Original Articles

Chirurgia (2015) 110: 109-116
No. 2, March - April
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Postoperative Functional Result and Quality of Life after Oesophageal Reconstruction Based on the Type of Cervical Anastomosis

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Rezumat

Rezultatul funcțional și calitatea vieții postoperatorii în reconstrucția esofagiană funcție de tipul anastomozei cervicale

Introducere: Cheia de boltă în ceea ce priveşte rata complicațiilor post-operatorii cât şi în privința rezultatului funcțional în reconstrucția esofagiană este tehnica/modalitatea anastomozei cervicale. În ciuda noilor achiziții tehnologice și a perfecționării tehnicii din centrele specializate, nici la ora actuală complicațiile post-anastomotice nu cunosc o ameliorare semnificativă.
Scop: Studiul nostru își propune să analizeze cauzele ce fac din esofag/hipofaringe un caz particular dpdv anastomotic. Dacă condiționalitățile anatomice și morfologice nu pot fi ajustate (structură histologică mediocră, precaritatea vascularizației, etc), o serie de alte elemente importante pentru securitatea unei suturi pot fi identificate și corectate.
Material și metodă: În intervalul 1981-2014, în clinică au fost operați 195 pacienți cu indicație de reconstrucție esofagiană. Studiul nostru a presupus o analiză a numai 72 de cazuri (2000-2014) operate și s-a bazat pe o evaluare statistică printr-o metodă Kaplan-Meier ce a luat în calcul o baterie importantă de factori (partener anastomotic esofag/hipofaringe, partener visceral stomac, jejuno-ileon, colon, tip de faringotomie, tip de anastomoză T-L, T-T, L-L, L-T, straturi anastomotice). Rezultatele au fost comparate cu cele obținute printr-o investigație de tip clinico-paraclinic ce a analizat rezultatul postterapeutic cu ajutorul a trei criterii (clinica deglutiției, studiul baritat şi endoscopic) precum şi printr-o apreciere subiectivă, a fiecărui bolnav, asupra situației sale, a acuzelor pe care aceştia le-au reclamat şi care au viciat rezultatul funcțional la distanță (disfagie, reflux, durere, astenie fizică, scădere în greutate, disfonie, altele).
Rezultate: Analiza statistică a stabilit că numai unii din factori analizați s-au dovedit valoroşi. Astfel, cu cât anastomoza este plasată mai sus cu atât funcționalitatea pasajului digestiv este mai afectată. Jejunul și colonul stâng s-au dovedit cei mai eficienți parteneri anastomotici. Varianta de implantare optimă pare a fi cea T-T ori T-L iar numărul de straturi anastomotice nu a influențat rezultatul postoperator.
Concluzii: Datele obținute pot modula într-o oarecare măsură gestul operator, cu ameliorarea ratei complicațiilor. Din păcate, condițiile tehnice laborioase și limitările anatomice specifice fac greu realizabil acest deziderat.

Cuvinte cheie: stenoză esofagiană postcaustică, reconstrucție esofagiană, anastomoza cervicală, variabile tehnice, calitatea vieții, rezultat funcțional

Abstract

Introduction. The keystone of the rate of postoperative complications and functional outcome in oesophageal reconstruction is the technique/method of performing cervical anastomosis. Despite new technologies and improved technique in specialized centres, post-anastomosis complications have not significantly improved.
Purpose: The goal of our study is to analyse the causes that

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make anastomosis with the oesophagus/hypopharynx a particular case. If anatomical and morphological aspects cannot be adjusted (poor histological structure and vascularity etc.), some important elements for performing a good anastomosis can be identified and corrected.
Material and Method: Between 1981-2014, 195 oesophageal reconstructions were performed in our clinic. Our study involved an analysis of 72 cases (2000-2014), based on a statistical evaluation by Kaplan-Meier method that considered a series of factors (oesophagus/hypopharynx as anastomotic partner, stomach, jejuno-ileum, colon as visceral partner, pharyngotomy type, T-L, T-T, L-L, L-T type anastomosis, number of anastomotic layers). Results were compared with those obtained by standard clinical and laboratory investigation, analysing the post-therapeutic outcome using three criteria (clinical aspects of swallowing, barium swallow and endoscopy) and by subjective assessment by each patient of his/her state and complaints, with effects on long-term functional outcome (dysphagia, reflux, pain, asthenia, weight loss, hoarseness).
Results: Statistical analysis determined that only some of the analysed factors proved to be valuable. The higher the level of the anastomosis, the more intense the impairment of the digestive function. The jejunum and left colon proved to be most effective anastomotic partners. The best method for implantation seems to be T-T or T-L and the number of anastomosis layers has no influence on postoperative outcome.
Conclusions: Acquired data can influence to some extent the operatory technique, with a lower complication rate. Unfortunately, laborious technical aspects and specific anatomical limitations make this goal difficult to achieve.

Key words: oesophageal postcaustic stenosis, oesophageal reconstruction, cervical anastomosis, technical variables, quality of life, functional outcome

Introduction

Postcaustic esophagitis, as a result of accidental ingestion of corrosive substances or with suicidal intent, or of drug compounds administered orally, remains a significant public health problem (1,2,3). The lesional consequence beyond the acute event, long after the moment of ingestion, is oesophageal stenosis, with an extremely diverse morphopathology, which renders the patient socially and, most importantly, dietary handicapped. The therapeutic solution, far from being the prerogative of a single specialty, associates a gastroenterologist, an ENT specialist, a radiologist, a psychologist, and the most important link, the surgeon. Thus, the decision to restore swallowing by means of both a technique of reconstruction using the patient's visceral capital and possibly an oesophageal resection ablative method rests with the surgeon. The key point of any oesophageal reconstruction in terms of long-term postoperative complications and functional outcome, which is precisely the purpose to which the oesophageal plasty is performed, is represented by an efficient cervical anastomosis, with swallowing restored. Despite technical improvements (crimped wires, mechanical suture, etc.), no significant improvements of the results were obtained, the risk of fistula development remaining approximately 8-10% of cases, ranging between 3.7 and 20%! (4-8) and, although no vital impact is reported, functionally impairing the assembly in spite of a viable, cervically ascended graft. With this argument, our study identifies a number of criteria that have an impact on the functional outcome in oesophageal reconstruction and, by integrating them statistically, allows adjustment of the decision regarding reconstructive therapeutic management.

Aim

Our study aims to analyse the causes that make the oesophagus or hypopharynx a particular case from an anastomotic point of view. If the anatomical and morphological conditionalities cannot be adjusted (due to poor histologic structure, precarious vascularization etc.), a number of other elements important for the safety of a suture can be identified and corrected. Thus, we must answer the following questions:

- which of the two possible anastomotic partners – the oesophagus or the hypopharynx – is more adequate for an anastomosis?
- which visceral distal anastomotic partner provides the best long-term results (stomach, jejunum, right or left colon)?
- what type of pharyngotomy provides a convenient functionality, with minimal complications?
- what type of anastomosis (T-L, T-T, L-T sau L-L) is more indicated to be used?
- is the number of layers important in terms of minimizing the fistula development risk and/or the functionality of the anastomosis?

Together with other associated questions, through this study we hope to obtain an ideal mathematical and statistical model, applicable to oesophageal reconstruction, which will prove useful at the moment of technical decision-making to a surgeon trained in this type of surgery.

Material and Method

Between 1981-2014, 195 patients with indication for oesophageal reconstruction were operated in our clinic. In view of the questions raised above, our study involved an analysis of the reconstruction cases operated in the clinic (72 cases from 2000 to 2014) and was based on a statistical evaluation by Kaplan-Meier method, which took into account an important range of surgical decision factors involved in the functional outcome:

- oesophagus vs hypopharynx as anastomotic partner;
- visceral partner (stomach, jejuno-ileum, right or left colon);
- pharyngotomy type;
- anastomosis type (T-L, T-T, L-L, L-T);
- number of anastomosis layers.

All variables were processed and statistically analysed using X2 tests for discrete factors and Wilcoxon tests for continuous ones, any index value $p < 0.05$ having statistical significance (9, 10). Patients' responses fall relatively within the standard population group, keeping within the error margins established in accordance with generally accepted typical tests.

We used two criteria for result assessment:

- Study I, subjective, a questionnaire completed by each patient, on his/her state, physical complaints influencing the long-term functional outcome (dysphagia, reflux, pain, asthenia, weight loss, dysphonia, and others), quantified as a self-evaluation in terms of quality of life in the postoperative period;
- Study II, objective, a clinical and para-clinical evaluation conducted in the clinic by the specialist, which includes general examination and swallowing clinical aspects, endoscopy and barium swallow exam (in particular situations we also used radio-labelled tracers in a meal and pH meter), patients being initially followed at 6 and 12 months respectively.

Results

Study I subjective (quality of life)

The questionnaire for assessing quality of life includes elements considered mandatory in order to have interpretation value (defined by the National US Committee Short Form - 36 Health Survey - SF-36) (11,12): general health, current physical activity, work ability, vitality scale, social integration, mental health, emotional problems, pain complaints (see *Fig.1* Sheet Type I). Each criterion was rated on a scale from 0 to 100, higher values indicating better quality of life.

Comparative assessment to a control group from the general population was made with a group of American population, because statistical evaluations of our country are missing from official data (13). This highlighted a value of quality of life in the control group of 80.562 and a value of 71.865 for the patients in the study (if we had an ideal value of 100% in the control group, we would have a very high value of quality of life for operated patients, of 89.2%!) - *Table 1*.

Applying and analysing each technical detail criterion (see above) with regard to impact on quality of life in the postoperative period, we identify elements that can increase / decrease this result - *Table 2*. Thus, for the cervical anastomotic partner type (oesophagus or hypopharynx), we applied the test of Kruskal-Wallis statistical evaluation and found a clearly statistically significant relationship between quality of life and cervical anastomotic partner type, the average score obtained, 0.0111, proving the causality, and the oesophagus proved its supremacy to the hypopharynx. There is no correlation with statistical significance regarding mental health, but the latter has a significant influence on physical activity (0.002), work ability (0.0019), vitality global scale (0.0026) and pain complaints (0.0001).

Applying the same evaluation method depending on the type of the distal anastomotic partner, we obtained results that

SHEET no. I

Quality of life evaluation

Evaluation criteria	Evaluation score (0-100)
Health perception (general health)	
Physical functioning (daily activities)	
Role-physical (ability to work)	
Energy/fatigue (vitality)	
Social functioning (social activities)	
Mental health (nervousness/depression)	
Role-emotional (emotional problems)	
Bodily pain (pain)	
Total points	

Figure 1. *Type I form for assessment of quality of life, the basic criteria being quantifiable on a scale of 0-100*

show an excellent score for the jejunum and left colon, followed by the stomach and right colon.

During the study three types of pharyngotomy were performed in our clinic: i) classic type, lateral to the thyroid cartilage's wing, with partial severing of the lower pharyngeal constrictor muscle, ii) Z. Popovici type, an elliptical pellet on the side wall of the pharynx after resection of the left hemihyoid and the superior horn of the thyroid cartilage, and iii) Laccourreye-Dubost type, elliptical pharyngotomy extended into the lower pharyngeal constrictor muscle, after resection of the left upper horn of the thyroid cartilage.

Evaluation test shows the most favorable results for Popovici pharyngotomy, followed by classic and Laccourrey-

Table 1. *Score assessing quality of life based on the MOS SF-36 assessment criteria and comparison between the two groups, patient and control respectively*

Evaluation criteria (normal population)	Patients Score	Witness score
Health perception (general health)	56,5	75,4
Physical functioning (daily activities)	76,0	87,3
Role-physical (ability to work)	84,0	83,4
Energy/fatigue (vitality)	48,0	62,9
Social functioning (social activities)	79,0	90,4
Mental health (nervousness/depression)	78,5	77,6
Role-emotional (emotional problems)	84,0	88,1
Bodily pain (pain)	69,0	79,4
Total points	71,875	80,562

Table 2. *Correlations between quality of life criteria and surgical variables (cervical partner, graft type, anastomosis type, pharyngotomy type, no. of anastomotic layers)*

Variable	*Cervical visceral type & p-value*	*Visceral graft type & p-value*	*Anastomotic type & p-value*	*Pharingotomy type & p-value*	*Anastomotic layers & p-value*
Health perception (general health)	E: **57.36**± 3.59 0.0021 H: 53.00± 2.45	S: 61.00 0.1227 GT: 54.00 J: 60.00 RC: 54.00 LC: 56.00	T-L: 54.00 0.2133 T-T: 60.0000 L-T: 54.0000 L-L: 56.0000	C: **61.00**±1.0 0.0128 P: 54.10±2.6854 L: 56.80±3.8410	I: 56.3784±3.8467 II: 56.9091±3.9358 0.6912
Physical functioning (daily activities)	E: **7.15**±4.23 0.0002 H: 70.875±2.748	S: ***82.00*** 0.0397 GT: 72.00 J: 80.00 RC: 72.00 LC: 76.00	*T-L:* ***82.00*** 0.4768 T-T: 80.00 L-T: 72.0000 L-L: 76.0000	C: **82.00** 0.0020 P: 72.00 L: 76.00	I: 76.0000± 4.7610 II: 76.0000± 4.4272 ????
Role-physical (ability to work)	E: **4.97**±4.75 0.0019 H: 79.125±3.3991	S: 90.00 GT: 79.00 J: ***92.00*** 0.0187 RC: 81.00 LC: 84.00	T-L: 90.0000 *T-T:* ***92.00*** 0.3876 L-T: 81.0000 L-L: 84.0000	C: **90.00**±1.0 0.0084 P: 80.70± 4.3982 L: 84.4286± 4.7545	I: 83.7027±4.7602 II: 85.0000±5.8138 0.4545
Energy/fatigue (vitality)	E: **9.026**±4.57 0.0026 H: 43.6250±2.9246	S: 53.00 GT: 44.00 J: ***55.00*** 0.0083 RC: 42.00 LC: 47.00	T-L: 53.0000 *T-T:* ***55.00*** 0.2727 L-T: 42.0000 L-L: 47.0000	C: **54.0**±2.646 0.0011 P: 44.0000± 2.4495 L: 48.6286± 4.6151	I: 48.0000± 4.5583 II: 48.0000± 5.7096 ????
Social functioning (social activities)	E: **9.92**±4.53 0.0087 H: 75.2500±3.4949	S: ***86.00*** 0.0482 GT: 75.00 J: 84.00 RC: 74.00 LC: 79.00	*T-L:* ***86.00*** 0.0395 T-T: 75.0000 L-T: 84.0000 L-L: 79.0000	C: **85.3**±3.055 0.0049 P: 75.9000±3.8137 L: 79.3429±4.4652	I: 78.7568± 4.4994 II: 79.8182± 5.5645 0.5186
Mental health (nervousness/ depression)	E: 9.00±3.84 0.2014 H: 77.1250±2.9970	S: 81.00 0.2246 GT: 76.00 J: 80.00 RC: 78.00 LC: 78.00	T-L: 81.00 0.6108 T-T: 76.0000 L-T: 80.0000 L-L: 78.0000	C: 82.3±3.215 0.1494 P: 77.3000±3.6530 L: 78.5143±3.9211	I: 78.1622±4.0518 II: 79.6364±3.3548 0.2781
Role-emotional (emotional problems)	E: 3.231±4.1197 H: **86.75**±3.01 0.0271	S: 80.00 0.1029 GT: 87.00 J: 82.00 RC: 85.00 LC: 84.00	T-L: 87.00 0.6148 T-T: 82.0000 L-T: 85.0000 L-L: 84.0000	C: 80.0±2.00 0.1306 P: 85.6000±5.6016 L: 83.8857±3.8023	I: 84.3784± 4.2253 II: 82.7273± 4.3610 0.2644
Bodily pain (pain)	E: 7.5641±4.0379 H: **74.75**±5.47 0.0001	S: 67.00 0.8738 GT: 69.50 J: 67.00 RC: 70.00 LC: 69.00	T-L: 67.00 0.3309 T-T: 67.0000 L-T: 70.0000 L-L: 69.0000	C: 66.0±5.568 0.0621 P: 72.2000±5.3500 L: 68.3143±4.8189	I: 69.1351 ± 5.3133 II: 68.4545± 4.8449 0.7057
Median Score	E: **72.28**± 2.25 0.0111 H: 70.0625± 1.5498	S: ***75.0*** 0.0168 GT: 70.1875 J: ***75.000*** RC: 69.625 LC: 71.500	*T-L:* ***75.0*** 0.1353 *T-T:* ***75.000*** L-T: 69.6250 L-L: 71.5000	C: **75.00** 0.0063 P: 70.3125 L: 71.6250	I: 71.8142±2.1897 II: 72.0682±2.6536 0.7491

Wilcoxon and X^2 test

$p < 0,05$ significant statistical standpoint

Visceral graft type: Stomac – S, Gastric tube – GT, Jejunum – J, Right colon – RC, Left colon – LC

Dubost type. Note that there is statistical significance in terms of vitality scale (0.0011), performing ordinary activities (0.0020), work ability (0.0084), health perception (0.0128), but not in terms of mental health, emotional problems and pain perception.

In relation to the type of anastomosis, test shows L-T anastomosis to have the best results, followed by the T-T, T-L and L-L, but we cannot establish a causal link, since the average score obtained is 0.135.

In terms of number of anastomotic layers and quality of life of patients, it seems that there is no causal link, and neither of the two options appears to present a statistically significant importance.

Assessment by quality of life questionnaire in reverse order

of importance (cervical anastomotic partner, type of anastomosis, pharyngotomy type, distal anastomotic partner and number of anastomotic layers) provides the surgeon with the following optimal model:

- proximal anastomosis with the oesophagus;
- left colon or jejunum as distal partner;
- Popovici pharyngotomy;
- L-T or T-T anastomosis;
- no importance attributed to the number of anastomotic layers.

Discriminant analysis of variables aims to investigate the differences between groups based on the attributes (characteristics) of cases, indicating which attributes contribute most to separate the groups. From this point of view, the desire is to pinpoint which variable of the general vitality scale is the most influential, and which operative criterion exerts the most influence on the intervention.

Current vitality seems to be the most involved, and the criteria influencing it are visceral type and manner of cervical ascension of the graft. At the opposite pole are health state, physical activity, work ability and mental health.

At the end of this first part, after statistical analysis, some practical conclusions are required.

Firstly, as was expected, not all variables have the same rates of subjective significance. The most important assessment variable was that of the current vitality scale, and the less important was that of emotional limitations.

Secondly, all variables had predictive values, and therefore importance in statistical type conclusions. Finally, the technical criteria used had an impact on the variables of vitality, so they also had significance for the interpretation of statistical results.

Study II

The second part of statistical analysis was conducted in a dual manner, through a clinical-paraclinical investigation (the postoperative outcome was analysed based on three criteria – swallowing clinical aspects, barium swallow exam and endoscopic examination), and through a subjective assessment of each patient, by filling in a Type II form (see *Fig. 2*) describing the long-term evolution, aiming to establish the causal link between patient's complaints (dysphagia, reflux, pain, asthenia, weight loss, hoarseness) and objective examination. The criteria introduced for evaluation were consistent with those of the main papers (14-17) on this theme, namely health state control and therapeutic outcomes of the postoperative period, but were adjusted taking into account the particularities of substitute surgery. This form contains a segment of 7 components addressing the patient and another 3 components for the assessing clinician, each item being scored on a scale of 1 to 10, with a total of 100 points. The subjective elements were marked so that the closer they are to normality, the nearer to 10 is the score. Interestingly, according to this evaluation, 53 (73.5%) had good or excellent results after a reconstructive technique. However, one in five patients complains of an improper functionality of the assembly, or one is confirmed paraclinically - *Table 3*.

SHEET no. II

Clinical score (pacient only)		
Complaints		**Score (1-10 pct)**
Dysphagia		
Reflux		
Pain		
Asthenia		
Weight loss		
Hoarseness		
Others		
Paraclinic score (doctor only)		
Swallowing	Normal (10pct)	Modified (1-9pct) embarrassment, hesitation, difficult, etc)
[redacted]		
Barium meal	Normal (10 pct)	Modified (1-9pct) (difficult, slow, reflux, etc)
[redacted]		
Endoscopy	Normal (10 pct)	Modified (1-9pct) (reflux, anastomosis caliber, etc)
[redacted]		
Total		

Figure 2. *Type II assessment form, with the score per element of discretion (0-10) and the total score of assigning functional outcome (0-100)*

In order to be able to draw conclusions regarding the most convenient assembly on the long term from a functional standpoint, we used the same criteria and decision elements used in assessing the vitality scale:

1. oesophagus vs hypopharynx as anastomotic partner;
2. visceral partner (stomach, jejuno-ileum, right or left colon);
3. pharyngotomy type;
4. anastomosis type (T-L, T-T, L-L, L-T);
5. number of anastomosis layers.

Processing of results took into account the score obtained by each patient (type II form), and reporting of every criterion and decision element was necessary so that the result obtained enabled a subsequent surgery-related decision - *Table 4*.

The first criterion, that of cervical anastomotic partner,

Table 3. *Long-term functional outcome assessment results, from a subjective and paraclinical point of view*

Scale	Outcome	No.cases
0 → 20	Improper	3 (4%)
21 → 40	Poor	6 (9%)
41 → 60	Moderate	10 (13%)
61 → 80	Well	17 (24%)
81 → 100	Excellent	36 (50%)
Total		72

Table 4. *Correlations between clinical-paraclinical criteria for postoperative functionality and surgical variables (cervical partner, graft type, anastomosis type, pharyngotomy type, no. of anastomotic layers)*

Results	Visceral cervical type Row % & Col %	Visceral graft type Row % & Col %	Pharyngotomy type Row % & Col %	Anastomosis type Row % & Col %	Anastomotic layers Row % & Col %
Excellent	Hypopharyngx **40.0** 20.7 Esophagus **69.7** 79.3	Stomach **100.0** 10.3 Gastric tube **33.3** 6.9 Jejunum **100.0** 3.4 R.Colon **40.0** 6.9 L.Colon **63.6** 72.4	Popovici **100.0** 10.3 Classic **65.7** 79.3 Laccoureye **30.0** 10.3	T-L **72.7** 27.6 T-T **100.0** 10.3 L-L **56.8** 72.4 L-T **63.6** 72.4	I **50.0** 6.9 II **47.4** 93.1
Well	Hypopharyngx 20.0 30.0 Esophagus 21.2 70.0	Stomach 0.0 0.0 Gastric tube 33.3 20.0 Jejunum 0.0 0.0 R.Colon 20.0 10.0 L.Colon 21.2 70.0	Popovici 0.0 0.0 Classic 17.1 60.0 Laccoureye 40.0 40.0	T-L 9.1 10.0 T-T 0.0 0.0 L-L 24.3 90.0 L-T 21.2 70.0	I 25.0 10.0 II 20.5 90.0
Moderate	Hypopharyngx 26.7 66.7 Esophagus 6.1 33.3	Stomach 0.0 0.0 Gastric tube 16.7 16.7 Jejunum 0.0 0.0 R.Colon 20.0 16.7 L.Colon 12.1 66.7	Popovici 0.0 0.0 Classic 20.0 33.3 Laccoureye 20.0 33.3	T-L 9.1 16.7 T-T 0.0 0.0 L-L 13.5 83.3 L-T 12.1 66.7	I 0.0 0.0 II 13.6 100.0
Poor	Hypopharyngx 6.7 50.0 Esophagus 3.0 50.0	Stomach 0.0 0.0 Gastric tube 16.7 50.0 Jejunum 0.0 0.0 R.Colon 0.0 0.0 L.Colon 3.0 50.0	Popovici 0.0 0.0 Classic 10.0 50.0 Laccoureye 2.9 50.0	T-L 0.0 0.0 T-T 0.0 0.0 L-L 5.4 100.0 L-T 3.0 50.0	I 0.0 0.0 II 4.5 100.0
Improper	Hypopharyngx 6.7 100.0 Esophagus 0.0 0.0	Stomach 0.0 0.0 Gastric tube 0.0 0.0 Jejunum 0.0 0.0 R.Colon 20.0 100.0 L.Colon 0.0 0.0	Popovici 0.0 0.0 Classic 2.9 100.0 Laccoureye 2.9 100.0	T-L 9.1 100.0 T-T 0.0 0.0 L-L 0.0 0.0 L-T 0.0 0.0	I 25.0 100.0 II 0.0 0.0
TOTAL	Hypopharyngx 100.0 31.3 Esophagus 100.0 68.8	Stomach 100.0 6.3 Gastric tube 100.0 12.5 Jejunum 100.0 2.1 R.Colon 100.0 10.4 L.Colon 100.0 68.8	Popovici 100.0 6.3 Classic 2.9 100.0 Laccoureye 100.0 72.9	T-L 100.0 22.9 T-T 100.0 6.3 L-L 100.0 77.1 L-T 100.0 68.8	I 100.0 8.3 II 100.0 91.7

resulted in an almost predictable outcome i.e. a maximum result in favour of the oesophagus. The result only confirms the desirability of an anastomosis with the oesophagus - a Very good score of ≈ 75%. This fact is easy to guess, as any eventual high anastomosis with the hypopharynx is required whenever severe injuries of the aero-digestive crossroads occur, as it is technically more difficult, and presents possible iatrogenic involvement of the neuro-motor structures taking part in swallowing mechanisms. From the obtained score a complete lack of a Very good result is observed in case of anastomoses with the hypopharynx, and a Good score presents a less than modest value- 50%. The important percentage of 12.5% for Inadequate results is also noteworthy. In relation to the type of pharyngotomy, we obtained the same result as with quality of life, Popovici type pharyngotomy proving its superiority, followed by the Laccourrey and classic type.

Regarding the distal anastomotic partner, the results vary, the jejunum and stomach achieving better results, followed by

the left colon, compared to the stomach and left colon result obtained from the quality of life questionnaire. If the stomach presents with a good predictable score, it is somewhat strange that a similar result is achieved when using the jejunum. The low number of cases in which the jejunum was used may however be a factor that can alter the statistical results. Compared to colic graft, a Very good outcome was achieved in 63.6% of cases who underwent an Orsoni type reconstruction, and 40% in those who underwent a Roith procedure. Gastric tube has disappointed in passing the test of time, with modest results of only 33%.

The type of anastomosis has also suffered changes from the Quality of Life questionnaire, meaning that it yielded better results for T-T and T-L type anastomosis (versus L-T and T-T in the previous survey).

In terms of number of anastomotic layers, the result is once again inconclusive.

Last, but not least, we must also insist on the correlation between the assessment made by the patient and that provided by the physician (many patients present a significant psychological component as well - suicide attempts, and if there are inconsistencies between the two evaluations, there will be a deterioration of the outcome). Pearson Correlation method showed a statistically significant concordance between the score given by the patient and the doctor, in other words, the results are correct, non-dissonant and confirm a correct assessment (*Table 5*).

Table 5. *Pearson Correlation - statistically significant concordance between the patient's and the doctor's score*

Correlations

		Medium score	Functional score
Medium Score	Pearson Correlation	1,000	0.717**
	Sig. (2-tailed)		0.000
	N	48	48
Functional score	Pearson Correlation	0.717**	1,000
	Sig. (2-tailed)	0.000	
	N	48	48

**. Correlation is significant at the 0.01 level (2-tailed).

Conclusions

Can we postulate an optimal model of oesophageal reconstruction and if so, what would it be?

We must choose the best possible option for the best functional outcome, namely an effective postoperative swallowing function. The best and most motivating argument for the surgeon is the long-term outcome and improved quality of life (18).

There is a definite link between functional outcome and quality of cervical anastomosis. According to our study, the most effective cervical anastomotic partner proved to be the oesophagus, so whenever we can, we will choose the latter. Unfortunately, the oesophagus is not always intact, and then we must turn our attention to the hypopharynx as the only anastomotic possibility. The disadvantages of high anastomoses are numerous, and digestive passage functionality is the more impaired as it is located higher. High graft anastomosis addresses some selected cases, in which there is no other technical possibility. Of the various types of pharyngotomies, type Z.Popovici is preferable, and in terms of anastomosis type, L-T and T-T. The most functional distal partner depending on time as criterion is disputed by the stomach and left colon, but not at all negligible, is the jejunum whenever its use represents a credible solution. The use of multilayer sutures compared with monolayer at cervical level does not bring any benefit in improving fistular risk and, implicitly, minimizing anastomosis stricture development rate of the oesophagus / hypopharynx graft.

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