esophagus are common. Apart from the necessity to perform a radical excision, it is also necessary to apply complicated reconstruction techniques in order to restore tissues and maintain the continuity of the alimentary tract.

### Case report

A 66-year old man with laryngeal cancer recurrence after total laryngectomy and adjuvant radiotherapy was admitted to the Department of Head and Neck Cancer of the Maria Skłodowska-Curie Memorial Cancer Centre and Institute of Oncology in order to consider the possibility of performing salvage surgery. 17 months earlier the patient was found to have laryngeal cancer infiltrating both vocal chords, pronounced as T2N0M0. He was treated with conventionally fractionated radical radiotherapy to a total dose of 66 Gy. Seven months after the completion of radiotherapy tracheostomy had to be made because of dyspnea and, in view of pathomorphological confirmation of recurrence within the vocal chords, total laryngectomy was performed. Postoperative complications were observed in the form of a pharyngocutaneous fistula, which lengthened the patient's hospital stay. He was discharged after complete healing, 6 weeks after surgery. Histopathological diagnosis was: "Carcinoma planoepitheliale G3; clusters of cancer cells within the lymphatic vessels and infiltration along nerve sheaths" (Sample number 9450/2002, evaluated by Grzegorz

Rymkiewicz MD, Dept. of Pathology of The Maria Skłodowska-Curie Memorial Cancer Centre and Institute of Oncology). The patient remained under careful oncological scrutiny.

Approximately two weeks before his next hospitalization in the Head and Neck Cancer Department the patient complained of dysphagia. On laryngological examination no pathology was observed within the hypopharynx. In the median line of the neck a 5x3 cm tumour bound to the skin, but mobile against the base was observed. Fine needle aspiration biopsy confirmed the diagnosis of laryngeal cancer recurrence. CT scans revealed esophageal infiltration over the distance of 5 cm, beginning 1 cm above the tracheostomy (Figure 1). On admission the patient was incapable of food intake and of swallowing saliva. After 7 days of parenteral nutrition salvage surgery was undertaken.



Figure 2. Intraoperative view – the site after tumour excision (incl. excision of the cervical oesophagus and the infiltrated skin)

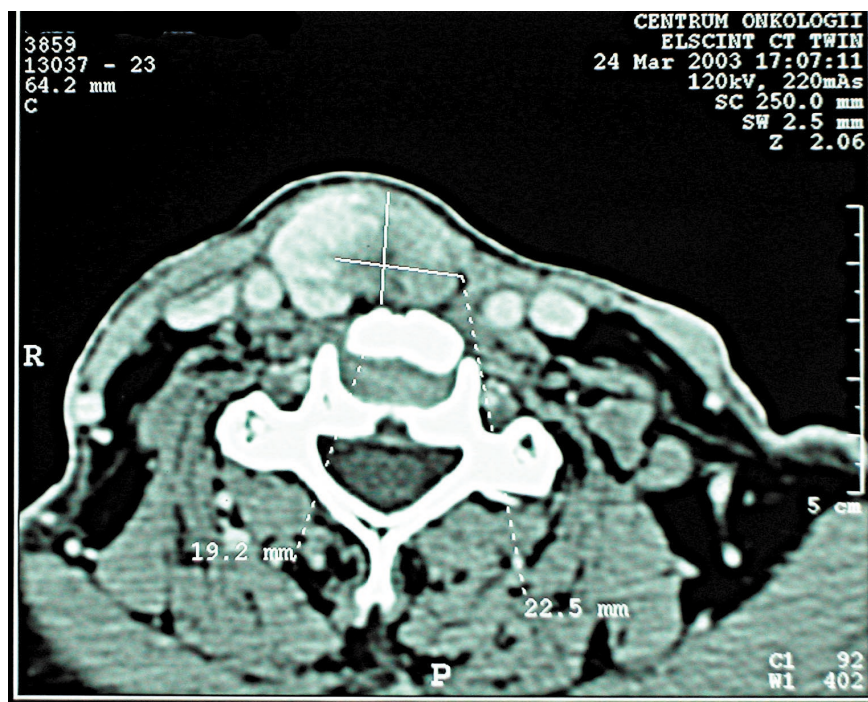
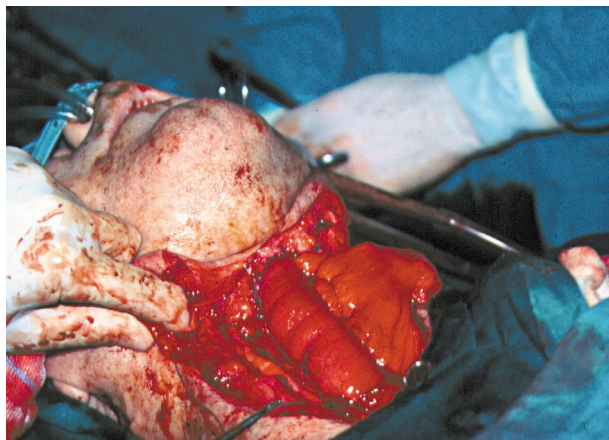


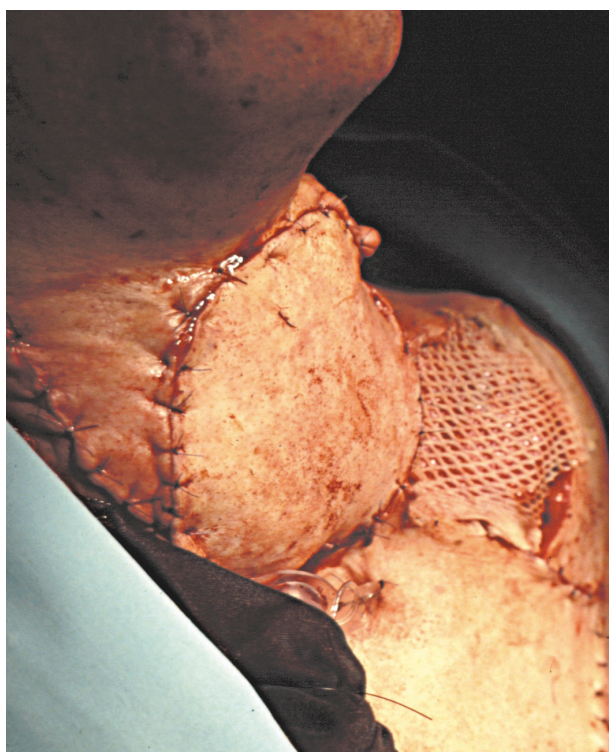
Figure 1. CT scan depicting the tumour infiltrating the entire circumference of the cervical oesophagus





**Figure 3.** Intraoperative view – the site after oesophageal reconstruction with the free jejunal graft

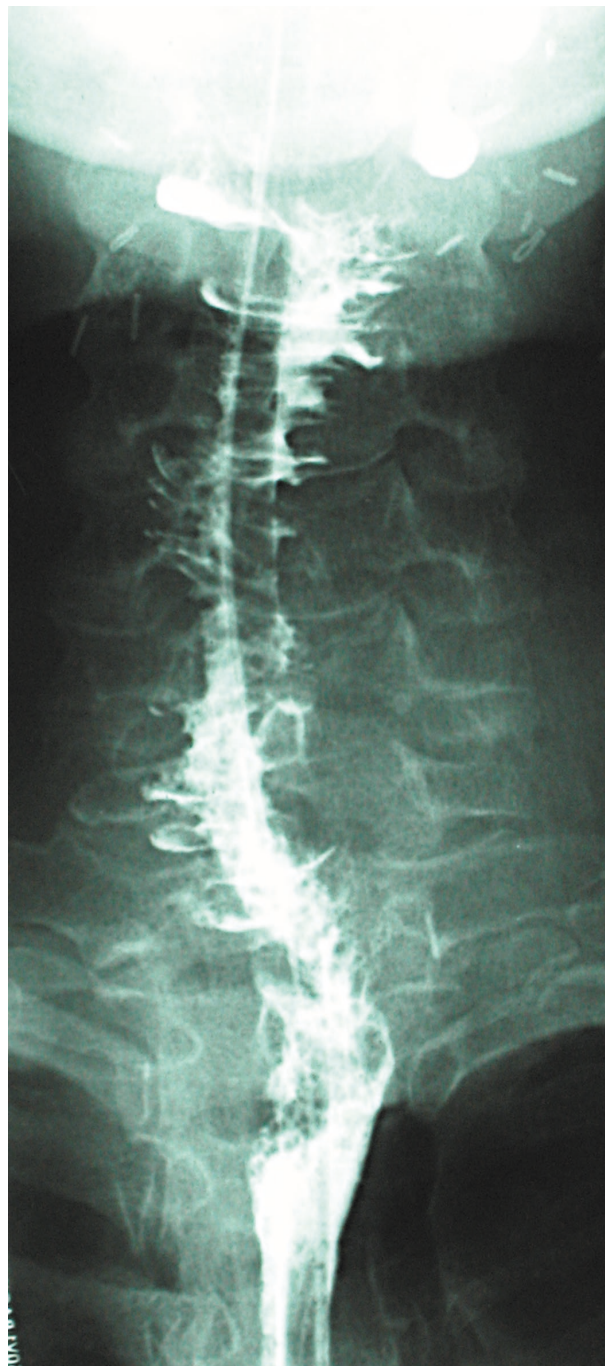
We excised the tumour “*en block*” with the infiltrated skin of the neck with and 8 cm of the oesophagus (Figure 2). The excision was pronounced as complete with the aid of intraoperative histopathological examination. The oesophagus was reconstructed with a jejunal graft (harvested together with the mesentery and vessels approx. 40 cm. below the duodeno-jejunal ligament). Before dissecting the jejunum the patient was administered 5000 i.u. heparin i.v.; the jejunal vessels were not flushed. The jejunal vein was sutured “end-to-side” to the internal jugular vein with 7/0 single nylon sutures. The jejunal artery was sutured “end-to-side” to the external carotid artery also with 7/0 single nylon sutures. The external carotid artery was chosen because no lower arterial branches remained after previous surgery. The jejunum was sutured into the oesophageal stump and into



**Figure 4.** Intraoperative view – the site after reconstructing the skin defect with the pectoral muscle flap

the hypopharynx with two layers of 3/0 single vicryl sutures (Figure 3). Before the distal anastomosis was made, two gastric tubes were inserted *via* the nose. The large skin defect was covered with the pectoral muscle myocutaneous pedicled flap (Figure 4).

Recovery was uneventful. We began to feed the patient via the gastric tube on postoperative day 5. On day 15 after surgery the anastomoses were checked during contrasted X-ray, and when no leakage was found the gastric tubes were removed and oral feeding instituted (Figure 5). The patient was discharged on postoperative day 20. Histopathologically the tumour was pronounced



**Figure 5.** Contrast X-ray – the cervical oesophagus on day 15 after surgery – the passage through the jejunal graft may be seen. No leakage within the pharyngo-jejunal and jejuno-oesophageal anastomoses

to be “carcinoma planoepitheliale – complete excision” (sample nr. 4585/2003 examined by Klara Zakrzewska MD, Dept. of Pathology of The Maria Sklodowska-Curie Memorial Cancer Centre and Institute of Oncology).

During follow-up examination two months after surgery the patient reported that he had been swallowing solid foods for over a month. On ENT examination we found no residual saliva within the hypopharynx. Three months after surgery gastroscopic examination was performed (Maciej Rupiński MD, PhD; Dept of Gastroenterology of the Centre for Postgraduate Training in Medicine), on which it was concluded that the patient “had undergone partial excision of the cervical oesophagus with jejunal graft reconstruction, the long axis of the oesophagus correct, anastomosis width correct”. Five months after surgery, on ambulatory follow-up no signs of either local recurrence nor of distant metastases were found.

## Discussion

### Factors affecting success in the treatment of recurrent laryngeal cancer

Treatment planning should be based on the clinical advancement of the malignancy. Apart from careful physical examination, the size and the topography of the tumour itself should be assessed in either CT or MRI, as they provide data concerning the resectability. USG, especially combined with fine needle aspiration biopsy, allows to assess clinically mute regional lymph nodes [1]. In patients with laryngeal cancer distant metastases are found only in some 9% of the patients [2]. The minimal course of diagnostics must consist of, at least, a chest X-ray in two projections. This allows to exclude metastases to the lungs, as well as primary lung cancer, which is a common feature in this particular group of patients.

When deciding upon the course of therapy it is also necessary to consider the results of histopathological assessment, both from specimens obtained during initial treatment, and in biopsies confirming the diagnosis of cancer. Such characteristics as low differentiation, infiltration of nerve sheaths, clusters of cancer cells in blood and lymphatic vessels are signs of poor prognosis.

Another factor directly suggesting poor prognosis is the presence of metastases in the regional lymph nodes parallel to the loco-regional recurrence.

History of previous radiotherapy increases the risk of postoperative complications and lessens the possibility of radical tumour excision, especially due to topographic difficulties arising from the problems with determining the infiltration margins. Another important issue is the time lapse between the completion of initial treatment and the diagnosis of recurrence.

At the completion of effective radical treatment (either combined, or consisting of radiotherapy alone) the tumour should in no way be discernible at its original site. If, however, there are signs of cancer residue within the larynx or the laryngectomy site, the patient should

be referred for salvage surgery as soon as possible, keeping in mind the possibility of early post-irradiation complications, which usually disappear after approximately 2 months. The longer the time lapse between the completion of initial treatment and the diagnosis of recurrence, the higher the chances of healing the disease.

### Methods of treatment of recurrent laryngeal cancer in patients after laryngectomy and radiotherapy

The basic method of cancer treatment is surgery, which should consist of total tumour resection. In case of recurrence after laryngectomy, there exists the possibility that the tumour infiltrates neighbouring structures, such as the oesophagus, the skin, the carotid arteries, the trachea and the cervical spine. Before deciding upon salvage surgery one must carefully consider the complex character of the operation and the influence of all the factors which have been listed above.

One may consider the surgical treatment of tumours infiltrating the carotid arteries. Such a procedure demands either immediate reconstruction or, at least, an attempt at prior closing of the lumen of the artery (before the operation itself) in the conscious patient i.e. under local anaesthesia. Tumours infiltrating the vertebrae may also be considered for excision, however in such cases techniques of cervical spine stabilisation are necessary. Attempts have also been made at excision of tumours, which directly infiltrate the tracheostomy site. In such cases parts of the claviculo-sternal joints and of the sternum are excised, while the stomy of the trachea opens up on the chest [3]. Decisions regarding such extensive procedures are always made individually for each patient. They may be considered in cases, when there exists a possibility of removing the entire tumour mass, especially in patients who present with good prognostic factors (such as a high grade of cell differentiation, uninvolved regional lymph nodes, long time lapse from original treatment completion to recurrence).

Surgical treatment of oesophageal infiltration in recurrent laryngeal cancer is commonly accepted. Such procedures call for immediate reconstruction of the continuity of the alimentary tract. Attempts at reconstruction of the cervical oesophagus and the hypopharynx have been undertaken for over 100 years [4]. Reconstructive techniques have included the use of neighbouring skin flaps, the Bakamian flap and pedicled musculo-cutaneous flaps. Functional results were usually poor, while the procedures were associated with a high ratio of failures and complications. Techniques involving the use of pedicled colon grafts or “pull-through” gastric grafts significantly increase the range of the operation while the risk ratio remains relatively high [5, 6].

The first literature report on successful reconstruction of the cervical oesophagus with a free jejunal graft goes back to 1959 [7]. This method has a relatively low failure rate (less than 5% of cases of total graft necrosis) and complication rate (8%-35% of cases of

pharyngo-cutaneous fistulas, over half of which heal with conservative treatment) [8, 9]. This reconstruction technique also allows to achieve good functional results – some 90% of patients are capable of swallowing solid foods. Despite the fact that a number of authors advocate the free forearm fascio-cutaneous flap in selected cases [10], at present the free jejunal graft with vessel anastomosis is the method of choice for cervical oesophagus reconstruction. In Poland the technique was introduced by the team of surgeons and otolaryngologists of the Central Clinical Hospital of the Medical University of Warsaw, and the techniques and results were published in literature [11, 12]. The method, which we here present, is a modification of that latter technique. The modifications were based on our own experiences acquired during the use of free flaps and from literature reviews.

One of the most important factors, vital for achieving success, is keeping the skin loose during suturing, so as to avoid any pressure on the jejunal graft [8]. It is difficult to achieve this in patients with prior radiotherapy, especially with primary wound closure – thus the necessity to use additional skin flaps. In the reported case it was also necessary to excise infiltrated skin. In order to close the defect we used the pedicled musculo-cutaneous flap from the greater pectoral muscle. This technique is relatively simple, it lengthened the procedure only slightly, and allowed not only to reconstruct the defect, but also brought healthy tissue with a good blood supply which was harvested from beyond the irradiated skin, thus limiting the risk of fistulas.

It is also worth mentioning, that in patients with local recurrence of laryngeal cancer the presence of resectable lung tumours (both primary and metastatic from laryngeal cancer) is not a contraindication to salvage surgery. The order in which the tumours are excised should allow to remove first the tumour which poses the greater risk on delay – therefore in a vast majority of cases the tumour on the neck is excised first.

Palliative chemotherapy is usually the only treatment option for patients with local recurrence of laryngeal cancer, who do not qualify for salvage surgery. Although in some cases of head and neck tumours additional irradiation may be considered, yet it is not possible in this localization, due to the direct vicinity of critical organs and the high risk of severe and untreatable complication – such as fistulas. Chemotherapy is, in these cases, palliative and may not be considered as an alternative to salvage surgery, which should be performed if possible.

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