RELATIONSHIP BETWEEN THE SEVERITY OF LOWER THIRD MOLAR IMPACTION ON POST-ODONTECTOMY PAIN INTENSITY

(HUBUNGAN ANTARA TINGKAT KEPARAHAN IMPAKSI MOLAR KETIGA BAWAH TERHADAP INTENSITAS NYERI PASCA ODONTEKTOMI)

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JHDS.unjani.ac.id/jite
Doi: 10.54052/jhds.

Article History
Received:16/06/2024
Accepted: 03/07/2024

ABSTRACT

The third molar is the last tooth to erupt, so it often experiences impaction with varying severity. Impacted teeth can cause various problems, so they need to be removed. Extraction of the third molar, namely odontectomy, sometimes causes postoperative complications; one of the most common is pain. The purpose of this study was to determine the relationship between the severity of impaction of the lower third molar and the intensity of pain after odontectomy. This study is an observational analytical study with a cross-sectional approach. The sampling method used was non-random, using the purposive sampling technique, for patients who came to the oral surgery clinic of Gunung Jati Regional Hospital, Cirebon, and had undergone odontectomy of the lower third molar. This study assessed the severity of impaction based on the Pedersen classification with the help of panoramic images into mild, moderate, and severe. The intensity of pain after odontectomy was

measured using the NRS score into mild, moderate, and severe. The results showed that of the 37 patients who underwent odontectomy, the majority had moderate impaction severity in 24 patients (64.9%) and experienced moderate pain intensity post-odontectomy in 14 patients (37.8%). Spearman's correlation test showed a p-value of 0.530 (p> 0.05). there is no correlation between the severity of lower third molar impaction and postoperative pain intensity.

Keywords: odontectomy; pain; severity; lower third molar;
odontectomy

ABSTRAK

Gigi molar ketiga merupakan gigi yang erupsi paling akhir, sehingga seringkali mengalami impaksi dengan berbagai keparahan. Gigi impaksi dapat menimbulkan berbagai masalah sehingga perlu dicabut. Pencabutan gigi molar ketiga, yaitu odontektomi, terkadang menimbulkan komplikasi pascaoperasi, salah satu yang paling umum adalah nyeri. Tujuan dari penelitian ini adalah untuk mengetahui hubungan antara tingkat keparahan impaksi gigi molar ketiga bawah dengan intensitas nyeri pasca odontektomi. Penelitian ini merupakan penelitian observasional analitik dengan pendekatan crosssectional. Metode pengambilan sampel yang digunakan adalah non-random, dengan menggunakan teknik accidental sampling, terhadap pasien yang datang ke poli bedah mulut RSD Gunung Jati Cirebon untuk menjalani odontektomi gigi molar ketiga rahang bawah. Penelitian ini menganalisis keparahan impaksi berdasarkan klasifikasi Pedersen menjadi ringan, sedang, dan parah. Penelitian ini merupakan penelitian observasional analitik dengan pendekatan crosssectional. Metode pengambilan sampel yang digunakan adalah non-random, dengan menggunakan teknik purposive sampling, terhadap pasien yang datang ke poli bedah mulut RSUD Gunung Jati Cirebon untuk menjalani odontektomi gigi molar ketiga rahang bawah. Penelitian ini menilai keparahan impaksi berdasarkan klasifikasi Pedersen dengan bantuan

gambaran panoramik menjadi ringan, sedang, dan parah. Selanjutnya dilakukan pengukuran intensitas nyeri pasca odontektomi menggunakan skot NRS menjadi ringan, sedang berat. Total 37 pasien menjalani odontektomi, yang terbanyak memiliki keparahan impaksi sedang sebanyak 24 pasien (64,9%), dan mengalami intensitas nyeri sedang post odontektomi, sebanyak 14 pasien (37,8%). Uji korelasi Spearman menunjukkan nilai p sebesar 0,530 (p > 0,05). tidak terdapat korelasi antara tingkat keparahan impaksi molar ketiga bawah dengan intensitas nyeri pascaoperasi.

***Kata kunci**: impaksi; molar ketiga bawah; nyeri; keparahan; odontektomi*

INTRODUCTION

An impacted tooth fails to erupt into its functional position in the dental arch and is covered by soft tissue or alveolar bone.[1,2,3] The tooth becomes impacted because of primary and secondary factors. The primary factors are abnormal tooth orientation, adjacent teeth, dense overlying bone, excessive soft tissue, and history of impaction or premature loss of deciduous teeth. The secondary factors include systemic disorders such as endocrine disorders, fever, and vitamin D deficiency.[3,4] Teeth most commonly impacted teeth are third molars because they are the last teeth to erupt, therefore, they are the most likely to have inadequate space for complete eruption.[1,3] The prevalence of impaction varies between countries, globally reaching 24.40% of the population. The prevalent of lower third molar impaction is 57.58%, higher than in the upper jaw.[5]

An impacted tooth can cause the patient mild to serious problems if it remains unerupted. In these conditions, the involved tooth impaction should be surgically removed, knowns as odontectomy.[1,3,6] Odontectomy procedures have a level of difficulty based on the severity of the impaction position.[1,3] A variety of classification systems have been developed to aid in the determination of surgical difficulty, and the most widely used is the Pedersen index.[1] The Pedersen classification index was based on the sum of the scores obtained in the analysis of the angulation of the impacted tooth, the relationship of the impacted tooth to the anterior border of the ramus and the second

molar, and the depth of the impaction, and defined as mild, moderate, and severe.[1,7]

Odontectomy of impacted third molars is associated with the incidence of complications, approximately 10%, such as swelling, pain, stiffness, bleeding, paresthesia, and fracture of the mandible.[1,8,9] The most common complication from third molars odontectomy is postsurgical pain (91,3%).[10] The pain begins when the effects of the anesthesia subside and reaches its maximum intensity during the first 12 hours postoperatively.[1] The pain intensity a patient may experience after a third molar odontectomy is highly variable.[3] Postsurgical pain is considered a temporary complication. Still, this condition can be a source of anxiety for patients.[9] Based on the description above, the researcher intends to analyze the relationship between the severity of lower third molar impaction on post-odontectomy pain intensity.

METHOD

The study is an observational analytical study with a cross-sectional approach to determine the relationship between the third molar impaction severity with post-odontectomy pain intensity. The method used was non-probability sampling with a purposive sampling technique.

The subjects were patients who came to the oral surgery clinic of Gunung Jati Regional Hospital (RSGJ) Cirebon and had undergone odontectomy of the lower third molar. Inclusion criteria were patients who underwent odontectomy under general anesthesia and took ibuprofen three times a day for three days after surgery. The patient had a panoramic radiographic and was agreed to be examined. Patients who did not take analgesics as recommended or took pain medication other than ibuprofen were excluded from the study.

The third molar impaction severity was determined based on the Pedersen classification by assessing the angulation of the impacted tooth, the relationship of the impacted tooth to the anterior border of the ramus and the second molar, and the depth of the impaction based on panoramic radiographic,[1,7] then given points. The angulation of the impacted tooth was determined according to Winter's classification as mesioangular alignment (1 point), horizontal/reversed alignment (2 points), vertical alignment (3 points), and distoangular alignment (4 points). The relationship of the impacted tooth to the anterior border of the ramus and the second molar was determined according to Pell and Gregory's classification as class 1 relationship if the mesiodistal diameter of the crown is completely anterior to the

anterior border of the mandibular ramus (1 point), class 2 relationship if the tooth is positioned on posteriorly so that approximately one half is covered by the ramus (2 points), and class 3 relationship if the tooth is located completely within the mandibular ramus (3 points). The depth of the impaction was also determined according to Pell and Gregory's classification as position A if the occlusal surface of the third molar is level or nearly level with the occlusal plane of the second molar (1 point), position B if the occlusal surface of the third molar is between the occlusal plane and the cervical line of the second molar (2 points), and position C if the occlusal surface of the third molar is below the cervical line of the second molar (3 points).[3,7] The severity of lower third molar impaction is determined based on the total score obtained and defined as mild for scores of 3-4 points, moderate for 5-6 points, and severe for 7-10 points.[7]

The intensity of pain after odontectomy was performed when the patient came for control on the seventh day by asking about the history of post-operative pain felt on the first day. The pain intensity was measured using the Numeric Rating Scale (NRS) score with a range of 0-10. Score zero meaning "no pain", 1-3 meaning "mild pain", 4-6 meaning "moderate pain', and 7-10 meaning "severe pain".[11] All examinations and data collection in the study were carried out by the same researcher.

Data analysis

The collected data was analyzed using the SPSS program. The results of the research will be described using bivariate analysis to see the relationship between the severity of lower third molar impaction and post-odontectomy pain intensity. The hypothesis was tested using the Spearman correlation test, with an alpha value adopted of 0.05. If the p-value is lower than 0.05, the hypothesis is declared as accepted, or there is a correlation between the variables. If the p-value is higher than 0.05, the hypothesis is rejected or declared as there is no correlation between variables.

Research ethical aspect

This research has received ethical approval by the Health Research and Development Ethics Committee of Gunung Jati Hospital, Cirebon, with No. 23/LAIKETIK/KEPPKRSGJ/IX/2023.

RESULT

The subjects of this study consisted of 37 patients who met the inclusion and exclusion criteria. The distribution of subject characteristics is shown in Table 1.

Table 1. Characteristics of the subject

Characteristics	n=37
Gender	
Male	16 (43.2%)
Female	21 (56.85%)
Age	
Mean ±Std	24.49±5.026
Median	23.00
Range (min-max)	15.00-34.00

Table 1 describes the characteristics of the research subjects. Most of the patients were female, as many as 21 (56.85%), while 16 patients were male (43.2%). The patient's ages ranged from 15 to 34 years, with an average of 23 years.

The distribution of lower third molar impaction severity is shown in Table 2.

Table 2. Distribution of the frequency of lower third molar impaction severity

Severity level	n	Percentage (%)
Mild	9	24.3
Moderate	24	64.9
Severe	4	10.8
Total	37	100.0

Based on Table 2, the distribution of lower third molar impaction severity consisted of 9 people with mild impaction severity (24.3%), 24 people (64.9%) with moderate impaction severity, and four people (10.8%) with have severe degree of impaction severity.

The description of lower third molar impaction severity is shown in Table 2.

Table 3. Description of the frequency of pain intensity post-odontectomy

Pain intensity	n	Percentage (%)
No pain	3	8.1
Mild pain	11	29.7
Moderate pain	14	37.8
Severe pain	9	24.3
Total	37	100.0

Based on Table 3, as many as three people (8.1%) felt no post odontectomy pain, 11 people (29.7%) felt mild pain, 14 people (37.8%) felt moderate pain, and nine people (24.3%) felt severe post odontectomy pain.

The relationship between the severity of impacted lower third molars and the intensity of post-odontectomy pain was measured using the Spearman correlation test and Pearson correlation test.

Table 4. The relationship between the severity of impacted lower third molars and the intensity of post-odontectomy pain

Severity level	Total Percentage	Pain intensity				Total	P-value	r
		No pain	Mild	Moderate	Severe			

Mild	N	1	4	2	2	9	0.530*	0.107
	%	33.3	36.4	14.3	22.2	24.3		
Moderate	N	2	6	9	7	24		
	%	66.7	54.5	64.3	77.8	64.9		
Severe	N	0	1	3	0	4		
	%	0	9.1	21.4	0	10.8		
Total	N	3	11	14	9	37		
	%	100	100	100	100	100		

*(P<0.05) Rank-Spearman test

Table 4 shows the result of the analysis using the Spearman correlation test between the severity of lower third molar impaction and post-odontectomy pain intensity. The P value obtained was 0.530, which means that there is no relationship between the two variables. The correlation coefficient (r) was found to be 0.107, which means a very low close relationship. This table shows that there is no significant correlation between the severity of lower third molar impaction and post-odontectomy pain intensity.

DISCUSSION

Pain is a complex human psychophysiological experience. Such factors as past pain experiences, cultural behaviours, and emotional and medical states influence this unpleasant experience.[3,12] Pain is one of the most common morbidities after a third molar odontectomy.[1,3] The odontectomy procedure can produce a large amount of tissue damage, resulting in an inflammatory process. Inflammation begins with the release of inflammatory mediators, such as histamine, bradykinin, prostaglandins, and leukotrienes, that cause sensitization of nociceptor endings in peripheral tissues and causing pain. Inflammatory mediators also cause vasodilation, increasing vascular permeability and extravasation of plasma protein that causes edema. Excessive tissue pressure due to edema will cause nociceptive stimulation and causing pain.[13,14]

Odontectomy of lower third molar impaction needs adequate access to underlying bone and tooth through a properly designed and reflected soft tissue flap and removing the underlying bone. This procedure may be difficult due to the severity of impaction, thus producing varying degrees of damage and inflammation. A variety of factors are known to make impaction surgery difficult; the three most widely used are angulation of the impaction tooth, the relationship of the impacted tooth to the anterior border of the ramus and the second molar, and the depth of the impaction.[1]

It is generally acknowledged that the mesioangular impaction is the least difficult to remove. The vertical and the horizontal impaction are intermediate in difficulty, whereas the distoangular impaction is the most difficult. The relationship of the impacted tooth to the anterior border of the ramus is a reflection of the amount of room available for the tooth eruption as well as the planned extraction. If the length of the alveolar process anterior to the anterior border of the ramus is sufficient to allow tooth eruption, the tooth is generally less difficult to remove. Conversely, teeth that are essentially buried in the ramus of the mandible are more difficult to remove. The depth of the impaction under the hard and soft tissues is likewise an important consideration in determining the degree of difficulty. It is widely employed in part because it may be the most useful indicator of the time required for surgery. A more challenging and time-consuming surgical procedure results in a more troublesome and prolonged postoperative recovery.[1]

In the present study, the severity of third molar impaction did not show a significant relationship to postoperative pain intensity. The result is supported by previous research conducted by Fakhrurrazi et al. in 2015 that showed that there was no relationship between the degree of difficulty of third molar mandibular odontectomy and postoperative complications because of the difference in the number of subjects between mild, moderate, and severe difficulty levels was too large.[15] This study was also supported by research conducted by Dwipayanti et al. in 2009, which explained that there was no significant difference between post-odontectomy complications and the degree of difficulty. It is suggested to be caused by most subjects being in mild and moderate degrees of difficulty.[16]

There was another factor that can contribute to postoperative pain; one of them was a technique used by operators in surgery procedures and pain management. Some operators may use techniques that minimize tissue trauma that may reduce postoperative pain, such as variations in flap design.[17] An atraumatic bone removal, aseptic, and non-heat-producing technique, with as little bone removed, may minimize damage. The tooth was divided into sections and delivered with elevators; using reasonable force may prevent complications. The wound that was debrided mechanically and irrigated thoroughly may provide the best possible healing environment in the postoperative period.[1]

The anesthetic technique can also contribute to pain management, both during

and after the procedure. Appropriate anesthesia techniques will help minimize post-odontectomy pain and increase patient comfort during the recovery process. The use of anesthetic agents with a longer duration of action can prolong the pain-free period after surgery, giving more time for the patient to recover comfortably. Additionally, certain techniques, such as nerve block anesthetic injections can be more effective in managing pain for certain procedures compared to local infiltration alone.[18,19]

Other uncontrolled factors contribute to postoperative pain. One of them was the patient's anxiety level, whereas the sensation of pain can increase due to anxiety or fear.[20] Another factor that allows patients to feel pain is the patient's surgical experience. Patients who have undergone previous surgery may experience lower pain intensity due to previous pain management experience.[21]

The most important determinant of the amount of postoperative pain that occurs is the length of the operation. Neither swelling nor trismus correlates with the length of time of the surgery. There is, however, a strong correlation between postoperative pain and trismus, indicating that pain may be one of the principal reasons for the limitation of opening after the removal of impacted third molars.[1]

Postoperative pain usually can be managed by a large variety of analgesics.[3] Ibuprofen has been demonstrated to be an effective analgesic to control discomfort from a tooth extraction.[3] Analgesics should be given before the effect of the anesthesia subsides. In this manner, the pain is usually easier to control, requires less drug, and may require a less potent analgesic. The administration of nonsteroidal anti-inflammatories before surgery may be beneficial in aiding in the control of postoperative pain.[1]

CONCLUSION

The present study concluded that the severity of third molar impaction of the patients in RSD Gunung Jati Cirebon is mostly at a moderate level with a percentage of 64.9%. Most patients feel moderate pain after odontectomy, with a percentage of 37.8%. There was no relationship between the severity of the impaction and the intensity of post-odontectomy pain at RSD Gunung Jati Cirebon.

CONFLICT OF INTEREST

There is no conflict of interest in writing this article.

ACKNOWLEDGEMENT

We want to express our gratitude to Lembaga Penelitian dan Pengabdian

kepada Masyarakat (LPPM) Universitas Jenderal Achmad Yani (Unjani), who financially support the study, Gunung Jati Regional Hospital (RSGJ) Cirebon, and everyone who contribute to the study and writing of this publication.

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