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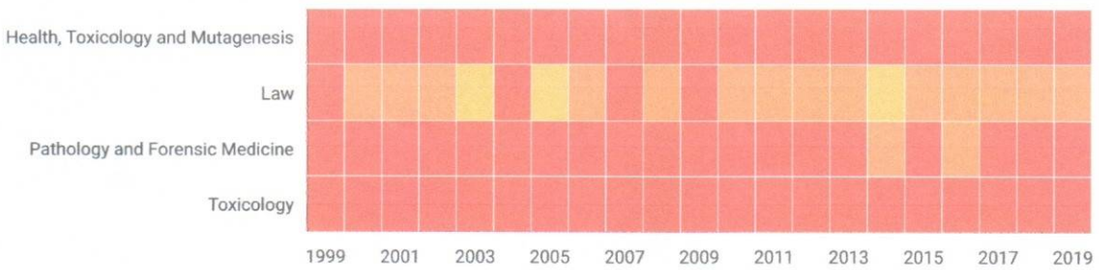

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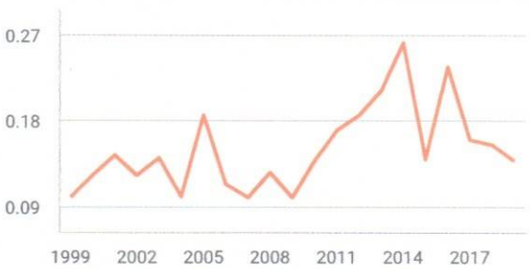

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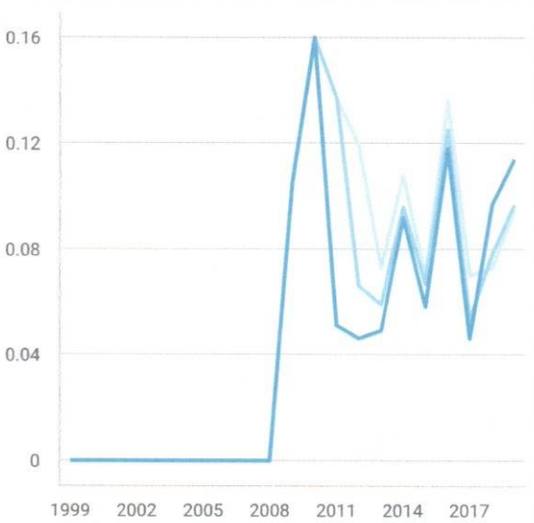

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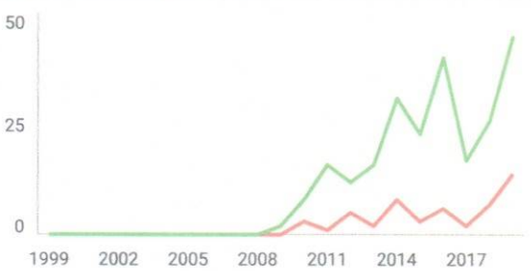

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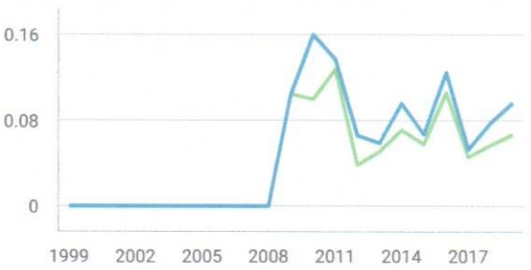

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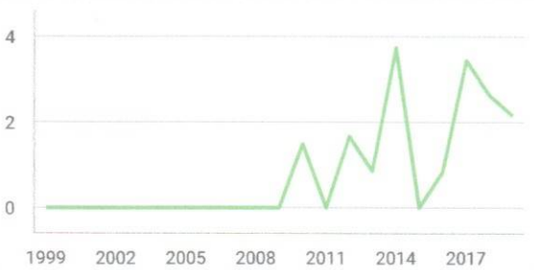

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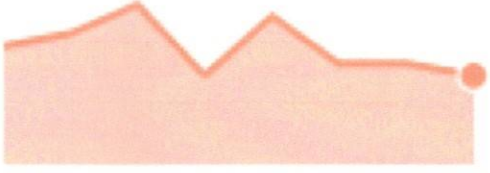

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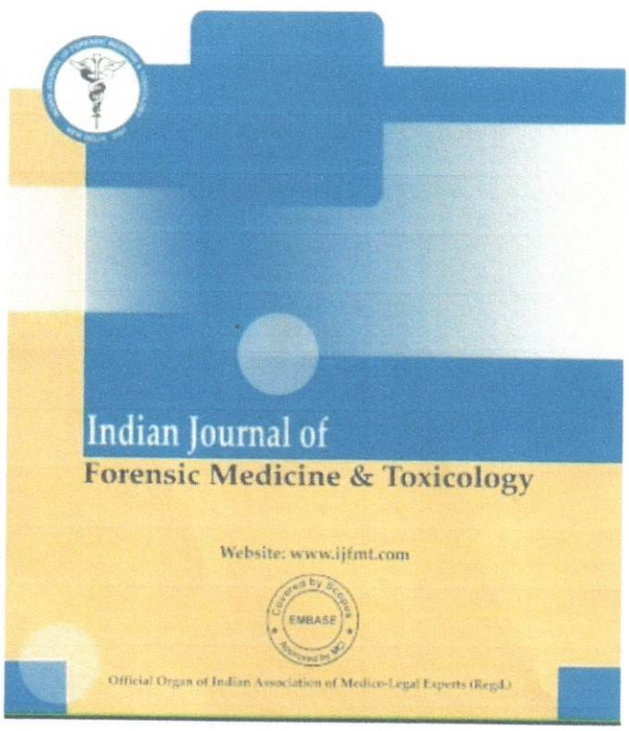
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The Relationship Between Qor-40 Questionary Value And Pupillary Pain Index As Assessment Of Recovery Quality On Post-Operating Patients Treated By Multimodal Analgesia (Parasetamol + NSAID + PCA OPIOID)

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Abstract

This study analyzes the correlation between QoR-40 questionnaire value and the Pupillary Pain Index as an assessment for the quality of recovery of postoperative patients receiving multimodal analgesia (Paracetamol + NSAID + PCA Opioid) in Dr. Soetomo Hospital. An observational analytic study with cross-sectional design was conducted on patients aged 18-60 years who underwent elective surgery with general anesthesia at Dr. Soetomo Hospital Surabaya and receiving multimodal analgesia therapy, which includes intravenous paracetamol 4 x 500 mg, intravenous ketorolac 3 x 10 mg, and intravenous fentanyl via PCA. Recovery quality checks were performed at 12 and 24 hours postoperatively. Retrieval of data in the form of a QoR-40 questionnaire and pupillary pain index examination using algiscan® pupillometry. Both parameters will be analyzed by correlation test. The total need for fentanyl and PCA demand dose was also evaluated for use within 24 hours postoperatively. From 46 samples, obtained characteristics of studyare widely distributed in terms of age, sex, anthropometry, and preoperative physical status. The average total fentanyl PCA requirement is relatively small at 0.28 mcg / kg / hour. The correlation formed between QoR-40 and pupillary pain index is significant. It can be concluded that Pupillary Pain Index can replace the QoR-40 questionnaire as an alternative assessment of the quality of recovery of patients after surgery.

Keywords: *QoR-40 Questionnaire, Pupillary Pain Index, Quality of Postoperative Recovery.*

Introduction

Uncontrolled postoperative pain can have various consequences including increased morbidity, delayed recovery, and a high incidence of chronic pain. Postoperative pain affects the quality and duration of the patient's postoperative recovery period and will affect his quality of life. The postoperative recovery that has been developed and specifically designed for multimodal perioperative care pathways that will be aimed at obtaining rapid healing after major surgery with preoperative support of organ function and exacerbating the stress response caused by surgical trauma[1].

In the United States, more than 80% of patients undergoing surgery experience acute postoperative pain and approximately 75% report moderate, severe or extreme pain [2]. Based on the Ministry of Health survey data, more than 80% of surgical patients reported experiencing moderate pain and 31-37% of patients experiencing severe to very severe pain[3]. Inadequate pain control has a negative impact on quality of life, risk after surgery, and risk of postoperative persistence[2].

Multimodal analgesia is the use of more than one type of analgesia drug and technique which targets different mechanisms of action in the central and / or peripheral nervous system (which can be combined with non-pharmacological interventions) that allow for synergy or addiction effects and are more effective in relieving pain than with a single capital intervention[2].

The selection of tools to check pain and the quality of recovery also needs to be considered in the form of

pain scores such as the Numeric rating system (NRS) and Visual analogue Scale (VAS) or questionnaire[4]. The recovery quality questionnaire (QoR-40) is a tool used to assess the quality of recovery after surgery through questions relating to 40 items related to 5 domains. However, QoR-40 has limitations, which requires a long time and good understanding from sufferers to be able to obtain the quality of postoperative pain[5].

Objective parameters of pain and quality of recovery can be evaluated using biomarkers and tools. Studies on pain biomarkers do not have very significant results and are considered not cost-effective. Recent research reveals, evaluation of pain and quality of recovery can use tools that utilize a variety of body responses due to pain or discomfort, one of which is Pupillary Pain Index (PPI) which can be assessed by interpreting the response of dilated pupils to the presence of pain or discomfort. PPI is considered more practical, non-invasive, does not require a long time and is inexpensive in evaluating the objective parameters of pain and its relation to the quality of postoperative recovery[6]. Studies that have evaluated the quality of postoperative recovery with subjective and objective parameters in the provision of multimodal analgesia have never been done, this study tried to analyze the relationship of recovery quality as measured by a QoR-40 questionnaire and PPI using the pupilometry.

Materials and Method

This type of research is an observational analytic research using Diagnostic Test intended to find the relationship between QoR-40 questionnaire and PPI using the pupilometry so that it can determine that PPI can replace the QoR-40 questionnaire as an evaluation of quality recovery postoperatively [4]. This research was carried out at the recovery room at the Dr. Soetomo Hospital Surabaya in September-October 2019. The study samples were aged 18-60 years who underwent elective surgery with general anesthesia. With the inclusion criteria are patients with physical status ASA (American Society Anesthesiologist) 1-2, can communicate well, not deaf, not mute, not mentally retarded and not senile. The sampling technique in this study was conducted with judgment sampling. Patients who entered the inclusion criteria will be examine preoperatively 1 day before surgery, including history, physical examination, laboratory and radiological examination. Patients will receive multimodal analgesia therapy, which includes intravenous paracetamol 4 x 500 mg, intravenous ketorolac 3 x 10 mg, and intravenous fentanyl via PCA (Patients-Controlled Analgesia). Recovery quality checks were performed at 12 and 24 hours postoperatively. Retrieval of data is in the form of a QoR-40 questionnaire and pupillary pain index examination using pupillometry. Parameters will be analyzed by correlation test. The total need for fentanyl and PCA demand dose was also evaluated for use within 24 hours postoperatively. Data analysis is divided into 2 parts, descriptive statistical analysis, and correlation analysis of two variables.

Results

There were 46 patients was taken in the Recovery Room of Dr. Soetomo Hospital Surabaya during September to October 2019. Following are the characteristics of the research subjects:

Table 1. Characteristics of Subjects

Parameter	Variable	Frequency
Sex	Male	22(47,8%)
	Female	24(52,2%)
Age (years old)	18-20	4 (8,7%)
	21-30	9 (19,6%)
	31-40	7 (15,2%)
	41-50	12 (26,1%)
	51-60	14 (30,4%)
Body Mass Index	<18,5	4 (8,7%)
	18,5 - 24,9	23 (50%)
	25,0 - 29,9	19 (41,3%)
PS ASA	1	17 (37%)
	2	29 (63%)
Type of Operation	Digestive	5 (10,9%)
	Gynecology	5 (10,9%)
	Head and Neck	8 (17,4%)
	Laparoscopy	1 (2,2%)
	Oncology	8 (17,4%)
	Orthopedic	11 (23,9%)
	Plastic Surgery	2 (4,3%)
	Urology	6 (13%)

The characteristics of the initial preoperative hemodynamic examination of patients in this study are described in table 2.

Table 2 Characteristics of Subjects Preopeative Hemodynamic

Hemodinamic Parameter	Min	Max	Mean ± SD
Sistolic Pressure (mmHg)	99	156	118,41 ± 11,76
Diastolic Pressure (mmHg)	54	97	73,91 ± 9,12
MAP (mmHg)	73	109	87,54 ± 8,66
HR (x/menit)	18	98	81,56 ± 13,50
RR (x/menit)	14	20	17,54 ± 1,61
Temperature (oC)	36,3	37,3	36,68 ± 0,26

Evaluation of the patient's initial pain scale using WBFS (Wong Baker Faces Scale) prior to anesthesia and surgery. From the data table below, there were no patients with moderate or severe pain scale at the beginning of the preoperative examination.

In this study, the use of modalities used for postoperative pain relief therapy is multimodal analgesia with PCA fentanyl. Provision of the amount of fentanyl need for pain relief through PCA was measured for each patient in this study. There are 2 parameters of PCA fentanyl requirements that are evaluated, namely total fentanyl and total demand dose within 24 hours of administration.

The quality of recovery of postoperative patients evaluated in this study includes 2 things, namely from the subjective parameters of the patient using the self-reporting method using the QoR-40 questionnaire and also from the objective parameters using the pupillary pain index which is examined by digital pupillometry. Quality recovery checks were performed in 2 times, namely at 12 hours postoperatively and 24 hours post surgery. This study uses a cut-off point 142 as a clinical interpretation of good and poor quality of recovery, following previous study[8]. While in the PPI assessment, the range of values is between 1 and 10, where the smaller the value, the better the quality of recovery well.

Examination of the quality of recovery of patients after surgery when compared between the 12th hours to the 24th hour on both parameters. It showed a significant difference with $p < 0.01$.

Correlations analysis between the quality of recovery of postoperative patients based on QoR-40 and PPI is drawn according to the graphs in Figure 1 and Figure 2.

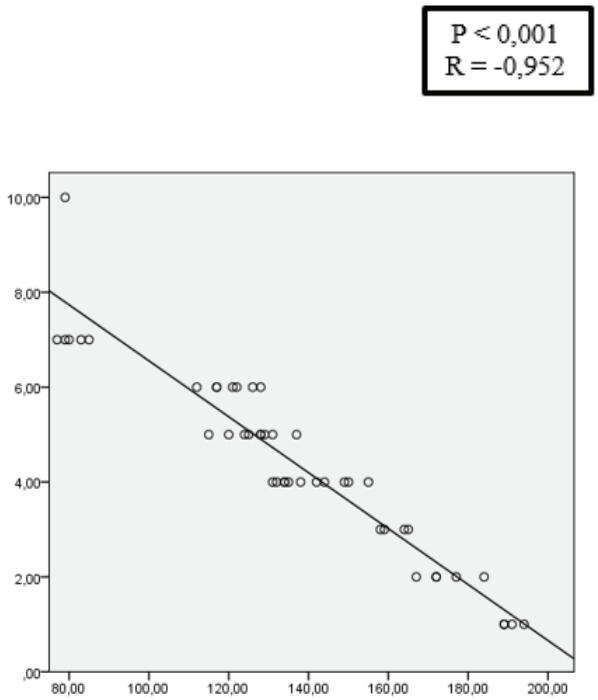

Figure 1 Correlations between Qor-40 and PPI at 12 hours.

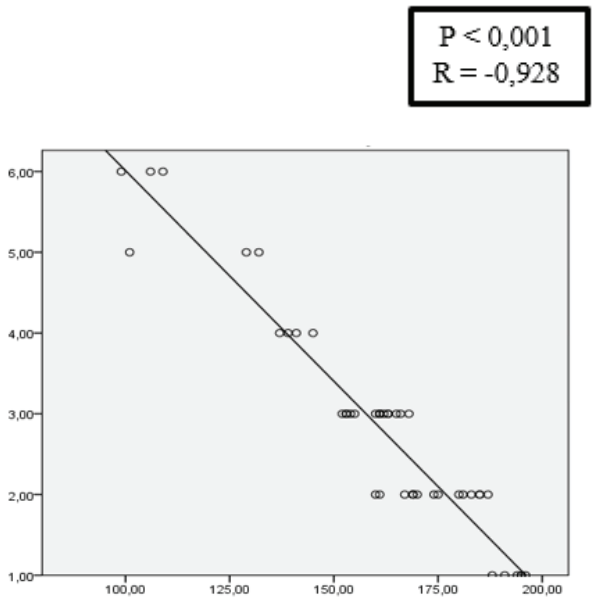

Figure 2 Correlations between Qor-40 and PPI at 24 hours.

Discussion

This broad distribution of types of surgery shows that the results of the correlation analysis between QoR-40 and PPI, apply in all types of operations. It showed that the number of fentanyl PCA requirements can be seen according to table 4. In this study, Fentanyl can be used as a single modality for postoperative analgesia with a continuous dose ranging from 0.5 to 0.75 mcg / kg / hour [9]. The dose of fentanyl continuous infusion as a mild-moderate postoperative opioid analgesia is 0.4-0.6 mcg / kg / hour[7]. This shows the number of fentanyl needs of patients is low.

The concept of multimodal analgesia can be given at a smaller dose than a single administration of the drug[2]. In this study the provision of multimodal analgesia was clinically effective, because with the combination of paracetamol and ketorolac the amount of PCA fentanyl requirement was relatively small at 0.28 mcg / kg / hour. According to the study[7], the administration of therapeutic regimens through PCA can be tailored to individual needs for improving the quality of healing and care [7].

According to a study[8], the quality of patient recovery at 12 hours postoperatively is unsatisfying because it has a mean value QoR-40 is below the cut-off point[8]. Further, from 46 samples, 28 patients (60.8%) had a QoR-40 questionnaire value of less than 142. Only 39.2% of patients who had a QoR-40 score of 142 and above, or clinically had good recovery quality at 12 o'clock after surgery. But in evaluating the quality of recovery at 24 hours postoperatively, the Qor-40 questionnaire value of the sample patients in this study had a statistically significant improvement compared to 12 hours ($p < 0.01$). The mean QoR-40 at 24 hours was 161.06 ± 24.56, exceeding the cut-off point of 142. Most, 37 patients (80.4%), had good recovery quality (QoR-40 more than 142) 24 hours postoperatively. Only 9 or 19.6% of patients had poor recovery quality (QoR-40 value <142) at 24 hours.

Several things can cause the lack of quality post-operative recovery at 12 hours based on the QoR-40 questionnaire. The quality of recovery in QoR-40 is assessed based on 5 dimensions: patient support, patient comfort, patient emotions, physical independence, and pain[5]. The provision of multimodal analgesia dealing with pain and comfort for patients, but support, emotional, and independence factors are more subjective and cannot be controlled with multimodal analgesia[10], in the acute phase, less than 1 day after surgery. Maybe, the patient does not feel pain, but emotionally does and his physical independence is still lacking [11]. This causes the quality of recovery at 12 hours is unsatisfying.

In evaluating the quality of recovery using objective parameters (PPI), the value at 12 hours postoperatively varies from 1 to 10. While at 24 hours, the value of PPI variations 1 to 6. In contrast to QoR-40, quality assessment recovery using PPI has the opposite interpretation. In PPI, the higher the value the clinical patient feels very painful or uncomfortable, while the smaller the value, the better the quality of recovery [12]. There is no cut-off point for PPI values that can be used as a clinical interpretation in the classification' quality of recovery[4].

When compared between the 12th hour PPI value and the 24th hour, there was a statistically significant difference ($p < 0.01$). At the 12th hour postoperatively the PPI mean value was 4.39 ± 1.94, while at the 24th hour there was a decrease in the PPI mean value of 2.82 ± 1.33. In the sample data of this study, there were 36 patients (78.2%) who experienced a decrease in PPI values from 12 to 24 hours. There were 7 patients (15.2%) who had the same PPI values at 12 and 24 hours, and only 3 patients (6.6%) experienced an increase in PPI values from 12 to 24 hours.

Based on the analysis of the relationship between QoR-40 and PPI, it can be concluded clinically that PPI

evaluation can be used as a substitute for QoR-40 in assessing the quality of recovery of patients after surgery. This is in accordance with a study conducted by Rollins et al [13], that the characteristics of pupils and pupillary dilation reflex (PDR) can be used as an objective response to discomfort or pain in postoperative patients [13]. Comfort and pain are also factors that influence the quality of patient recovery directly[6], this causes PPI to have a significant relationship and can be used to replace QoR-40 as an assessment of the quality of recovery of patients after surgery.

Clinically, the use of PPI when compared to the QoR-40 questionnaire is more practical and effective. PPI examination with pupillometry is an objective measurement of pain, the same as pain biomarkers such as cortisol, IL-6, TNF-alpha and others. But studies of pain biomarkers do not have very significant results and are considered not effective. On the other hand, evaluation of pain and quality of recovery can use tools that utilize a variety of body responses due to pain or discomfort, one of which is PPI which can be assessed by interpreting the response of dilated pupils to the presence of pain or discomfort. PPI is considered more practical, non-invasive, fast and inexpensive in evaluating the objective parameters of pain and its relation to the quality of postoperative recovery [6].

Conclusion

The QoR-40 questionnaire has a significant correlation with the Pupillary Pain Index as an assessment of the quality of recovery in postoperative patients ($p < 0.01$). Pupillary Pain Index can replace QoR-40 as an alternative assessment of the quality of recovery of patients after surgery.

Conflict of Interest: The authors declare that there is no conflict of interest.

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