RESEARCH

Analgesic Profile in Intensive Observation Room (*Ruang Observasi Intensif/ ROI*) Dr. Soetomo General Hospital Surabaya

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ABSTRACT

Introduction: Pain is a condition that the majority of critical care patients will possibly suffer at some point during their stay in the intensive care unti (ICU). In both medical and surgical ICU patients, the incidence of considerable pain is still 50% or greater. Analgesic administration is considered one of the most effective pain managements. While useful, it can cause detrimental effects if not used according to its indications and regulations.
Objective: To obtain the analgesic profile used in intensive observation room (*ruang observasi intensif/ROI*) Dr. Soetomo General Hospital Surabaya.
Methods: This study is a retrospective descriptive study with 537 medical records met the inclusion criteria.
Result: The most frequent analgesic used is metamizole (44.41%) and paracetamol (16.08%) while ketamine was used the least (0.24%). Most commonly used analgesic adjuvants is phenytoin (6.12%). The amount of single drug administration (52.70%) is more frequent than multimodal analgesic (47.30%). Metamizole with paracetamol is the most popular analgesic combination (20.74%), followed by metamizole with tramadol (14.17%), and metamizole with fentanyl (12.99%). The most common procedures recorded are obstetrics and gynaecological (29.98%), cranial and general surgery with the same result (21.42%), and orthopaedic (12.29%). 205 samples with Wong-Baker FACES Pain Ratings Scales stated that there is an increase in patients who do not experience pain after administration of analgesics (N=25 to N=132), patients that underwent mild pain decreased (N=134 to N=65), and patients with moderate and severe pain also decreased (N=43 to N=8 and N=3 to N=0 respectively).
Conclusion: Non-opioid analgesic dominates the analgesic profile in *ROI* Dr. Soetomo General Hospital Surabaya compared to opioids that generally used the most worldwide. Giving analgesics to patients has been proven successful in reducing the pain degree.

Keywords: analgesic; intensive observation room (*ROI*); medicine; non-opioid; opioid

INTRODUCTION

Pain is an unpleasant sensory and emotional sensation that is linked to, or resembles, real or possible tissue injury.[1] The effect of pain on the quality of human life is significant, both physically and psychologically, thus any measurement is considered to relieve pain. Simple pain medications are effective in 20%-70% of cases.[2]

Despite the fact that pain relief is a fundamental right, the majority of critical care patients will suffer pain at some point during their stay in the intensive care unit (ICU), notably when clothing, changing positions, and even repose, and this can be a major source of stress. Because of altered levels of consciousness, mechanical ventilation, or large doses of sedatives or muscle relaxants, the majority of critical care patients may be unable to self-report their pain vocally or with other signals. In both medical and surgical ICU patients, the incidence of considerable pain is still 50% or greater.[3] These individuals have procedural pain in addition to resting pain, pain from surgery, trauma, burns, and cancer. It's ubiquitous, and insufficient procedural pain therapy is still a major issue for ICU patients. Bathing, back and pressure point massages, sheet changes, and repositioning are the most common uncomfortable nursing care treatments in ICU patients.[4]

Regardless of the clinical situation, a complete pain assessment is required. Location, features, severity, start, progression, duration, quality, radiation, relieving and exacerbating factors, and effects of past therapy should all be included in pain assessments. This information assists clinicians in determining the underlying cause of pain as well as the treatment strategies that will be used. Sedatives and analgesics play important role in pain management in the ICU.[5]

Opioids are the principal analgesics used in the ICUs because of potency, concomitant mild sedative and anxiolytic properties, and their ability to be administered by multiple routes. Morphine, fentanyl, and hydromorphone are the most common opioids administered in ICUs.[6] Paracetamol, NSAIDs, ketamine, clonidine, and dexmedetomidine are examples of non- opioid analgesics that are routinely used.[7]

While useful, analgesics can cause detrimental effects if not used according to its indications and regulations. It also comes along with adverse effects, contraindications, and toxicity.[8] Clinicians should be more mindful of the possibility of long-term impacts, and they should use tactics that optimize benefit while limiting risk. Frequent assessments for pain, anxiety, and agitation using a reproducible scale; combination therapy combining opioids and sedatives; and, most importantly, careful communication among team members, with a special recognition that the bedside nurse must be empowered to pair assessments with drug manipulation.[9]

This study intends to assess the analgesic used in intensive observation room (*ruang observasi intensif/ROI*) Dr. Soetomo General Hospital and the efficacy of the analgesic to reduce the pain in comparison to the analgesic used world-wide.

METHOD

This is a descriptive retrospective study which was conducted by using medical records of patients who received analgesic in the intensive observation room (*ruang observasi intensif/ROI*) from January 1st until June 30th, 2020. This study used consecutive sampling technique in which the inclusion criteria are patients who received analgesic in the *ROI* Dr. Soetomo General Hospital Surabaya from January-June 2020. Patients with incomplete medical records are excluded from this study.

The data consists of the patients' clinical profile: diagnosis and pain assessment and the analgesic profile: class of analgesic, route of administration, amounts of drugs, and appropriate dose. The data was processed using Microsoft Excel and presented in distribution frequency Table and Figure. This study is ethically approved by the committee of ethics Dr. Soetomo General Hospital Surabaya (0647/LOE/301.4.2/X/2021).

RESULT

The research subject that met the inclusion criteria in this study are 537 medical records of patients who were treated in the intensive observation room (*ruang observasi intensif/ROI*) at RSUD Dr. Soetomo Surabaya. The subjects consist of all ranges of age and have complete medical records.

Table 1. Classification of procedure

Procedure	N (%)
Operative Procedure	
Obstetrics and Gynaecology	161 (29.98)
Cranial	115 (21.42)
General Surgery	115 (21.42)
Orthopaedic	66 (12.29)
Other Operations	65 (12.10)
Cardio-Thoracic	4 (0.74)
Spinal	3 (0.56)
Non-Operative Procedure	8 (1.49)

Out of 537 subjects, 529 are patients underwent operative procedure while the rest are patients underwent non-operative procedure. Obstetrics and gynaecology procedure dominate the data (29.98%) followed by cranial and general surgery that has same result (21.42%). Other operations such as tracheostomy, incision and drainage of abscesses, eye surgery, tooth extraction surgery, and genitourinary surgery accounted for 65 cases (12.10%).

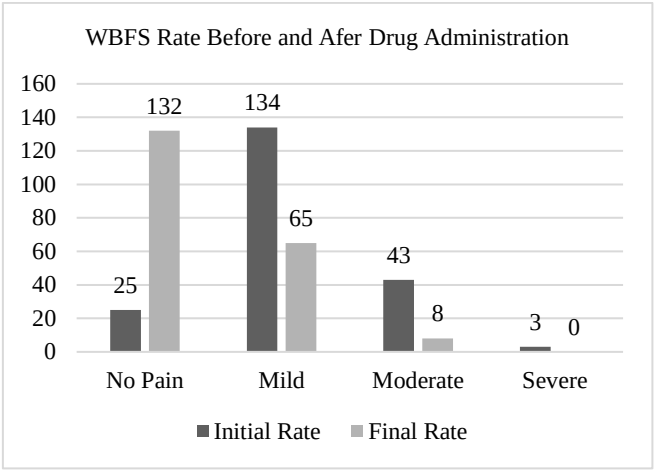

Figure 1. Wong baker faces pain rating scale (WBFS). Description of WBFS rate quantitatively: 0 in no pain, 1-3 in mild pain, 4-6 in moderate pain, and 7-10 in severe pain.

A total of 205 samples of WBFS usage reported that there is a change between the number of each category before and after the administration of analgesics. There is an increasing number of patients who do not feel pain after administration of analgesics (N=25 to N=132) while the numbers of patients who underwent mild, moderate and severe pain decreased after analgesic administration (N=143 to N=65, N=43 to N=8, and N=3 to N=0 respectively).

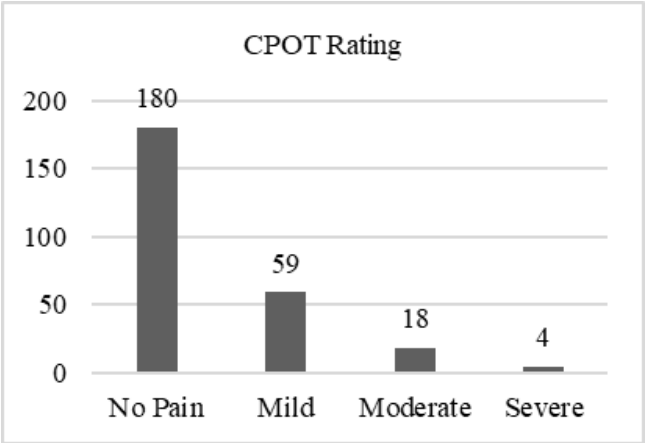

Figure 2. Critical pain observational tool rating (CPOT). Description of CPOT rate quantitatively: 0 in no pain, 1-3 in mild pain, 4-6 in moderate pain, and 7-10 in severe pain.

In 261 patients that were on ventilator, 180 patients expressed no pain while 59 patients expressed mild pain. 18 reported having moderate pain, while 4 patients had expressed severe pain. Although the initial status of patients on mechanical ventilation was that they did not feel pain, analgesics were still applied because there were obstacles in assessing the pain scale of these patients. Direct pain assessment is essential, but the presence of a ventilator can hinder this process.[10] Adequate assessment is important, and even in the presence of the correct instrument, there can still be errors in pain assessment, so this might be a consideration for administering analgesics.

Table 2. Pain scale ratings based on procedure

Procedure	Mean Initial WBFS Rating	Mean Final WBFS Score	Mean CPOT Score
Operative			
Obstetrics and Gynaecology	1.83	0.16	0.60
Cranial	2.11	0.83	0.64
General Surgery	3.31	1.11	1.08
Orthopaedic	3.42	0.96	1.20
Other Operations	3.00	0.65	0.92
Cardio-Thoracic	2.50	0.00	-
Spinal	2.00	1.00	-
Non-Operative Procedure	2.45	1.20	-

Orthopaedic procedures placed number one as the procedure that has highest pain rating with mean initial WBFS Rating on 3.42 and mean CPOT score of 1.20 while obstetrics and gynaecology procedure scored the last with the mean initial WBFS score of 1.83 and mean CPOT score of 0.92.

Table 3. Medication profile

Drug Name	N (%)
Analgesic	
Metamizole	370 (44.41)
Paracetamol	134 (16.08)
Ketorolac	90 (10.80)
Tramadol	82 (9.84)
Fentanyl	76 (9.12)
Morphine	14 (1.68)
Dexmedetomidine	6 (0.72)
Ketamine	2 (0.24)
Adjuvant	
Phenytoin	51 (6.12)
Phenobarbital	2 (0.24)
Sedative	
Midazolam	4 (0.48)
Ropivacaine	2 (0.24)

The majority of analgesics used are metamizole (44.41%), paracetamol (16.08%), and ketorolac (10.80%), where all three are non-opioid groups. Tramadol (9.84%), fentanyl (9.12%), and morphine (1.68%) followed with less usage. Dexmedetomidine (0.72%) and ketamine (0.24%) are classified into the analgesics because it contains analgesic property at low dose. There are only two adjuvants recorded, both being in the group of anticonvulsants, namely phenytoin (6.12%) and phenobarbital (0.24%). Sedatives are used less with only midazolam and ropivacaine with the percentage of 0.48 and 0.24 respectively.

Table 4. Pain scale ratings based on management approach

Management Approach	N (%)	Average Initial WBFS Rate	Average Final WBFS Rate	Average CPOT Rate
Single Drug	283 (52.70)	2.71	0.61	0.83
Multimodal	254 (47.29)	2.91	0.79	0.91

From the total of 537 samples, it is found that the amount of single drug administration is slightly more frequent than the administration of combination drugs with the total of 283 count while the combination drugs administration has the total count of 254. There is not much differences between the single drug and multimodal pain rating scale pattern, yet multimodal administration has higher numbers.

Table 5. Single drug profile

Name	N (%)	Mean Initial WBFS Score	Mean Final WBFS Score	Mean CPOT Score
Metamizole	181 (63.95)	2.67	0.67	0.96
Ketorolac	49 (17.31)	1.89	0.27	0.27
Paracetamol	32 (11.30)	2.55	0.77	0.92
Tramadol	9 (3.18)	3	0.22	0
Fentanyl	9 (3.18)	4	1.67	0.3
Morphine	2 (0.70)	-	-	1
Midazolam	1 (0.35)	-	-	0

Metamizole dominates the single drug profile (63.95%) with the average WBFS pain score is reduced by 2 points. Ketorolac followed second (17.31%) with the average WBFS pain score reduced by 1.62 points. Paracetamol is the third most common single drug used (11.30%) that reduced WBFS pain score by 1.78 on average. Tramadol and Fentanyl are in the same number (3.18%) with both given toward patients with higher initial WBFS score. Tramadol reduced 2.78 and fentanyl reduced 2.33 of the pain score by average. Both morphine (0.70%) and midazolam (0.35%) recorded being given toward patients that do not have WBFS score. All of the medications listed on the table has average CPOT Score below 1 except for morphine.

Table 6. Multimodal analgesic profile

Combination	N(%)	Mean Initial WBFS Score	Mean Final WBFS Score	Mean CPOT Score
Metamizole + Paracetamol	52 (20.74)	2	0.10	0.80
Metamizole + Tramadol	36 (14.17)	2.70	0.40	0.42
Metamizole + Fentanyl	33 (12.99)	4.55	1.89	1.50
Metamizole + Phenytoin	21 (8.26)	2.60	0.60	0
Ketorolac + Tramadol	16 (6.29)	2.67	0.67	1.25
Ketorolac + Paracetamol	12 (4.72)	2.50	1.14	0
Paracetamol + Tramadol	12 (4.72)	3	0.67	0.33
Other Combination(s)	72 (28.34)	-	-	-

This study recorded that metamizole and paracetamol (20.74%) being the most favoured multimodal analgesic administered. It also reduced WBFS score 1.90 points by average. Metamizole and tramadol (14.17%) followed second with the capability to reduce WBFS score by 2.30 points on average. Metamizole and fentanyl (12.99%) is the third most popular combinations with higher average WBFS initial pain score (4.55%) and could be reduced by around 2.66 points. Similar to single drug profile result, almost all of average CPOT scores in multimodal analgesic profile is less than 1 with metamizole fentanyl (1.50%) and ketorolac tramadol combinations as exceptions (1.25%).

While studies conducted in 16 countries shown result that opioid analgesics are the most commonly used analgesic in the ICU–mainly morphine, fentanyl, and sufentanyl[11] –*ROI* Dr. Soetomo General Hospital is more inclined to utilize non-opioid analgesics. It is recorded that in total of 833 drugs of the group opioid, non-opioid, adjuvant analgesics and sedative, 72.26% of it comes from non-opioid analgesics. Metamizole (44.41%) is the most commonly used non-opioid analgesic, while the most common used opioid analgesic is tramadol (9.84%).

DISCUSSION

Pain assessment is the initial step of pain management, in which patients both with or without ventilator being assessed by several pain scale ratings. The majority of the non-ventilator patients' pain severity is observed with Wong Baker FACES Pain Scale Rating (WBFS), while the most popular way to measure the degree of discomfort in patient with ventilator is by Critical Care Pain Observation Tool (CPOT). Both of these pain scale rating interpreted as mild pain for the score of 1-3, moderate pain for the score of 4-6 and severe pain for the score of 7-10.[12, 13]

Each medical procedure has its own degree of pain that can be used as a benchmark for the appropriate analgesic administration for each patient. Orthopaedic procedures tend to occupy the highest positions in post-operative pain levels, while obstetric and gynaecological procedures such as caesarean section and hysterectomy occupy the 9th and 27th positions of the 179 surgical procedures studied, respectively. Cranial procedures were found to be in position 173 while general surgery such as appendectomy was in position 19 with a mean NRS pain scale of 5.95 points.[14] The difference in pain scale for each procedure can also be seen in Table 2, where orthopedic procedures have the highest average initial WBFS and CPOT values. Attached in Table 1, the majority of procedures contained in the *ROI* of Dr. Soetomo General Hospital are obstetrics and gynaecology, cranial, and general procedure. Meanwhile, procedures with a high post-operative pain scale were only 66 cases (12.29%). Based on Figures 1 and 2, the number of patients who experienced moderate (N=61) to severe pain (N=7) tended to be fewer than patients who experienced mild pain (N=239) and no pain at all (N=159). Algorithm for giving analgesics also depends on the degree of pain experienced by the patient. The first stage is that patients who experience mild pain will be given non-opioid analgesics such as NSAIDs and paracetamol, the second stage is that patients who experience moderate pain will be given weak opioids (hydrocodone, codeine, tramadol) with or without non-opioid analgesics, and with or without adjuvants. While the third stage with severe pain will be given

potent opioids (morphine, methadone, fentanyl, oxycodone, buprenorphine, tapentadol, hydromorphone, oxymorphone) with or without non-opioid analgesics, and with or without adjuvants.[15,16] As shown in Tables 5 and 6, potent analgesics were administered to patients with mean WBFS pain scale of 4 - 4.55. In addition, inevitable consequences of procedures such as the incidence of paralytic ileus in post-operative caesarean section and abdominal surgery, which incidentally is the most common diagnosis in *ROI*, is quite common. Meanwhile, most opioid agonists including morphine, cause decreases in gastric and abdominal motility.[17,18] Hence, the administration of opioid analgesic in cases of obstetrics and gynaecology is not widely used. These situations may be the reasons for the difference in the use of analgesic types in ROI compared to world-wide.

It is recommended to utilize a multimodal approach to manage acute pain after surgery if possible. Aside from opioids, other medicines with different modes of action affect pain pathways, resulting in additive and/or synergistic effects. Alpha 2 agonists, NMDA receptor antagonists, gabapentinoids, dexamethasone, NSAIDs, acetaminophen, and duloxetine are some of these medications.[12] This study recorded that 48% of the administration used multimodal analgesics while the single drug administration count is slightly more frequent with the percentage of 52%. There are 7 major combinations recorded in the *ROI* with the most frequent combination recorded is metamizole and paracetamol. Several studies proved that using a combination between non-opioid and opioid analgesic provide greater pain relief than the individual use of each drug.[19,20] However, this study proves that there was no significant difference of pain scale ratings in patients who received multimodal analgesics and single drug analgesics even though patients receiving combined analgesics had higher average pain rating scales. The use of combination between analgesic and its adjuvant is also popular, mainly in the group of anticonvulsants. This combination was noted to be encountered in cases of brain surgery such as craniotomy, external ventricular drainage, endoscopic evacuation of hematoma and also cases of caesarean section. There is also no significant difference on pain scale ratings between patients who received adjuvants and the patients who did not.

CONCLUSION

Out of 537 samples taken in this study from the span of January-June 2020, the most common procedure in Intensive Observation Room (*Ruang Observasi Intensif*/ROI) Dr. Soetomo General Hospital Surabaya are obstetrics and gynaecology, head, and abdomen procedures. There are differences in the types of analgesics used in *ROI* compared to the types of analgesics used worldwide in general. This study proves that *ROI* prefers to use non-opioid analgesics over opioid analgesics. Metamizole is the most favoured analgesic administered, followed by paracetamol, tramadol, fentanyl, morphine, dexmedetomidine, and ketamine respectively. Adjuvant analgesics administered all come from anticonvulsant group, two of them are phenytoin and phenobarbital. The administration of sedative is less used with midazolam and ropivacaine as the drug of choice. Giving analgesic has been proven successful to reducing pain degree.

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