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Maria Francisca Monteiro da Costa

Quality of Recovery after anesthesia

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FMUP FACULDADE DE MEDICINA UNIVERSIDADE DO PORTO
UNIDADE CURRICULAR
PROJETO DE OPÇÃO
DISSERTAÇÃO / MONOGRAFIA

Projeto de Opção do 6º ano - DECLARAÇÃO DE INTEGRIDADE

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Faculdade de Medicina da Universidade do Porto, 20/03/2013

Assinatura: Maria Francisca Monteiro Costa

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Projeto de Opção do 6º ano – DECLARAÇÃO DE REPRODUÇÃO

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Faculdade de Medicina da Universidade do Porto, 20/03/2013

Assinatura: Maria Francisca Monteiro Costa

Quality of Recovery after anesthesia

Study design: Prospective observational study

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Quality of Recovery after anesthesia

Background: The Quality of Recovery 40 (Qor-40) has been shown to measure health status after surgery. The aim of our study was to evaluate the incidence of Poor Quality of Recovery (PQR) in the PACU (Post Anesthesia Care Unit) and to compare their QoR scores before surgery, 24 hours after surgery and 3 months later.

Methods: Observational prospective study approved by the institutional ethics committee, written informed consent was obtained. Adult Portuguese-speaking patients submitted to elective non-cardiac and non-neurological surgery were eligible to the study. Demographics data and perioperative variables were recorded. The validated Portuguese version of the QoR-40 was used to measure health status before surgery (T0), 24h after anesthesia (T1) and 3 months after surgery (T2). PQR was defined for patients with QoR-40 score lower to the mean QoR40 score at T1 minus 1 standard deviation. Descriptive analyses were used to summarize data. Non-parametric tests were performed for comparisons.

Results: Mean QoR-40 score was 169 and PQR patients were identified if their QoR-40 score was lesser than 142. PQR occurred in 26 patients (24%). Global median scores for PQR patients were lower at T0 (121 vs. 184, $p<0.001$), at T1 (120 vs. 177, $p<0.001$) and at T2 (119 vs. 189, $p<0.001$). At T1 PQR patients showed lower median scores for emotional state, physical comfort and pain.

Discussion: Patients with PQR measured 24 hours after surgery have lower QoR scores prior to surgery, which suggests that these patients might be identified before surgery using QoR-40. Patients with PQR 24 hours after surgery have lower QoR-40 scores 3 months later, which indicates lower quality of life. This may allow earlier and more effective interventions in order to improve recovery of patients undergoing surgery.

Keywords: anesthesia, quality of recovery, quality of life, QoR-40

Introduction

Post-operative recovery is a key outcome in the perspective of anesthesiologists. It is defined as the patients return to the normal state after a surgery, and has traditionally been referred in terms of pain scores, duration of hospital stay, and return to normal activities [1]. It involves several factors such as regain of physical, physiologic and social functions. It is therefore fundamental for the evaluation of health care and patient satisfaction after surgery [2].

Regarding outcomes, what concerned more the health professionals were the mortality and complication rates. Since these parameters have improved, as a result of surgical techniques enhancement, patient's quality of life (QOL) is now more than ever a central aspect [3-5]. Although satisfaction cannot be considered as an objective indicator of the quality of anesthesia care, it remains the best way to assess the outcome from the point of view of the patient [6]. Patient satisfaction was illustrated as the most clinically relevant measure of outcome [7] and also became a fundamental step in processes of hospital accreditation [8]. Therefore it's vital to estimate patients' quality of recovery (QoR) from their perspective, what might be said to be connected with the perception of their own QOL.

Quality of life is defined by the World Health Organization as the individual perception of one's position in life, in the context of his culture, objectives, expectations and worries [9]. The complexity and subjectivity of this concept makes it difficult to evaluate and even more difficult to measure appropriately [10]. So the question arises: how can we define and assess changes in the QOL after surgery?

A valid and reliable measure of quality of recovery after anesthesia and surgery, the QoR-40 was developed by Myles et al. [11]. It is a 40-item questionnaire with five main dimensions: emotional state, physical comfort, physiological support, physical independence and pain. It showed especially superior content validity and construct validity, when compared to other pre-existing questionnaires, and did not reveal any negative ratings [1]. This questionnaire was specifically designed to measure a patient's health status after surgery and anesthesia and has been proposed as a measure of outcome in clinical trials [11]. It has been demonstrated a significant

correlation of the Qor-40 sores with the SF-36 questionnaire (an extensive validated measure of quality of life and with clinical utility in a broad range of clinical settings) [12-14] [20]. A poor score on Qor-40 is associated with a poor score on the SF-36. This supports the belief that a poor quality of recovery (PQR) can predict a poor quality of life after surgery. [12] Hence, Qor-40 might be used as a predictive index to identify patients whose health status is about to change.

If it was possible to foresee a PQR, a more effective support strategies could be proposed for these patients during their hospital stay [12]. Furthermore, a poor quality of recovery was associated with a prolonged duration of stay in the hospital, readmission and post-operative complications indicating not only patient discomfort but also consumption of economic resources. [14]

The aim of our study was to evaluate the incidence of Poor Quality of Recovery (PQR) in the PACU (Post Anesthesia Care Unit) and to compare their QoR scores before surgery, 24 hours after surgery and 3 months later.

Methods

The study was conducted in the in the Post Anesthesia Care Unit (PACU), of Centro Hospitalar São João (CHSJ), Porto, Portugal. Ethical approval (Ethical n. º 127/2012) was provided by the Ethical committee of CHSJ (Comissão de Ética para a Saúde do Hospital de São João – Chairperson Prof Filipe N.A.S. Almeida). Written informed consent was obtained from all patients.

Centro Hospitalar de São João is an 1124-bed tertiary hospital in a major metropolitan area that serves 3,000,000 people. This prospective study was conducted in the 12-bed PACU over a 4-week period from Monday through Thursday (from 18 June to 12 July 2012).

Every patient admitted to the PACU, during this period of time, who was able to provide written informed consent was included in the study. Exclusion criteria were patient refusal, incapacity of providing informed consent, a score of <25 in the mini-mental state examination test (MMSE), age under 18 years, foreign nationality, known neuromuscular disease, urgent/emergent surgery and cardiac surgery, neurosurgery or other procedures that required therapeutic hypothermia.

A total of 221 patients were enrolled in the study. Baseline demographic data were collected for descriptive purposes.

All patients were interviewed in the eve. It was then conducted a small consultation to obtain consent to perform MMSE test and to collect the medical history.

The validated QoR-40 Portuguese version was used to measure health status before surgery (T0), 24h after surgery (T1) and 3 months after surgery (T2). QoR-40 is a 40-item questionnaire, developed for the purpose of measuring quality of recovery following anesthesia and surgery. It contains five sub-scales: physical comfort, emotional state, patient support, physical independence, and pain. Each item is rated on a scale of 1 to 5, providing a minimum score of 40 and maximum of 200. It was developed to measure early postoperative health status [12].

The questionnaire was completed with direct assistance from one of the investigators. The investigator asked the patient to rate each of the items on the QoR-40 by reading each item, asking the patient to provide a rating and then proceeding on to the next

item until all 40 items had been addressed. Completed questionnaire data were coded and entered into a database. After discharged from the hospital patients were contacted by telephone for the 3 months follow up and repeated de Qor-40 using the same method.

Poor quality of recovery (PQR) was defined for patients with a QoR-40 score lower to the mean QoR score at T1 minus 1 standard deviation.

The anesthesiologist in charge was blinded to patient involvement in the study. Conduct of anesthesia, including the choice of type of anesthesia or whether to use or not a muscle relaxant (and what type) was at the discretion of the anesthesiologist.

Anesthesia was provided and monitored according to the criteria of the anesthesiologist in charge, but this conduct followed minimum departmental standards. Neuromuscular blocking drugs (NMBD) were used for tracheal intubation, and additional boluses were provided, if needed. No written policy exists concerning the use of neuromuscular monitoring so this was performed at the discretion of the anesthesiologist. To ensure that the anesthesiologist remained blinded to the patients' participation in the study, we did not attempt to observe the use or interpretation of TOF (Train Of Four) intraoperatively. The anesthesiologist was free to decide whether to reverse the neuromuscular blockade (NMB) with neostigmine at the conclusion of the surgical procedure.

Usually, the patient was extubated in the operating room and transferred to the PACU. Criteria for extubation included sustained head lift or hand grip for more than 5 seconds, the ability to follow simple commands, a stable ventilatory pattern with an acceptable arterial oxygen saturation (SpO2) > 95%, and a TOF ratio of greater than 0.80. All subjects were administered 100% oxygen by a facemask after tracheal extubation. The anesthesiologist was free to decide whether to administer oxygen during the time between transfer to the cart and admission to the PACU.

Upon arrival to the PACU oxygen was provided to all subjects by either a nasal cannula or facemask.

Temperature and Visual Analogic Scale (VAS) for pain were evaluated at PACU admission.

A standardized data collection sheet was completed for each patient.

The recorded patients characteristics were: age, gender, weight, height, BMI, benzodiazepines administration before surgery, chronic benzodiazepines use, site of surgery (intra-abdominal, musculoskeletal, head and neck), American Society of Anesthesiologists physical status (ASA-PS), Revised Cardiac Risk Index (RCRI), duration of preoperative fluid fasting, type of anesthesia, duration of surgery, length of stay (LOS) in the PACU.

The magnitude of the surgical procedure was classified as major (surgery in which body cavities or major vessels are exposed to ambient temperature such as major abdominal, thoracic, or major vascular, thoracic spine surgery with instrumentation, or hip arthroplasty), medium (surgery in which body cavities are exposed to a lesser degree such as appendectomy), and minor surgery (superficial surgery). Major surgery was defined as a surgery requiring a hospital stay of 2 or more days.

Clinical risk factors (history of chronic obstructive lung disease, history of ischemic heart disease, history of compensated or prior heart failure, history of cerebrovascular disease, diabetes mellitus and renal insufficiency) and surgical risk (high-risk defined as intrathoracic, intraperitoneal, or suprainguinal vascular surgery, or surgery involving large blood loss or fluid shifts) were defined according to the Cardiac Risk Stratification for Noncardiac Surgical Procedures of the 2007 guidelines on Perioperative Cardiovascular Evaluation and Care for Noncardiac Surgery of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines [15].

Data for other preoperative clinical information regarding chronic obstructive pulmonary disease (COPD), hypertension and dyslipidemia were collected from routine clinical documentation entered into the institution's perioperative clinical information system.

Residual neuromuscular block (RNMB) was defined as TOF<0.9 and it was quantified at admission to the PACU using acceleromyography of the adductor pollicis muscle (TOF-Watch®). [16, 17]

For delirium screening, at PACU discharge and in the ward the next day after surgery, the nursing delirium screening scale were (Nu-DESC) [18] used, and patients with a Nu-

DESC score of 2 or more points at least at one evaluation were considered delirium positive. Patients were tested for delirium by the research team at the time they were formally declared to be 'ready for discharge' to the regular ward by the physician in charge of the recovery room. In addition, the patients were seen on the morning of the first postoperative day.

Patients were asked to provide a global rating of their nausea intensity using a 100 mm Nausea VAS. Postoperative nausea and vomiting (PONV) was evaluated and measured with PONV Intensity scale described by Myles et al. [19].

At discharge of PACU VAS for pain was measured.

Statistical Analysis

Descriptive analysis of variables was used to summarize data. Ordinal and continuous data found not to follow a normal distribution, based on the Kolmogorov–Smirnov test for normality of the underlying population, are presented as median and interquartile range. Non parametric tests were used to compare continuous variables and Chi-square or Fisher's exact test to compare proportions between 2 groups of subjects.

The related samples Wilcoxon signed rank test was used to compare Qor-40 scores. Differences were considered statistically significant when p was <0.05. Data was analyzed using SPSS software for Windows Version 19.0 (SPSS Inc., Chicago, IL, USA).

Results

Form 221 patients consecutively admitted in the PACU during the study period, a total of 114 were studied.

One-hundred and seven patients were excluded from this initial cohort: 66 were lost to the follow-up or had missing information crucial to data analysis, 12 patients were admitted to a surgical intensive care unit, 8 patients were unable to provide informed consent or had a MMSE <25, 2 patients did not undergo surgery, 2 patient underwent neurosurgery, 11 patient were less than 18 years old, 3 patient did not speak Portuguese and 3 patients refused to participate.

Table 1 lists pre-admission patient's characteristics and outcomes.

PQR patients had more frequently PONV (42% versus 25%, p= 0.038).

At T1, mean QoR-40 score was 169 and PQR patients were identified if their QoR-40 score was lesser than 142. PQR occurred in 26 patients (24%).

Table 2 shows global median scores comparing PQR with patients with no PQR at T0, T1 and T2.

According to the various QoR-40 sub-scales, PQR patients showed lower median scores at T0 for emotional state (24 vs. 39, p<0,001), physical comfort (29 vs. 55, p<0,001) and pain (10 vs. 33, p<0,001), while in the other sub-scales (psychological support and physical independence) the results were similar.

At T1 patients showed lower median scores for emotional state (23 vs. 40, p<0.001), physical comfort (30 vs. 53, p<0.001), pain (13 vs. 31, p<0,001), psychological support and for physical independence (14 vs. 22, p=0,001).

At T2 patients presented lower median scored for emotional state (22 vs. 41, p<0,001), physical comfort (28 vs. 58, p<0,001) and pain (10 vs. 34, p<0.001), while in the other sub-scales (psychological support and physical independence) the results were analogous.

Table 3 shows that there were no differences observed in global scores and scores for each QoR-40 dimensions for patients with PQR comparing scores observed before surgery and 3 months after surgery.

Table 4 shows global scores and scores for each QoR-40 dimensions for patients without PQR comparing scores observed before surgery and 3 months after surgery. In physical comfort dimension there was an improvement in median scores but for global score and for the other dimensions there were no differences observed.

Discussion

The principal findings of this study were as follow: the incidence of PQR was 24%; patients with PQR have lower QoR scores prior to surgery and 3 months after surgery.

The incidence of PQR 24 hours after surgery in our study (24%) is in accordance with the current literature [13], although there is a lack of studies with the same methodology after non cardiac surgery [12] [20].

PQR patients had PONV more frequently than what was expected because PONV are included in QoR individual questions and are well weighted in the questionnaire. This was already studied by Myles et al [19] that concluded that patients with PONV had lower scores of QoR.

PQR patients may be identified prior to surgery, because these patients have lower median scores ($p < 0,001$) for the global QoR score, and for some of the QoR dimensions (Pain, Physical Comfort and Emotional State dimension) measured at T0. This may be important because as soon as these patients are identified the sooner efforts might be taken to provide important measures capable of improving quality of recovery. Important measures trying to improve scores in Pain, Physical Comfort and Emotional State dimensions could be implemented in patients previously identified in order to improve QoR-40 scores 24 hours after surgery, and thereby improving quality of recovery.

As others had proposed in analogous studies [12] PQR 24h after anesthesia can predict a poor quality of life at 3 months. QoR-40 and Quality of Recovery are related with quality of life 3 months after surgery [12], that is why we suggest that improving the Qor-40 score after surgery might be able to improve the quality of life. Others have described the relationship between quality of recovery after surgery and quality of life up to 3 years [13] so QoR may be considered an indirect tool to measure QOL.

The results of our study showing a decrease at T2 in QoR global score and at several dimensions (Pain, Physical Comfort and Emotional State) suggests that patients with PQR maintain lower quality of recovery until at least 3 months after surgery, especially in Pain and Emotional State dimensions.

In our study the Psychological support and Physical Independence dimensions at T0 and T2 showed to be equal in both Patients with PQR and without PQR, which suggests that these dimensions may not contribute to predict those patients who will develop PQR and may not contribute for the low quality of recovery after 3 months of surgery.

In patients with PQR and comparing scores before and after surgery there were no observed differences but in patients without PQR physical comfort score improved 3 months after surgery. It was expected a more global improvement in QoR after surgery but these results might suggest that after surgery in patients without PQR the more accurate dimension to measure improvement might have been physical comfort because before surgery these patients might have no derangements in other dimensions. In contrary patients with PQR were already affected in all dimensions and were not able to improve.

In order to reduce bias we were strict about timing measurements since it was essential in a dynamic process such as postoperative recovery. Also by selecting a heterogeneous surgical population we ought to be able to measure great extremes of comfort and mobility [12]. In this study it was the investigator that administered the questionnaire, what may be seen as a more efficient use of resources, as complete and a timely data were collected [21].

Limitations of the study

A major limitation of our study was the high rate of losses to the follow-up leading to a rate of 52% of global answers.

We did not use a previously validated tool to measure quality of life, assuming a relationship between quality of recovery and quality of life. But then again, QoR-40 and SF-36 contain similar scopes and dimensions that will assist their association and also because they represent similar psychosocial aspects, they ought to be correlated [11-12].

To conclude, Quality of Recovery is crucial for Quality of Life after surgery. QoR-40 score is an important tool to assess Quality of Recovery and our study suggest that QoR-40 may be used prior to surgery to identify patients who will develop PQR. Moreover, recognizing the most affected dimensions could help to implement actions in order to achieve a better quality of recovery. However more studies are needed in order to validate this tool prior to surgery [12].

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Table 1. Pre-admission patient characteristics and outcomes.

	All (n=114)	**No PQR** (n=88) 76%	**PQR** (n=26) 24%	**P**
Age in years, *median (IQR)*	60 (43-68)	60 (42-68)	55 (44-71)	0.685 [a]
Age group, *n (%)*				0.603 [b]
< 65 years	75 (66)	59 (67)	16 (62)	
≥ 65 years	39 (34)	29 (33)	10 (38)	
Gender, *n (%)*				0.937 [b]
Male	49 (43)	38 (43)	11 (42)	
Female	65 (57)	50 (57)	15 (58)	
ASA physical status, *n (%)*				0.543 [c]
I/II	87 (76)	66 (75)	21 (81)	
III/IV	27 (24)	22 (25)	5 (19)	
Body Mass Index in Kg/m^2, *median (IQR)*	26 (24-30)	26 (24-30)	29 (24-32)	0.207 [a]
Duration of anaesthesia (min.), *median (IQR)*	120 (90-180)	120 (90-180)	120 (84-189)	0.868 [a]
Type of anesthesia, *n (%)*				0.062 [a]
General / Combined general locorregional	94 (82)	75 (85)	19 (73)	
Locorregional	20 (18)	13 (15)	7 (17)	
Site of surgery				0.860 [c]
Abdominal	52 (46)	39 (44)	13 (50)	
Musculoskeletal	49 (43)	39 (44)	10 (39)	
Head and neck	13 (11)	10 (11)	3 (11)	
Temperature at PACU admission, *median (IQR)*	35.5 (34.9–36.0)	35.5 (34.9-35.9)	35.7 (35.2 - 36.0)	0.201 [a]
Hypertension, *n (%)*	56 (49)	46 (52)	10 (39)	0.216 [b]
Hyperlipidemia, *n (%)*	40 (35)	32 (36)	8 (31)	0.599 [b]
COPD, *n (%)*	8 (7)	5 (6)	3 (12)	0.263 [c]
High-risk surgery, *n (%)*	28 (25)	22 (25)	6 (23)	0.841 [b]
Ischaemic heart disease, *n (%)*	7 (6)	5 (6)	2 (7)	0.503 [c]
Congestive heart disease, *n (%)*	3 (3)	2 (2)	1 (4)	0.544 [c]
Cerebrovascular disease, *n (%)*	1 (3)	1 (1)	0	0.772 [c]
Renal insufficiency, *n (%)*	9 (8)	8 (9)	1 (4)	0.346 [c]
Insulin therapy for diabetes, *n (%)*	17 (15)	16 (18)	1 (4)	0.059 [c]
Total RCRI, *n (%)*				0.676 [c]
≤2	109 (96)	83 (95)	26 (96)	
>2	5 (4)	4 (5)	1 (4)	
Medication with benzodiazepines	31 (27)	22 (25)	9 (35)	0.333 [b]
Benzodiazepines premedication	43 (38)	31 (35)	12 (36)	0.536 [b]
Crystalloids, *median (IQR)*	1000 (1000-2000)	1000 (1000-2000)	1000 (1000-2600)	0.089 [a]
Colloids, *n (%)*	3 (3)	2 (2)	1 (4)	0.579 [c]
Erythrocytes, *n (%)*	2 (2)	2 (2)	0	0.569 [c]
RNMB	19 (17)	16 (18)	3 (12)	0.715 [c]
PONV	**34 (30)**	**22 (25)**	**12 (42)**	**0.038 [b]**
Delirium	18 (16)	13 (15)	5 (19)	0.584 [c]
VAS for pain at PACU admission	0 (0-5)	0 (0-5)	0 (0-4)	0.378 [a]
VAS for pain at PACU discharge	0 (0-2)	0 (0-2)	1 (0-3)	0.599 [a]
SICU length of stay (minutes), median (IQR)	114 (85-146)	110 (81-144)	120 (110-188)	0.169 [a]

[a] Mann-Whitney U test, [b] Pearson χ^2, [c] Fisher´s exact test, **IQR**, interquartile range

ASA, American Society of Anesthesiologists; **COPD**, Chronic Obstructive Pulmonary Disease; **RCRI**, Revised Cardiac Risk Index; **PACU**, Post Anesthesia Care Unit; **PONV**, Postoperative Nausea and Vomiting; **RNMB**, Residual Neuromuscular blockade; **VAS**, Visual Analogic Scale

Table 2. Pre-admission patient QoR-40 scores and outcomes.

	All (n=114)	No PQR (n=88) 76%	PQR (n=26) 24%	P
Emotional State T0	**36 (27-42)**	**39 (33-42)**	**24 (22-28)**	**<0.001**
Emotional State T1	**38 (30 – 42)**	**40 (35-43)**	**23 (20-28)**	**<0.001**
Emotional State T2	**38 (29 – 44)**	**41 (33-45)**	**22 (21-37)**	**<0.001**
Physical Comfort T0	**54 (48 – 57)**	**55 (51-58)**	**29 (28-38)**	**<0.001**
Physical Comfort T1	**51 (43 -55)**	**53 (50- 56)**	**30 (25-41)**	**<0.001**
Physical Comfort T2	**57 (47 – 60)**	**58 (53 – 60)**	**28 (28-53)**	**<0.001**
Physchological support T0	35 (34 – 35)	35 (34-35)	35 (35-35)	0.115
Physchological support T1	35 (34 – 35)	35 (34 – 35)	35 (31 – 35)	0.166
Physchological support T2	35 (34 – 35)	35 (34 – 35)	35 (34 – 35)	0.794
Physical Independence T0	25 (23 – 25)	25 (23 – 25)	25 (23 – 25)	0.937
Physical Independence T1	**21 (15- 25)**	**22 (17 – 25)**	**14 (12 – 22)**	**0.001**
Physical Independence T2	25(24-25)	25 (24 -25)	25(24- 25)	0.755
Pain T0	**31 (26 – 35)**	**33 (29-35)**	**10 (7 – 26)**	**<0.001**
Pain T1	**30 (25 – 32)**	**31 (28 – 33)**	**13 (10 – 24)**	**<0.001**
Pain T2	**32 (26 – 34)**	**34 (29 – 35)**	**10 (7 – 30)**	**<0.001**
Global T0	**180 (157- 190)**	**184 (170 – 192)**	**121 (117 – 139)**	**<0.001**
Global T1	**174 (151 – 183)**	**177 (166-187)**	**120 (107 – 134)**	**<0.001**
Global T2	**182 (161 – 196)**	**189 (173 -198)**	**119 (115 – 175)**	**<0.001**

T0, before surgery; **T1**, 24 after surgery**; T2**, 3 months after surgery; **PQR**, Poor Quality of Recovery.

Table 3. QoR global score and scores for each QoR-40 dimensions in patients with PQR

	Before surgery	3 months after surgery	p
Global	121 (117 – 139)	119 (115 – 175)	0.306
Emotional State	24 (22-28)	22 (21-37)	0.935
Physical Comfort	29 (28-38)	28 (28-53)	0.108
Psychological support	35 (35-35)	35 (34 – 35)	0.309
Physical Independence	25 (23 – 25)	25(24- 25)	0.502
Pain	10 (7 – 26)	10 (7 – 30)	0.311

QoR-40, quality of recovery score; **PQR**, poor quality of recovery

Table 4. QoR global score and scores for each QoR-40 dimensions in patients without PQR

	Before surgery	3 months after surgery	p
Global	184 (170 – 192)	189 (173 -198)	0.306
Emotional State	39 (33-42)	41 (33-45)	0.110
Physical Comfort	**55 (51-58)**	**58 (53 – 60)**	**0.004**
Psychological support	35 (34-35)	35 (34-35)	0.905
Physical Independence	25 (23 – 25)	25 (24 -25)	0.747
Pain	33 (29-35)	34 (29 – 35)	0.886

QoR-40, quality of recovery score; **PQR**, poor quality of recovery

Agradecimentos

Desejo agradecer ao Professor Fernando Abelha e ao Dr. Luís Guimarães por toda a disponibilidade e atenção prestada ao longo do desenvolvimento deste trabalho.

Aos pacientes que prescindiram de algum do seu tempo para responder aos questionários.

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