



only doubt that the five-year postoperative survival period is largely affected by such factors as the stage of carcinoma, estimated in T, N, M markers (according to UICC 1987) (Tab. 1 and Tab. 2), or the patient's general condition related to his/her age, the efficiency of circulatory and respiratory systems, and the patient's stage of nutrition (9, 12, 21, 24, 31). Among patients whose carcinoma stage has been defined as T1-N0, 65% (or even more) are likely to survive the period of five years. Such results of the treatment are chiefly discussed in the Japanese literature (3, 10, 11, 30).

Table 1. Percentage index of five-year survival of patients operated on cancer stage – histopathologic assessment) according to UICC classification 1987

Author [bibl. item]	Staging					
	0	I	IIa	IIb	III	IV
Hermanek et al. (13)*	–	67	23	19	20	0
Zhang et al. (31)	91,7	57,5	45,1	27,1	13	0
Killinget et al. (18)	–	50	33	0	0	–
Lerut et al. (19)	–	77	46,5		15	0
Adachi et al. (1) Shinshu group	–	80,7	37,9	16,7	16,9	–
Hebei group	–	92,6	53,9	27,5	14,3	–

\* R0 operations performed.

Table 2. Percentage index of five-year survival of patients operated on for squamous cell oesophageal cancer in relation to pT and pN markers – according to UICC 1987

Author [bibl. item]	Lymph node assessment	Tis	T1	T2	T3	T4
Killinger et al. (18)	n–	–	50	50	26	–
	n+	–	0	0	10	–
Watson (29)	n–	–	75	–	50**	–
	n+	–	50	–	10**	–
Endo et al. (11)	n–	–	85	–	–	–
	n+	–	48,6	–	–	–
Lerut et al. (19)	n–	–	51***	–	–	–
	n+	–	12***	–	–	–

Yoshinaka et al. (30)	n-	-	89	-	-	-
	n+	-	43	-	-	-
Ide et al. (15)	n-	100	74,6	68,1	54,9	100 (2 patients)
	n+	-	39,7	62,1	24,5	0

\* Patients with T1-2 marker; \*\* Patients with T1-3; \*\*\* Irrespective of pT marker (TxN0M0 or TxN1M0).

When speaking about the effectiveness of the surgical treatment one has to bear in mind that regardless of the estimated carcinoma stage it can benefit the patients (i.e. cause longer survival) only if the neoplasm is removed entirely (with no macroscopic or microscopic tumour focuses left – R<sub>0</sub> resection (12, 14, 24).

Unfortunately it is only possible to perform this type of operation on relatively low number of patients with oesophageal cancer (the number does not exceed 40% - particularly in the group of patients marked with T<sub>3</sub> and T<sub>4</sub>) – 25, 27. It is largely caused by a late diagnosis of the neoplasm which in approximately 75% of cases is detected in connection with dysphagia, which is when the neoplasm has invaded 2/3 of the oesophagus lumen and has already overgrown its wall. It needs to be stressed, however, which even the R<sub>0</sub> resection gives a chance of survival becoming longer than five years only in 15% to 49.5% of operated patients (13, 15, 24, 25, 27). As many authors have shown in their analysis, this type of resection proves to be one of the most important prognostic factors in the surgical treatment of oesophageal cancer (12, 14, 19, 24, 25, 27) – Tab. 3.

Table 3. Percentage index of five-year survival of patients operated on for squamous cell oesophageal cancer (at different stages) in relation to the resection type (R marker)

Author [bibl. item]	Resection type	
	R0	R1-R2
Roder et al. (24)	40	9-0
Ide et al. (15)	49,5 (R0-R1)	0 (R2)
Lerut et al. (19)	20	0
Sughimachi et al. (12)	8	8
Hermanek (13)	15-40	5
Siewert, Roder (25)	40	-
Stein et al. (27)	30	-

The fact that oesophageal cancer metastasises early in another major cause of failures in the surgical treatment of the neoplasm (3, 8, 24, 25). Histological examination and the observation of the biology of oesophageal cancer's early states indicate that only carcinomas located in the mucosa can be completely cured and do not metastasise to lymph nodes. An infiltration of the submucosa signifies that approximately 30% to 50% of lymph nodes (also cervical and abdominal ones) have been invaded (3, 12, 24, 25).

The anatomic position of the oesophagus is one more impediment to the treatment. Its compact adhesion to the tracheo-bronchial tree and to large vessels frequently precludes on „en block” resection and makes the R<sub>0</sub> resection less feasible (it mainly concerns the location of the cancer in the upper third part of the thoracic oesophagus (3, 24). Frequent occurrence of microscopic neoplastic texture near the circumferential resection line can also be observed. As a result in around 55% patients, a relapse takes place within three years after the operation. In the case of a free resection margins, local recurrence shows in only 13% of patients (8). At the 6<sup>th</sup> World Congress of the International Society for Diseases of the Esophagus Wang presented his observations on the connection between the length of the oesophagus margin left after the operation and the likelihood of the recurrence on the resection line. The data have been presented in Fumagalli's work (Tabs. 4-12).

Table 4. Index of cancer relapses in relation to the length of the oesophagus margin and the presence or absence of neoplastic texture (acc. to 12)

Esophagus margin	No. of patients with an infiltration		No. of patients with no infiltration		Total	
0-2 cm	1/11	9,1%	4/52	7,7%	5/63	7,9%
2-4 cm	1/10	10%	8/212	3,8%	9/222	4%
4-6 cm	0/9	0%	2/123	1,6%	2/123	1,5%
6-8 cm	0/9	0%	1/56	1,8%	1,65	1,5%
8-10 cm	0/3	0%	0/32	0%	0/35	0%
>10 cm	0/1	0%	0/27	0%	0/28	0%
Total	2/43	4,7%	15/520	3,0%	17/543	3,1%

Bearing in mind the above-mentioned factors which seriously hinder or even preclude the achievement of a satisfactory outcome in the treatment of squamous cell oesophageal cancer, one comes to the conclusion that prominence

should be given to those trends in surgery which are concerned with the approach techniques, the location of anastomosis and the extent of the removed structures. These may be crucial to the effectiveness of the operation, evaluated in terms of low postoperative mortality and long-term survival. In the cases of more advanced cancers they may be regarded as components of multimodal treatment (31).

In the past the *I v o r - L e w i s* (20) transabdominal and transthoracic resection (right sided thoracotomy) was the most popular type of operation for oesophageal cancer. The method considered in partial oesophagectomy combined with the invaded lymph nodes dissection, with a 5-10 cm wide margin of healthy tissue left above the tumour. The stump of the oesophagus was next anastomosed with the stomach translocated to the thorax. The method still has its proponents who consider it particularly commendable in more advanced cases of oesophageal cancer (4, 29, 31). Nevertheless, the resection of the oesophagus through the pleural cavity restricts the possibility of extended lymphadenectomy and determines the location of the anastomosis within the thorax, which may pose a serious treat to life in the event of a leak in the anastomosis (5, 9, 21, 31). Resecting the oesophagus through the left pleural cavity – reserved for tumours located in the lower part of the oesophagus or in the stomach cardia – is unsuitable for the same reason (1, 29, 31). An anastomosis formed in the thorax seems to be of little use in multimodal treatment.

Although the access from the thorax is frequently used in the resection of an oesophageal tumour and adjacent lymph nodes, a transhiatal resection without thoracotomy, proposed by *O r r i n g e r* (22), is more and more often recommended as one which allows to reduce postoperative complications. The operation is performed through both an abdominal and a cervical section (along the medial margin of the sternocleidomastoid muscle). The oesophagus blind is dissected through the oesophageal hiatus of the diaphragm and through the cervical access. To restore the continuity of the gastrointestinal tract the stomach (or an intestine) is translocated onto the cervix in the site of the oesophagus removal. Gastroesophagostomy is formed on the cervix.

An operation of this type, has, according to its originator, several advantages: a low rate of postoperative mortality, a small percentage of pulmonal complications and the cervical location of the anastomosis (22). The method is all the more useful because the operation can also be performed on patients with a high risk of pulmonal complications or those who show no positive reaction, i. e. no tumour regression despite a preoperative therapy (chemo- and radiotherapy). The assertion is based on the fact that nearly one third of patients with neo-

plastic texture persisting after preoperative chemo- and radiotherapy in the resected tumour, survive for 5 years after the treatment. On the other hand, there are disadvantages of this operative method which cannot be disregarded. It is pointed out that the operation is performed without visual control and that it is practically impossible to carry out accurate lymphadenectomy. Moreover, there is a risk of the trachea and the vessels getting damaged during the dissection of the tumour in the middle section of the oesophagus and the laryngeal nerves damage is necessarily more frequent (28).

Postoperative complications in 131 patients who had undergone the transhiatal resection for oesophageal cancers were examined in a retrospective study conducted in the Mayo clinic (28). Most of the tumours (91%) were located in the lower part of the oesophagus. A low postoperative mortality rate stood at 2.3% of the cases. In 32 patients (24%) a leakage in the anastomosis occurred and 15 patients (11%) suffered one-sided paralysis of the vocal cord. Only in 37 patients (28) no complications occurred. The data are the basis for the authors' preference for the transthoracic resection.

A German study dealt with 87 cases of squamous cell carcinoma: 46 patients after the transhiatal resection and 41 patients after the transthoracic one. No significant difference was found between the two groups, either in the postoperative mortality rate (15% in the first group, 10% in the second group) or in postoperative complications. The type of operation did not affect the number of patients with three-year survival, either (21% and 17% respectively). However, according to the study, laryngeal nerve paralysis often occurred as a consequence of the resection without thoracotomy (14).

Siewert's group has developed a new technique for oesophagectomy without thoracotomy (endodissection) – 7. According to the authors the method is particularly helpful in separating the oesophagus on the level of or above the trachea. It allows accurate identification of the mediastinal structures and biopsy of lymph nodes, at the same time, preventing damage to the laryngeal nerves.

While some authors try to specify a surgical approach that would entail the fewest complications possible, others concentrate on developing more extensive operative technics. One of the proposed solutions consists in radical oesophagectomy *en bloc* with the adjacent structures (down from the tracheal bifurcation) including, apart from the tumour, part of the pericardium, of the pleura, periesophageal connective tissue, the thoracic duct and the azygous vein. Skinner (26) reports on the application of the method in 80 patients, with the result of 18% of them surviving for five years. It is indeed feasible to apply the more radical resection when operating. On tumours in the lower third part of the

oesophagus (the stomach, the spleen, the left crus of the diaphragm and the retroperitoneal lymphatic system above the pancreas are removed as well). It has to be observed, however, that the possibility of extending the operation so that it includes a complete removal of the lymphatic system above the tracheal bifurcation is limited. A considerable percentage of invaded lymph nodes (over 40% acc. to A k i y a m a (3) right above the tracheal bifurcation and a large number of postoperative complications, as well as lack of evidence of longer survival, contribute to the low popularity of the method with surgeons.

Japanese surgeons are counted among advanced of extended resection, including the extensive lymphadenectomy (2, 3, 4, 16, 17, 23). A precise definition of the type of oesophagectomy, which also covers the extent of lymphadenectomy, has been given by B u m m (8). According to A k i y a m a (3) neoplasm metastases may occur simultaneously in cervical, mediastinal and epigastric nodes irrespective of the location of the neoplasm in the lymphatic system. The author claims that, when dealing with neoplasm located in the upper third part of the thoracic oesophagus one may expect lymph nodes to be involved in the following measure: cervical nodes – approximately 45%, mediastinal nodes: upper – 45%; middle – 20%; lower – 6%, epigastric – 11%. If the tumour occurs in the middle third part of the oesophagus these are respectively: 20%, 43%, 37%. In the case of the neoplasm located in the lower third part of the oesophagus metastases involve 20%, 31%, 43%, 34% and 70%. Having that in mind, Japanese authors recommend more radical procedures which put special emphasis on the evaluation of the lymph nodes along recurrent laryngeal nerves (5, 8, 16, 17). That is why at present operating with A k i y a m a's (2) method is preferred. It consists in transthoracic and transabdominal oesophagectomy as well as cervical lymphadenectomy bilaterally – left lateral lymph nodes and the dissection of external and internal deep nodes, upper middle and lower mediastinal nodes and epigastric nodes. The continuity of the gastrointestinal tract is reconstructed using the stomach, which is usually translocated retrosternally. As the published results suggest, the method creates possibilities of extending the survival period, and is the only reliable means of verifying the tumour remission scope after a preoperative chemo- and/or radiotherapy (3, 16, 17, 23) – Table. 5.

Table 5. Percentage index of five-year survival of patients operated on for squamous cell oesophageal carcinoma after 2-field and 3-field lymphadenectomy in relation to the carcinoma stage and occurrence of metastases in lymph nodes

Author [bibl. item]	N marker	Stage	No of operations	2-field	No of operations	3-field
Akiyama et al. (3)	-	0	1	100	4	66.7 ± 27.2
	-	I	26	69.2 ± 9.1		92.9 ± 6.9
	-	IIa	70	48.6 ± 6	36	82.5 ± 7.2
	-	IIIb	42	45 ± 7.7	23	57.7 ± 14.9
	-	III	96	27.1 ± 4	60	57 ± 7
	n+	IV	38	13.2 ± 5.5	91	27.8 ± 5.8
Kato (16)	-	-	121	43*	64	53
	n+	-	-	-	58	47
	n-	-	-	-	42	61
Aikou et al. (4)	-	I/II	-	-	**	53
	-	III/IV	-	-	**	18
Baba et al. (acc. to 8)	-	-	-	-	106	30.8
Nabeya (acc. to 23)	n-	-	-	34	-	48
	n+	-	-	22	-	34
Isono et al (acc. to 23)	n-	-	-	27	-	34
	n+	-	-	29	-	33
	-	1/3 upper	-	24	-	28
	-	1/3 middle	-	28	-	32
	-	1/3 lower	-	29	-	40
Idc et al. (15) R0-R1 operations	-	-	204	46.2	122	42.5
	n+cervix	-	-	-	28	30
	n+mediastinum	-	-	-	47	24.4
Kato et al. (17)	n+abdominal cavity	-	-	-	33	38.4

2-field extended lymphadenectomy, 127 cases of patients after oesophagectomy with right thoracotomy were analysed.

At this point it is well quoting E n d o et al.'s (10) opinion about the possibility of removing limited neoplasm of the oesophageal mucosa by means of an endoscope (so - called endoscopic mucosectomy). The author, who has considerable experience in evaluating superficial cancers, assumed that a neoplastic infiltration limited to the mucosa does not metastasise into lymph nodes while an infiltration into the muscular layer of the mucosa may metastasise in 4% of cases (11).

The way of reconstructing the continuity of the gastrointestinal tract after such extensive oesophagectomy remains an open question. The stomach is an organ most often used for this purpose and there are good grounds for it: is easy to mobilise, well vascularised (right and left gastric arteries), has a well-developed intramural vascular rate and is long enough to be transferred up into the cervix region (3, 9, 21, 29, 31). Pyroloplasty is recommended as a means of preventing the symptoms of gastric content retention in the stomach graft (7). At present the operation is believed to have little effect on the rate of stomach emptying, the duration of gastric contents retention, the risk of the stomach or oesophageal mucosa inflammation or other complications (5).

In cases when the stomach cannot be used as a graft material, the large or small intestine should be used (2, 6). Basing themselves on their many years' experience B e r n a t et al. (6) show preference for utilising, in the first place, the small intestine, which is possible in only 30% of cases. When the vascular system is unfavourable, which occurs in around 70% of cases, they advise forming the transplant from the ileum and the caecum in isoperistaltic position on the pedicle of the ileocolic artery. Owing to a favourable structure of its vascular system and to the anatomic topography it is also possible to mobilise the right part of the colon on the pedicle of the left or middle colonic artery in isoperistaltic position. It is pointed out that if it is possible to mobilise the right part of the colon on the pedicle of the ileocolic artery, the graft can be formed from the right part of the colon in anisoperistaltic position. An oesophageal prosthesis from the ileum and the ascending colon can also be formed on the right or middle colonic artery. Forming the graft from the left part of the colon on the middle colonic artery creates effective junctions between the middle end of the left colonic arteries.

After the "prosthesis" has been formed, it is transferred to the thorax or onto the cervix region in one of the three possible ways: in the posterior mediastinum in the site of the resected oesophagus; in the anterior mediastinum, behind the

sternum; or in the subcutaneous tissue above the sternum. The retrosternal way is now preferred with regard to the danger of local recurrence and because it allows a guided radiotherapy to be applied at the posterior mediastinum region after the operation (2).

Because of frequent complications the method of forming an anastomosis remains one of more serious problems in oesophageal surgery. Early fistulas and late strictures occur most often (4, 29, 31). Leaks in the anastomosis occur in the cervix region more often than in the thorax (4). Leakage-related mortality is according to B a r d i n i et al. (5) the same in both cases of the anastomosis location. However, most authors disagree with that view asserting that anastomosis leakage within the thorax are more perilous to life (29, 31). Having analysed numerous reports on methods of forming anastomoses and complications related to that, B a r d i n i et al. (5) have come to the conclusion that occurrence of fistulas should not be associated with either the material used for the anastomosis, or the technical modifications of the anastomosis formation. What is more important is the way of graft preparation (adequate blood supply, atonicity) as well as precision of anastomosing.

In many cases the treatment of neoplastic oesophageal strictures is merely a palliative therapy (2). Yet in the case of patients qualifying for chemo- and/or radiotherapy it is necessary to, first of all, restore proper swallowing and thereby, to check the progressing cachexia caused by the inability to feed properly. In that way also pulmonal complications are prevented, caused by the reflux of chyme (retained above the oesophageal stenosis) to the respiratory system. The methods most often applied in such cases are: destroying the neoplastic tissue with bipolar electrocoagulation (BICAP) or with a Nd:YAG laser (1). Also the photodynamic therapy, used in treating neoplasms at early stages proves helpful in the treatment of oesophageal strictures (1).

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#### STRESZCZENIE

Autorzy przedstawiają współczesną wiedzę dotyczącą chirurgicznego leczenia raka przełyku odcinka piersiowego. Szczególną uwagę poświęcają metodzie opisanej przez Akiyamę, jak również podkreślają rokownicze znaczenie limfadenektomii. Przedstawiają także najczęstsze powikłania pooperacyjne, a w szczególności podkreślają problemy związane z przetokami.