ARQGA/1526

PREDICTION OF SEVERE COMPLICATONS AND DEATH IN SUPEROBESE PATIENTS UNDERGOING OPEN GASTRIC BYPASS WITH THE RECIFE SCORE

Euclides Dias **MARTINS-FILHO**[1], Leila **KATZ**[2], Melania **AMORIM**[2], Álvaro Antônio Bandeira **FERRAZ**[3] and Edmundo Machado **FERRAZ**[4]

ABSTRACT – ***Context -*** Superobese patients who undergo gastric bypass have a greater incidence of complications. The greater incidence of comorbidity in this group leads to a higher surgical risk, and a need for special care. By analyzing the risk factors identified in the preoperative period, scoring them, constructing a score and assessing the occurrence of serious complications and death, we will have elements to identify which patients are at greater risk. ***Objective -*** To determine the accuracy of the Recife Score for predicting serious postoperative complications and death in superobese patients who undergo Roux-en-Y gastric bypass surgery by the conventional method. ***Methods -*** An ambidirectional study was conducted to validate the diagnostic test on 203 severely obese patients submitted to Roux-en-Y gastric bypass at the Hospital das Clínicas of the Federal University of Pernambuco, Recife, PE, Brazil, from September 1997 to May 2007. The dependent variables were major postoperative complications and death. The independent variable was the Recife Score. The data were analyzed using the Epi-Info 3.5.1 program. The accuracy of the Recife Score was analyzed considering the following parameters: sensitivity, specificity, positive predictive value, negative predictive value, positive verisimilitude ratio and negative verisimilitude ratio. ***Results -*** The accuracy of the Recife Score with cut-off points higher than 3 and higher than 5 to predict serious postoperative complications was, respectively, a frequency of complications of 12.3%, with a risk ratio of 2.83, sensitivity of 57.1% and specificity of 69.8%, and 12.5%, with a risk ratio of 1.88, sensitivity of 7.1% and specificity of 96.3%. The accuracy of the Recife Score with cut-off points higher than 3 and higher than 5 to predict death was, respectively, a frequency of death of 7.7%, with a risk ratio of 10.62, sensitivity of 83.3% and specificity of 69.5%, and 12.5%, with a risk ratio of 4.88, sensitivity of 16.7% and specificity of 96.5%. ***Conclusion*** - A Recife Score >3 prior to conventional gastric bypass presents a high level of accuracy in the prediction of serious postoperative complications and death.

HEADINGS – Obesity, morbid. Gastroplasty. Postoperative complications. Risk factors.

INTRODUCTION

Evidence has shown an increase morbidity and mortality in both men and women with severe obesity[23]. The number of obesity-related deaths per year is estimated in 300.000 in USA[6] and 220.000 in Europe[1]. BMI is a good indicator of body mass. A BMI higher than 28 is associated with increased risk of morbidities such as cerebral vascular accident, coronary disease and diabetes, which is 3 to 4 times higher than that of the general population[21].

Formerly, around 40.000 bariatric surgeries are carried out each year in the USA[5]. In 2007, 205.000 bariatric surgeries were performed in USA[13]. High level of operative complications in obese patients has been demosntrated[19]. However, increased experience with gastric surgery for obesity has gradually reduced these risks to acceptable levels[24].

The group of superobese patients differs from other cases of obesity. A higher frequency of comorbidities is present leading to a higher surgical risk. There is also greater technical difficulty, higher rates of complications and mortality, less weight loss after Roux-en-Y gastric bypass (GYR) with short jejunal loop (feed loop of 150 cm currently being the standard for this group) and the fact that laparoscopic GYR (GYR-LAP) is technically more difficult in this population[2, 4, 8, 22]. There have been relatively few studies analyzing postoperative morbidity in superobese patients, although it has been described that complications are more frequent in these patients than in severely obese patients[10].

Study carried out at the Bariatric Surgery Unit of the General Surgery Division of the University Hospital of The Federal University of Pernambuco (UFPE), Recife, PE, Brasil.

[1] Postgraduation in Surgery, UFPE; [2] Postgraduation in Maternal-Infant Medicine, Instituto de Medicina Integral Professor Fernando Figueira; [3] Surgical Department UFPE; [4] General Surgery Division, University Hospital, UFPE, Recife, PE, Brasil.

Correspondence: Dr. Euclides Martins Filho – Rua Vitoriano Palhares, 255 – apt.1001 – Torre – 50710-190 – Recife, PE, Brasil. E-mail: euclides_martins@yahoo.com.br

The current mortality rate for bariatric surgery is less than 1%, with perioperative complication rates varying between 3% and 20%, the more severe complications occurring within the first 30 days[11]. Analyzing a database of 16.155 patients, Flum et al.[12] showed higher mortality rates for men, at 30 days, 90 days and 1 year, (3.7% vs 1.5%, 4.8% vs 2.1% and 7.5% vs 3.7%, respectively). This risk of death was particularly high in patients aged over 65.

The frequency of major complications such as anastomotic leakage and peritonitis was between 0.5% and 3.9%, and appeared to be more frequent in older patients and those with android fat distribution[3, 16]. In the studied carried out at the University Hospital of the Federal University of Pernambuco, Recife, PE, Brazil (HC-UFPE), the rate of major postoperative complications was 9.7%[15].

Some studies associate certain risk factors, identified prior to surgery, with an increased incidence of postoperative complications and death following gastric bypass in severely obese and superobese patients. Research has shown that advanced age, weight and BMI constitute risk factors in the male population submitted to bariatric surgery ($P<0.01$). Even after logistical regression analysis, a high risk of complications is found among older patients, those with a higher BMI and males ($P<0.01$)[17].

Recent evidence indicates that male sex, among severe obese patients is associated with greater weight and height, higher rates of fasting glycemia, glycosylated hemoglobin and triglycerides, and low HDL cholesterol levels. Also, frequency of cardiac disease is 10 times higher, and that of sleep apnea, 2 times higher in men, which may contribute to a higher incidence of postoperative complications[20].

In another study of the risk factors associated with postoperative complications in obese patients submitted to gastric bypass, age >50 years and male sex were identified. On the other hand, the factors associated with a higher risk of major complications and repeat operations were age over 50 years and the surgeon's experience, the latter also being associated with prolonged hospital stay[18].

Preoperative risk factors were also evaluated for patients about to undergo GYR. It was observed that men were taller and wider, as well as presenting a higher frequency of comorbidities, with a higher incidence of hypertension, diabetes and sleep apnea. Anastomotic leakage occurred in 1.4% of the patients, and was more common in men. Carrying out a logistic regression analysis with a model which included 10 risk factors, it was detected that main factors associated with postoperative morbidity were male sex and a high BMI, while the main factor associated with mortality was age over 55 years. In this same study, an association was observed between the presence of complications and a mean BMI of 55 kg/m[14].

Analyzing risk factors associated with morbidity and mortality in superobese patients, our group demonstrated that the main factors associated with the presence of minor complications were BMI over 55 and the presence of diabetes and sleep apnea, while factors associated with major complications and death were BMI over 55 and presence of cardiopathy and coronary disease. Following the multivariate analysis, the only factor that remained significantly associated with death was BMI over 55[15].

The high surgical risk arising from the higher incidence of co-morbidities in the superobese group leads to a need for special care. Concerned about this additional risk, Ferraz et al.[10] compared the comorbidities and postoperative complications of superobese patients with those of severely obese patients who underwent the operation, showing that the frequency of these is higher in the first group, and elaborating the Recife Score. Through a grading system (Figure 1), this score quantifies, in the preoperative period, the likelihood of major complications and death (Figure 2).

Risk factors	Score
Age ≥ 40 years	1
Time of morbid obesity ≥ 5 years	1
BMI ≥ 60 kg/m^2	1
Sleep apnea	1
Diabetes	1
Dislipidemia	1
Coronary disease	1
Lung disease	1
Yhree co-morbidities not included	1
ASA 3 and 4*	1

* Classification of the American Society of Anesthesiology (ASA)

FIGURE 1. Score for the risk factors

Score	Mortality
0	<1%
1 - 3	1% - 4%
4 - 5	5% - 9%
>6	10% - 15%

FIGURE 2. Mortality risk according to Recife Score

One point is given for the presence of each one of the conditions above.

All points are summed and the final score is then associated with a certain risk of death (Figure 2).

Given that the elaboration of this score is based on a retrospective analysis of patients operated on between 1997 and 2002, some discrepancies emerge when compared with the study carried out by Martins et al.[15], in which the sole factor that was consistently associated with death was body mass index >55 kg/m^2. We believe its validation is important, thus, the objective of the present study is to determine the accuracy of the Recife Score for predicting severe postoperative complications and death in superobese patients who undergo gastric bypass by the conventional method.

METHODS

Two hundred three superobese patients submitted to GYR between 1997 and 2007 were evaluated. We carried

out a retrospective and prospective cohort study to validate this diagnostic test, accompanying these patients from the preoperative period, until day 30 postoperative.

The sample size was calculated using the program STATCALC of Epi-Info 6.04d. Inclusion criteria were being a superobese patient; undergoing GYR-LAP at the HC-UFPE. Patients with age under 16 and over 65 years, pregnancy, obesity resulting from psychiatric or endocrine disorders and associated diseases that determine a higher than expected surgical risk, such as hepatic cirrhosis and severe respiratory disease were excluded. All patients were followed up from this moment, during the surgery, and until day 30 postoperative.

The Recife Score was used as an independent variable. The dependant variables were: severe postoperative complications, and death. Major complications were defined as the presence of the following: peritonitis, abdominal abscess, anastomotic leakage, evisceration, acute gastric distension, pulmonary embolism, acute myocardial infarction or carrying out relaparotomy, recorded up until day 30 postoperative. Death was defined as: death of the patient in the postoperative period, due to causes directly or indirectly related to the surgical procedure, recorded up to day 30 postoperative.

All the patients were interviewed prior to surgery and were submitted to a complete clinical and laboratory evaluation, determining the Recife Score. Patients with *H. pylori* were previously treated with antibiotics and pump blocker. The patients were also submitted to a cardiac and respiratory evaluation of the surgical risk. Endocrine, psychological/psychiatric follow-up and preoperative nutrition were necessary for the surgical indication. Antibiotic prophylaxis was carried out with ceftriaxone 2 g or ertapenen 1 g IV in the anesthetic induction. Prophylaxis for thromboembolic disease was carried out with heparin (Liquemine®) at a dose of 0.25 mL subcutaneously in the anesthetic induction, after every 8 hours, or Clexane® 40 mg SQ in the anesthetic induction and once a day until the patient was discharged from hospital.

All patients underwent Fobi-Capella GYR. The gastric chamber was prepared using a linear stapler. Silastic ring was not used. The Roux-en-Y was prepared with a section of jejunum approximately 30 cm below the Treitz angle, and the feeding loop was prepared at 150 cm, also with reinforcement of the staple line.

After surgery, the patients remained in the ICU for 12h. Respiratory physiotherapy was given twice a day, and the patient was encouraged to walk soon after the operation, as part of the postoperative routine. Diet was initiated around second postoperative day and discharge, in general, was scheduled for the 3rd or 4th postoperative day. The postoperative follow-up took place in the outpatient clinic on the 15th postoperative day, when surgical stitches were removed, and on the 30th postoperative day. Any complaints and symptoms were recorded, as well as the patient's weight at each visit.

The data was analyzed using Epi-Info 3.5.1 software. Initially, frequency distribution tables were constructed for the description of the sample characteristics, considering the categorical variables. For the numerical variables, measurements of central trends and dispersion were calculated. The analysis of accuracy of the Recife Score included the following parameters: sensitivity, specificity, negative predictive value, positive verisimilitude ratio and negative verisimilitude ratio. The chi-squared test of association was used to determine significant differences between the groups, adopting a level of significance of 5%. Receptive operator characteristic (ROC) curves were used to describe and compare the performance of a technology or diagnostic algorithm.

All the patients were fully informed of the objectives and relevance of this study, and were only included if they agreed to take part, by signing an Informed Consent.

RESULTS

Mean age was 39.1 years, with 46.8% of the patients aged 40 or over. Males represented 51.7% of the sample. The mean weight was 158 kg. The average BMI was 56.3 kg/m^2, with 19.7% of the population presenting a BMI >60 kg/m^2. In relation to comorbidities, 71.9% of the patients had systemic arterial hypertension (SAH), 25.1% had diabetes and 15.3% had hypercholesterolemia. Other comorbidities were present in 39.3% of the sample (Table 1).

TABLE 1. Characteristics of the 203 superobese patients who underwent conventional Fobi-Capella surgery at the HC-UFPE, according to Recife Score (2005-2007)

Characteristic		%
Age		
Variation	16–68	
$\bar{x}$ ± DP	39.1 ± 12.03	
<40 years	108	53.2
≥40 years	95	46.8
Sex		
Male	105	51.7
Female	98	48.3
Weight (kg)		
Variation	110–268	
$\bar{x}$ ± DP	158 ± 26.7	
BMI		
Variation	50.0–89.3	
$\bar{x}$ ± DP	56.3 ± 6.7	
<60	163	80.3
≥60	40	19.7
Presence of co-morbidities		
Diabetes	51	25.1
Systemic arterial hypertension	146	71.9
Hypercholesterolemia	31	15.3
Other co-morbidities	79	39.3

Source: HC-UFPE

Analyzing the frequency distribution of the superobese patients who underwent surgery, according to the Recife Score, 68% (138 patients) scored between 1 and 3, 28.1% (57 patients) scored 4 or 5, and only 8 patients (3.9%) scored 6 or more (Table 2).

TABLE 2. Frequency distribution of the superobese patients who underwent conventional Fobi-Capella surgery in the HC-UFPE, according to the Recife Score (2005-2007)

Recife Score	n	%
1–3	138	68.0
4–5	57	28.1
≥6	8	3.9
Total	203	100.0

Variation: 1 – 10
Median: 2
Source: HC-UFPE

In relation to the frequency of postoperative complications, we identified that minor complications were present in 58 patients (28.6%), seroma was the most common (18.7%). Major complications occurred in 14 patients (6.9%) and 6 patients died (3%) (Table 3).

TABLE 3. Frequency distribution of postoperative complications in superobese patients who underwent conventional Fobi-Capella in the HC-UFPE

Complications*	n	%
Minor		
Seroma	38	18.7
Surface infection of the surgery site	10	4.9
Atelectasia	7	3.4
Incisional hernia	4	2.0
Respiratory infection	2	1.0
Lower digestive hemorrhage	1	0.5
Pleural effusion	1	0.5
Urinary infection	1	0.5
Deep vein thrombosis	1	0.5
Hypertensive Crisis	1	0.5
Dysphagia	1	0.5
Any minor complication	58	28.6
Severe		
Evisceration	3	1.5
Acute gastric distension	3	1.5
Peritonitis	3	1.5
Pulmonary embolism	2	1.0
Fistula	2	1.0
Subphrenic abscess	2	1.0
Acute myocardial infarction	1	0.5
Any major complication	14	6.9
Any complication (minor or major)	70	30.4
Death	6	3.0

*Each patient may have more than one complication
Source: HC-UFPE

In the evaluation of accuracy of the Recife Score with a cut-off point of 3 or more for prediction of severe postoperative complications, we found a frequency of complications, after this cut-off point, of 12.3%, with a risk ratio of 2.83 (IC 95% = 1.02–7.82), sensitivity of 57.1% and specificity of 69.8% (Table 4).

TABLE 4. Accuracy of the Recife Score (cut-off point >3) for prediction of severe postoperative complications in superobese patients submitted to conventional Fobi-Capella surgery in the HC-UFPE, according to the Recife Score (2005-2007)

Recife Score	Major postoperative complications				RR	IC 95%
	Present		Absent			
	n	%	n	%		
>3	8	12.3	57	87.7	2.83	1.02–7.82
1–3	6	4.3	132	95.7	1.00	

P= 0.04 (Fisher's exact test Sensitivity = 57.1% Specificity = 69.8% Positive predictive value = 12.3% Negative predictive value = 95.7% Positive verisimilitude ratio = 1.9 Negative verisimilitude ratio = 0.6

When a cut-off point for the Recife Score of 5 or more is considered for the prediction of severe postoperative complications, these were found in 12.3% of the patients who reached this score, with a risk ratio of 1.88 (IC 95% = 0.28–12.62), sensitivity of 7.1% and specificity of 96.3% (Table 5).

TABLE 5. Accuracy of the Recife Score (cut-off point >5) for predicting severe postoperative complications in superobese patients who underwent conventional Fobi-Capella surgery at the HC-UFPE, according to the Recife Score (2005-2007)

Recife Score	Major postoperative complications				RR	IC 95%
	Present		Absent			
	n	%	n	%		
>5	1	12.5	7	87.5	1.88	0.28–12.62
1–5	13	6.7	182	93.3	1.00	

P= 0.44 (Fisher's exact test Sensitivity = 7.1% Specificity = 96.3% Positive predictive value = 12.5% Negative predictive value = 93.3% Positive verisimilitude ratio = 1.93 Negative verisimilitude ratio = 0.96

In the evaluation of accuracy of the Recife Score with a cut-off point of 3 ore more for prediction death, a frequency of death of 7.7% was observed for patients with this score, with a risk ratio of 10.62 (IC 95% = 1.27–88.04), sensitivity of 83.3% and specificity of 69.5% (Table 6).

TABLE 6. Accuracy of the Recife Score (cut-off point >3) for predicting postoperative death in superobese patients who underwent conventional Fobi-Capella surgery at the HC-UFPE, according to the Recife Score (2005-2007)

Recife Score	Postoperative death				RR	IC 95%
	Yes		No			
	n	%	n	%		
>3	5	7.7	60	92.3	10.62	1.27–88.04
1–3	1	0.7	137	99.3	1.00	

P= 0.01 (Fisher's exact test) Sensitivity = 83.3% Specificity = 69.5% Positive predictive value = 7.7% Negative predictive value = 99.3% Positive verisimilitude ratio = 2.74 Negative verisimilitude ratio = 0.24

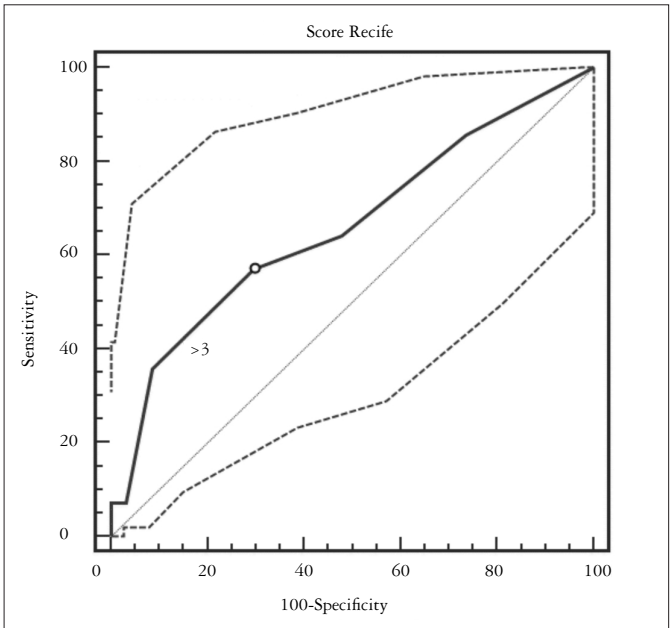
Evaluating the cut-off point of the Recife Score 5 or more for prediction of death, a frequency of death of 12.5% was seen for patients with this score, resulting in a risk ratio of 4.88 (IC 95% = 0.64–37.02), sensitivity of 16.7% and specificity of 96.5% (Table 7).

TABLE 7. Accuracy of the Recife Score (cut-off point >5) for prediction of postoperative death in superobese patients who underwent conventional Fobi-Capella surgery in the HC-UFPE, according to the Recife Score (2005-2007)

Recife Score	Postoperative death				RR	IC 95%
	Yes		No			
	n	%	n	%		
>5	1	12.5	7	87.5	4.88	0.64–37.02
1–5	5	2.6	190	97.4	1.00	

P= 0.22 (Fisher's exact test) Sensitivity = 16.7% Specificity = 96.5% Positive predictive value = 12.5% Negative predictive value = 97.4% Positive verisimilitude ratio = 4.7 Negative verisimilitude ratio = 0.86

ROC curves were constructed to evaluate the accuracy of the Recife Score for predicting major postoperative complications and death. For prediction of major postoperative complications (Figure 3), an area was observed under the curve of 65.8% (49.4%-82.1%), and the best cut-off point of the score (the point at which the curve deviates to the right) was greater than 3.

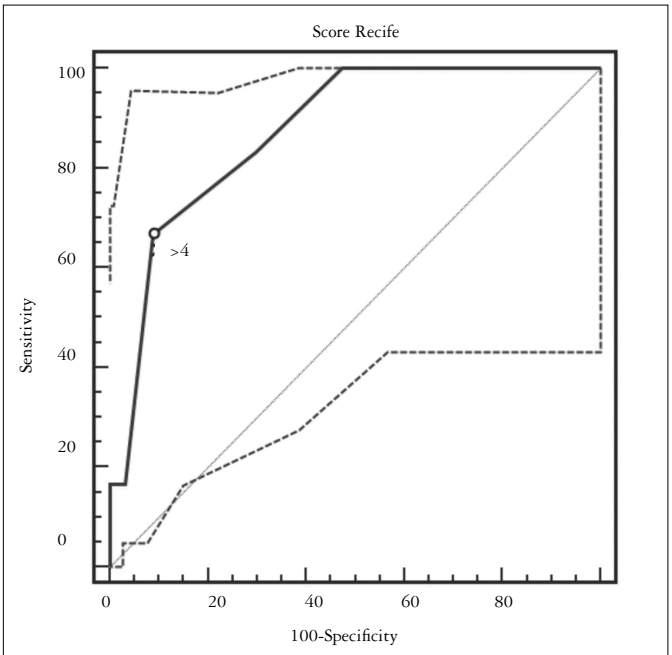


Area	Standard deviation	*P*	IC 95%
0.658	0.083	0.049	0.494 – 0.821

Area under the curve for the Recife Score in relation to postoperative complications:

FIGURE 3. ROC curve: Recife Score vs major postoperative complications in superobese patients who underwent conventional Fobi-Capella surgery at the HC-UFPE

For the prediction of death (Figure 4), an area was observed under the curve of 87% (75.7%-98.3%), and the best cut-off point of the score (the point at which the curve deviates to the right) was higher than 4.



Area	Standard deviation	*P*	IC 95%
0.870	0.058	0.002	0.757 – 0.983

Area under the curve for the Recife Score in relation to death:

FIGURE 4. ROC curve: Recife Score vs death in superobese patients submitted to conventional Fobi-Capella surgery at the HC-UFPE

DISCUSSION

Treating obesity is not an easy task. A good knowledge of physiology and its disorders is required, as well as an appropriate structure and multidisciplinary team for follow-up of these patients. Various publications, produced by various specialized centers worldwide, have demonstrated good results of bariatric surgical treatment; however few analyze the risks objectively, presenting their predictive value, especially for factors that can increase the chances of major complications and death – events which are not rare, particularly in the subgroup of superobese patients.

Ferraz et al.[10], in 2002, compared the comorbidities and postoperative complications of superobese patients with those of severely obese patients who underwent surgery, demonstrating that the frequency of these complications is higher in the first group, and elaborating the Recife Score. Through a grading system, this score quantifies, in the preoperative period, the chances of occurrence of major complications and death. Into the Recife Score, we find that 68% (138 patients) scored 1 to 3, 28.1% (57 patients) scored 4 or 5 and just 8 patients

(3.9%) scored 6 or more. We therefore observe that most of the casuistic scored up to 3 in the Recife Score.

For this reason, our group considered it relevant to evaluate these patients adequately, particularly those with a higher risk of death. By analyzing the risk factors identified preoperative, scoring them, constructing a score and evaluating the occurrence of major complications and death; we will have elements to identify which patients are at higher risk, which requires evaluating the accuracy of the test, in order to use it appropriately.

Another study in 2004, analyzed more than 2,000 patients, 884 of whom were superobese, who underwent GYR. After analysis, anastomotic leakage, pulmonary embolism, preoperative weight and hypertension were identified as risk factors associated with perioperative death. Surgical indication was maintained in this group, for the superobese patients; these represented a high risk of death even without surgery, even at an early age, due to excess weight and comorbidities[9].

Although the incidence of complications in the superobese group was similar, in some series, to that of the morbid obese group, the first group presented higher mortality, as the complications are generally fatal. Zhang et al.[25] carried out a major prospective study involving 77 surgeons and 18,972 procedures, in which they found an overall mortality rate of 3.45%. After an 8.3 year follow-up period, they concluded that the predictive factors of survival are: age, sex, BMI, smoking, diabetes and SAH. Patients who were younger, female, non-smokers, without diabetes or SAH, and with low BMI, presented a longer survival. The results of this study strengthen the theory that some factors and comorbidities influence perioperative mortality, i.e. up to 30 days, but also influence later mortality, 1 year after the procedure.

In a recent study, Martins et al.[15] analyze the risk factors associated with morbidity and mortality in superobese patients, demonstrating that the main factors associated with the presence of minor complications were BMI over 55, the presence of diabetes and sleep apnea, while the factors associated with major complications and death were BMI over 55 the presence of cardiac and coronary disease. After the multivariate analysis, the only factor that remained significantly associated with death was BMI over 55.

In a recent publication, DeMaria et al.[7] carried out a multicentre study to validate a predictive score for morbidity and mortality, including five risk factors: IMC>50 kg/m^2, male sex, hypertension, risk factors for pulmonary embolism and age >45 years. Four thousand and four hundred thirty-one patients were analyzed and classified as A, B or C. The patients who were classified as Class C (4 or 5 risk factors) presented mortality 12 times higher than the group of Class A (0 or 1 risk factor), with values of 0.2% and 2.4% for Classes A and C, respectively. This study is of value due to the large number of patients. On the other hand, only a small number of risk factors were studied, without including factors that have already been traditionally published as responsible for the increase in surgical morbidity and mortality.

Evaluating the accuracy of the Recife Score with cut-off points >3 and >5; for predicting major postoperative complications, we find, respectively, a frequency of complications of 12.3%, with a risk ratio of 2.83 (IC 95% = 1.02–7.82), sensitivity of 57.1% and specificity of 69.8%, and 12.5%, with a risk ratio of 1.88 (IC 95% = 0.28–12.62), sensitivity of 7.1% and specificity of 96.3%. Evaluating the accuracy of the Recife Score with a cut-off point >3 and >5 for predicting death, we see, respectively, a frequency of death of 7.7%, with a risk ratio of 10.62 (IC 95% = 1.27–88.04), sensitivity of 83.3% and specificity of 69.5%, and 12.5%, with a risk ratio of 4.88 (IC 95% = 0.64–37.02), sensitivity of 16.7% and specificity of 96.5%.

In our study we carried out the validation of the Recife Score with prediction of surgical morbidity and mortality for superobese patients who underwent conventional gastric bypass. Although our sample size is relatively small, we are evaluating only superobese patients, i.e. the group which really represents the population at highest risk for complications and death in the postoperative period.

We can therefore infer that the Recife Score is a good predictive score of morbidity and death, for superobese patients submitted to GYR by the conventional method. If the patient has a score of 3 or more, with increased risk, he/she should be evaluated with care in the preoperative period, and should attempt weigh loss methods before the surgical indication. We constructed ROC curves to better evaluate the accuracy of the Recife Score prediction of major postoperative complications and death. To predict the major postoperative complication, and area under the curve was observed, of 65.8% (49.4%-82.1%), and the best cut-off point of the score (the point where the curve deviates to the right) was 3 or more. For the prediction of death, an area under the curve was observed of 87% (75.7%-98.3%), and the best cut-off point of the score (the point where the curve deviates to the right) was 4 or more.

The significance of the risk factors was again reestablished, and correlated with the risk of morbidity and mortality in superobese patients, enabling discussion of strategies for preoperative reduction of risk factors and the possible limit of the criteria for surgical indication in this group of patients. Other studies should be carried out, in an attempt to analyze the impact of reducing or controlling these risk factors in superobese patients wishing to undergo gastric bypass.

Superobese patients who present a Recife Score of 3 or more prior to conventional gastric bypass present high accuracy for prediction of severe postoperative complications, and those superobese patients with a Recife Score of 4 or more prior to gastric bypass by conventional means present high accuracy for a prediction postoperative death.

Martins-Filho E, Katz L, Amorim M, Ferraz AAB, Ferraz EM. Previsão de complicações graves e de morte em pacientes superobesos submetidos a gastroplastia em Y-de-Roux com utilização do Escore do Recife. Arq Gastroenterol. 2011;48(1):8-14

RESUMO – ***Contexto*** **-** Pacientes superobesos submetidos a gastroplastia apresentam maior incidência de complicações. Alto risco cirúrgico decorre da maior incidência de comorbidades nesse grupo, levando à necessidade de cuidados especiais. Analisando os fatores de risco identificados no pré-operatório, pontuando-os, construindo um escore e avaliando a ocorrência de complicações graves e óbito, serão fornecidos elementos para identificar quais os pacientes de maior risco. ***Objetivo*** **-** Determinar a precisão do Escore de Recife para predição de complicações pós-operatórias graves e óbito em pacientes superobesos submetidos a cirurgia de derivação gástrica em Y-de-Roux por via convencional. ***Métodos*** **-** Estudo ambidirecional foi realizado para validação de teste diagnóstico em 203 pacientes superobesos submetidos a derivação gástrica em Y-de-Roux no Hospital das Clínicas da Universidade Federal de Pernambuco, Recife, PE, no período de setembro de 1997 a maio de 2007. As variáveis dependentes foram as complicações pós-operatórias graves e o óbito. A variável independente foi o Escore de Recife. A análise dos dados foi realizada utilizando-se o programa Epi-Info 3.5.1. A análise de precisão do Escore de Recife contemplou os seguintes parâmetros: sensibilidade, especificidade, valor preditivo positivo, valor preditivo negativo, razão de verossimilhança positiva e razão de verossimilhança negativa. ***Resultados*** **-** A precisão do Escore de Recife com pontos de corte maior que 3 e maior que 5 para predição de complicações pós-operatórias graves foi, respectivamente, frequência de complicações de 12,3%, com razão de risco de 2,83, sensibilidade de 57,1% e especificidade de 69,8%, e de 12,5%, com razão de risco de 1,88, sensibilidade de 7,1% e especificidade de 96,3%. A precisão do Escore de Recife com ponto de corte maior que 3 e maior que 5 para predição de óbito foi, respectivamente, frequência de óbito de 7,7%, com razão de risco de 10,62, sensibilidade de 83,3% e especificidade de 69,5%, e de 12,5%, com razão de risco de 4,88, sensibilidade de 16,7% e especificidade de 96,5%. ***Conclusão*** **-** A pontuação >3 no Escore do Recife no pré-operatório de gastroplastia por via convencional apresenta elevada precisão para predição de complicação pós-operatória grave e óbito.

DESCRITORES – Obesidade mórbida. Gastroplastia. Complicações pós-operatórias. Fatores de risco.

REFERENCES

1. Allison DB, Fontaine KR, Manson JE, Stevens J, Vanitallie TB. Annual deaths attributable to obesity in the United States. JAMA. 1999;282:1530-8.
2. Brolin RE, Kenler HA, Gorman JH, Cody RP. Long-limb gastric bypass in the superobese. A prospective randomized study. Ann Surg. 1992;215:387-95.
3. Capella JF, Capella RF. An assessment of vertical banded gastroplasty-Roux-en-Y gastric bypass for the treatment of morbid obesity. Am J Surg. 2002;183:117-23.
4. Ciovica R, Takata M, Vittinghoff E, Lin F, Posselt AM, Rabl C, Stein HJ, Campos GM. The impact of roux limb length on weight loss after gastric bypass. Obes Surg. 2007;18:5-10.
5. Cowan GS Jr, Buffington CK. Significant changes in blood pressure, glucose and lipids with gastric bypass surgery. World J Surg. 1998;22:987-92.
6. Deitel M. Overweight and obesity worldwide now estimated to involve 1.7 billion people. Obes Surg. 2003;13:329-30.
7. Demaria EJ, Murr M, Byrne TK, Blackstone R, Grant JP, Budak A, Wolfe L. Validation of the obesity surgery mortality risk in patients undergoing gastric bypass for morbid obesity. Ann Surg. 2007;246:583-4.
8. Dresel A, Kuhn JA, Mccarty TM. Laparoscopic Roux-en-Y gastric bypass in morbidly obese and super morbidly obese patients. Am J Surg. 2004;187;230-2.
9. Fernandez AZ Jr, Demaria EJ, Tichansky DS, Kellum JM, Wolfe LG, Meador J, Sugerman HJ. Multivariate analysis of risk factors for death following gastric bypass for treatment of morbid obesity. Ann Surg. 2004;239:698-703.
10. Ferraz EM, Arruda PCL, Ferraz AAB, Bacelar TS, Albuquerque AC. Severe obese patients have a low incidence of operative mortality? The Recife Score: a new morbidity and mortality grading scale. A preliminary report. In: VII World Congress of Bariatric Surgery. 2002.
11. Fisher BL, Schauer P. Medical and surgical options in the treatment of severe obesity. Am J Surg. 2002;184:9s-16s.
12. Flum DR, Salem L, Elrod JA, Dellinger EP, Cheadle A, Chan L. Early mortality among medicare beneficiaries undergoing bariatric surgical procedures. JAMA. 2005;294:1903-8.
13. Grady D. Diabetes study favors surgery to treat obese. New York Times. 2008 Jan 23. Available from: http://www.nytimes.com/2008/01/23/health/research/23diabetes.html
14. Livingston EH, Huerta S, Arthur D, Lee S, De Shields S, Heber D. Male gender is a predictor of morbidity and age a predictor of mortality for patients undergoing gastric bypass surgery. Ann Surg. 2002;236:576-82.
15. Martins-Filho ED, Câmara-Neto JB, Ferraz AA, Amorim M, Ferraz EM. Evaluation of risk factors in superobese patients submitted to conventional Fobi-Capella Surgery. Arq Gastroenterol. 2008;45:3-10.
16. Mason EE, Priten KJ Barron P, Lewis JW, Kealey GP, Blommers TJ. Risk reduction in gastric operations for obesity. Ann Surg. 1979;190:158-65.
17. Mason EE, Renquist KE, Jiang D. Perioperative risks and safety of surgery for severe obesity. Am J Clin Nutr. 1992;55:573s-6s.
18. Nguyen NT, Rivers R, Wolfe BM. Factors associated with operative outcomes in laparoscopic gastric bypass. J Am Coll Surg. 2003;197:548-55.
19. Pasulka PS, Bistrian BR, Benotti PN, Blackburn GL. The risks of surgery in obese patients. Ann Intern Med. 1986;104:540-6.
20. Residori L, García-Lorda P, Flancbaum L, Pi-Sunyer FX, Laferrère B. Prevalence of co-morbidities in obese patients before bariatric surgery: effect of race. Obes Surg. 2003;13:333-40.
21. Rosenbaum M, Leibel RL, Hirsch J. Obesity. N Engl J Med. 1997;337:396-405.
22. See C, Carter PL, Elliott D, Mullenix P, Eggebroten W, Porter C, Watts D. An institutional experience with laparoscopic gastric bypass complications seen in the first year compared with open gastric bypass complications during the same period. Am J Surg. 2002;183:533-8.
23. Sjöström LV. Morbidity of severely obese subjects. Am J Clin Nutr. 1992;55:508-15.
24. Yale CE. Gastric surgery for morbid obesity. Complications and long-term weight control. Arch Surg. 1989;124:941-6.
25. Zhang W, Mason EE, Renquist KE, Zimmerman MB. Factors influencing survival following surgical treatment of obesity. Obes Surg. 2005;15:43-50.

Received 31/7/2009.
Accepted 12/8/2010.