ORIGINAL ARTICLE
Özgün Araştırma

The Habits of Using Painkiller In Adult Inpatients With Burn Injury

Yanık Yaralanması Olan, Hastaneye Yatırılan Erişkin Hastalarda Ağrı Kesici Kullanma Alışkanlıkları

Yazışma Adresi
Correspondence Address

Mehmet TAPAN
Deparment of Plastic, Reconstructive and Aesthetic Surgery, Akdeniz University, Antalya, Türkiye

drmtapan@gmail.com

Geliş Tarihi : 23 July 2023
Received
Kabul Tarihi : 04 August 2023
Accepted
E Yayın Tarihi : 01 September 2023
Online published

Bu makalede yapılacak atıf
Cite this article as

Tapan M, Ayaz T, Kece I, Cengiz M, Ozkan O, Ozkan O.
The Habits of Using Painkiller In Adult InpatientsWith Burn Injury
Akd Med J 2023; 9(3): 325-330

Mehmet TAPAN
Deparment of Plastic, Reconstructive and Aesthetic Surgery, Akdeniz University, Antalya, Türkiye
ORCID ID: 0000-0002-9796-6375

Tuna AYAZ
Akdeniz University, School of Medicine, Antalya, Türkiye
ORCID ID: 0009-0007-0961-9247

Ilke KECE
Akdeniz University, School of Medicine, Antalya, Türkiye
ORCID ID: 0009-0003-2155-6761

Mucahit CENGIZ
Akdeniz University, School of Medicine, Antalya, Türkiye
ORCID ID: 0000-0002-0130-9021

Omer OZKAN
Deparment of Plastic, Reconstructive and Aesthetic Surgery, Akdeniz University, Antalya, Türkiye
ORCID ID: 0000-0002-9031-5596

Ozlenen OZKAN
Deparment of Plastic, Reconstructive and Aesthetic Surgery, Akdeniz University, Antalya, Türkiye
ORCID ID: 0000-0001-6744-9193

ABSTRACT

Objective:
Modern burn care is dependent on the effective management of burn pain. Although opioids remain the cornerstone of treatment, their adverse effects remain serious. In this study, we investigated non-opioid painkillers, including acetaminophen and dexketoprofen, which are commonly used in the clinical practice for adult burn inpatients who do not require admission to an intensive care unit.

Methods:
Thirteen consecutive inpatients with burns were included in this study. During the six-day period, the patients self-administered painkillers as needed. The time of medication intake was recorded, and a visual analog scale was used to assess pain. Thereafter, statistical analyses were performed.

Results:
No significant differences were observed between age and sex groups. As the percentage of burns increased, the number of painkillers used also increased. It was found that the patients took painkillers most frequently at 11 o'clock (when the wound dressing was changed) and least frequently at 14 o'clock. No significant difference was observed between the effects of dexketoprofen and paracetamol in reducing pain.

Conclusions:
The need for painkillers in patients with burns varies throughout the day. The effectiveness of acetaminophen and dexketoprofen during the day was higher than that during dressing changes. The total body surface area should be considered with regards to the amount and frequency of painkiller administered.

Key Words:
Acetaminophen, Adult inpatient with burn, Burn injury, Dexketoprofen, Painkiller

DOI: 10.53394/akd.1333575

ÖZ

Amaç:

Modern yanık bakımı, yanık ağrısının etkili yönetimine bağlıdır. Opioidler tedavinin temel taşı olmaya devam etse de, yan etkileri ciddiyetini koruyor. Bu çalışmada, yoğun bakım ünitesine yatış gerektirmeyen erişkin yanık hastalarında klinik uygulamada yaygın olarak kullanılan asetaminofen ve deksketoprofen gibi opioid olmayan ağrı kesicileri araştırdık.

Yöntemler:

Bu çalışmaya ardışık 13 yanıklı yatan hasta dahil edildi. Altı günlük süre boyunca, hastalar gerektiği kadar ağrı kesici kullandılar. İlaç alma zamanı kaydedildi ve ağrıyı değerlendirmek için "visual analog scale" kullanıldı. Daha sonra istatistiksel analizler yapıldı.

Bulgular:

Yaş ve cinsiyet grupları arasında anlamlı bir fark gözlenmedi. Yanık yüzdesi arttıkça kullanılan ağrı kesici sayısı da arttı. Hastaların ağrı kesici ilaçlarını en sık saat 11:00'de (pansuman değiştirilirken), en az saat 14:00'te aldıkları saptandı. Ağrıyı azaltmada deksketoprofen ve asetominofen etkileri arasında anlamlı bir fark gözlenmedi.

Sonuç:

Yanık hastalarında ağrı kesici ihtiyacı gün boyunca değişkenlik gösterir. Asetominofen ve deksketoprofen'in gün içindeki etkinliği pansuman değişimlerine göre daha yüksekti. Uygulanan ağrı kesici miktarı ve sıklığı ile ilgili olarak toplam vücut yüzey alanı dikkate alınmalıdır.

Anahtar Kelimeler:

Asetominofen, Erişkin hastaneye yatırılan yanık hastası, Yanık yaralanması, Deksketoprofen, Ağrı Kesici

INTRODUCTION

Modern burn care is fundamentally dependent on the effective management of burn pain. However, pain management in patients with burn injuries is complex. Opioids are the cornerstone of treatment, especially in the acute stage of burn, pain and are the most effective drugs for the management of moderate-to-severe perioperative pain. However, opioid use is associated with serious adverse effects. The Center for Disease Control have released guidelines encouraging the use of opioid-sparing therapies for acute pain management (1-4).

Patients with burns may experience extreme pain due to injuries, mobilization, wound care, and surgery. Burn injuries cause two types of pain: Evoked (procedural) and background pain. Background pain is less intense but is constant. Burn injury pain is typically categorized temporally, first as pain during the acute phase and then as pain during the chronic phase, when the majority of tissue healing has taken place (5).
In this study, we investigated the non-opioid painkiller habits of adult inpatients with burns who did not require admission to an intensive care unit. The primary aims of this single center study were to: 1) Determine the painkiller need of the patients according to sex, age, and total burn surface area; 2) Determine the effect of acetaminophen versus dexketoprofen; 3) Determine the efficacy of the drugs during wound dressing and daily activity in the hospital; and 4) Determine the painkiller habits of patients before and after surgery.

MATERIAL and METHODS

This study was conducted between July 2022 and November 2022. The study was planned as a cross-sectional type and ethical approval was obtained from the Clinical Research Ethics Committee of Akdeniz University Faculty of Medicine (20.07.2022 KAEK-439). The study was carried out in accordance with the Research and Publication Ethics and the Principles of the Declaration of Helsinki; Permission was obtained from the relevant institutions where the study would be conducted, and consent was obtained by explaining the purpose and scope of the study to the participants.

Thirteen consecutive patients were included in this study. The inclusion criteria were: 1) Patients ≥ 18 years; 2) not requiring admission to an intensive care unit; 3) Partial thickness burn injury between 10 and 30 % total body surface area; 4) Burns that involve the face, hands, perineum, genitalia, feet, or major joints; 5) Full thickness burns; 6) Patients only used painkillers when they experienced pain: 7) the pain killers used were acetaminophen or dexketoprofen which are commonly used in Turkey; and 8) At least 6 d hospital stay. Painkillers were randomly selected when required. The need for painkillers was recorded according to the length and hours of hospital stay. The wound dressing was always changed at 11 o'clock and on the day of the operation, there was no wound dressing at the service. For standardization, wound dressing and surgery were performed simultaneously (11 o'clock). Patients underwent surgery only once on the fourth or fifth day of the six-day period. Opioids are routinely used in these operations. Children with burns and adult patients with a history of burn admissions, polytrauma, or inhalation injuries were excluded.

A visual analog scale from 0 to 10 was used to assess the patient's pain scores when they experienced pain 30 min after medication administration. The reason for the 30-minute wait period was the intersection time of both maximum plasma concentration levels after the administration of the two drugs. Acetaminophen reached its maximum plasma concentration after 20–90 min after administration, and dexketoprofen reached its maximum concentration at 15–45 min after administration (6,7).

Statistical Analysis

Statistical analyses were performed using IBM SPSS Statistics for Windows, Version 22 (IBM Corp., Armonk, NY, USA). Conformity of the data to normal distribution was evaluated using visual (probability and histogram graphs) and analytical methods (Kolmogorov-Smirnov/Shapiro-Wilk tests). The data distribution was nonparametric. Therefore, descriptive statistics are presented as medians (minimum-maximum). The Wilcoxon test was used to compare data from the same patients. The

Mann-Whitney U test was used to compare the data from different patients. The Spearman correlation test was used to determine whether there was a significant relationship between patient age and the number of painkillers used. The statistical significance was set at $p<0.05$ in all analyses.

RESULTS

Patients were aged between 18 and 70 years. Ten male and three female patients were included in this study. Patient characteristics are listed in Table I.

Table I. Patient characteristics

	Gender	Age	Etiology	Affected Region	Total burn surface area (%)
Patient 1	M	51	Flame	Right Forearm, Right Lumbar Region	15
Patient 2	M	34	Flame	Both Sides Forearm, Both Sides Thigh	15
Patient 3	M	48	Electric	Both Sides Palm, Left Foot	2
Patient 4	M	25	Electric	Left Foot	5
Patient 5	M	34	Electric	Head, Right Arm, Right Hand	8
Patient 6	F	20	Hot water	Both Sides Hand, Trunk, Both Sides Thigh	18
Patient 7	M	54	Thermal contact	Both Sides Leg, Both Sides Foot	8
Patient 8	M	70	Flame	Head, Neck, Left Arm	9
Patient 9	M	32	Flame	Both Sides Arm, Both Sides Hand	12
Patient 10	F	46	Hot water	Neck, Both Sides Arm	10
Patient 11	M	30	Flame	Head, Neck, Trunk, Left Arm, Right Foot	30
Patient 12	F	29	Hot water	Head, Trunk, Left Arm, Left Thigh	15
Patient 13	M	18	Hot water	Head, Neck, Right Arm	10

While no significant relationship was found between age and the number of painkillers used, there was a significant positive relationship between the percentage of burns and the number of painkillers used. As the percentage of burns increased, the number of painkillers used also increased ($r= 0.569$, $P =0.042$) (Table II).

Table II. Correlation of age and burn percentage with the amount of pain killer used. r: Correlation coefficient, p: Significance value, data showing significant correlations are marked in bold

		Pain Killer Quantity
Age	*r*	0,22
	p	0,47
Total Burn Surface Area	*r*	**0,569**
	p	**0,042**

It was found that patients took painkillers most frequently at 11 o'clock and least frequently at 2 pm (Table III).

Table III. The times at which each patient took painkillers during the 6 days.

	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
Patient 1	0	1	0	3	0	0	0	1	1	0	1	0	0	1	0	3	0	11
Patient 2	0	0	1	4	0	0	0	0	0	0	1	1	0	0	1	1	2	11
Patient 3	0	1	0	0	0	0	0	0	0	0	1	0	0	0	1	0	2	5
Patient 4	0	0	0	0	1	0	0	0	0	0	0	0	0	0	4	0	1	6
Patient 5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Patient 6	0	0	0	0	2	0	0	0	0	0	1	0	0	0	1	0	0	4
Patient 7	0	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	2
Patient 8	0	0	0	5	0	0	0	0	1	0	3	0	0	0	4	0	1	14
Patient 9	0	0	1	0	1	1	0	0	0	0	1	1	0	0	0	0	0	5
Patient 10	0	0	0	0	1	0	0	1	1	0	1	0	0	0	1	1	1	7
Patient 11	2	0	1	2	2	0	0	1	1	0	0	0	1	1	1	0	3	15
Patient 12	0	1	1	3	0	0	0	0	1	0	1	0	0	1	2	0	0	10
Patient 13	1	0	1	2	0	0	0	0	0	1	0	0	0	0	2	0	0	7
toplam	3	4	5	19	7	2	0	3	5	1	10	2	1	3	18	5	10	

When the total scores of female and male patients were compared, no significant differences were found (p=0.675). There was no significant difference between the painkiller habits of women after wound dressing, that is, at 11 o'clock, and men's habits of taking painkillers at 11 o'clock (p=0.692).

Taking pain killers at 11 o'clock was found to be significantly more frequent than that at 8, 9, 10, 13, 14, 15, 16, 17, 19, 20, 21, and 23 h. ($p<0.05$).

The number of analgesics administered before surgery (47) was found to be significantly lower than the number of painkillers administered after surgery (total 51) (p=0.027).

There was no significant difference between the number of painkillers used before (n = 10) and after surgery (n = 9) during wound dressing (p=0.098).

The reducing effect (52.55% reduction) of the pain killer given to the patients after dressing or surgery was found to be significantly lower than the reducing effect (60% reduction) of the pain killer given due to daytime pain ($p<0.001$).

There was no significant difference between the effect of dexketoprofen in reducing pain (58.37% reduction) and that of paracetamol (58.08% reduction) (p=0.372).

DISCUSSION

According to one study, parents of the patients with burn injuries tended to give painkillers as scheduled (8). This tendency may sometimes cause overtreatment of patients. However, burn mass-casualty incidents, such as explosions, accidents, and terror attacks, can occur at any time. When such incidents occur, burn centers can be better prepared by determining the required amount of analgesics (9). Our study design was based mainly on these hypotheses in adults. In this study, the patients were administered medication when needed.

Opioids, the cornerstone of treatment for burn injuries, can cause many side effects. Studies have shown that up to 92% of people who use opioids to treat acute pain experience adverse effects. At least one side effect is experienced by patients, and two or more side effects are experienced by 76% of patients (10). Patients should regularly review their pain with careful dose escalation to improve analgesic results and reduce the risk of side effects of opioids. This is crucial in the acute phase of an injury and in the first few days after surgery. Acetaminophen and nonsteroidal anti-inflammatory drugs are extensively used painkillers, that are considered much safer than opioids. As a result of their ability to work in conjunction with opioids, their use can reduce the quantity of opioids required by up to 20% to 30% (11). In our study, we used opioids only during the intraoperative period. Therefore, we aimed to avoid the adverse effects of opioids.

Burn center referral criteria are well defined (12). Our patients were selected based on this guideline, excluding patients who would not require admission to the intensive care unit. The operating dynamics of the intensive care unit differ from those of inpatients in the clinic.

This study was conducted without pediatric burns. Adequate pain control is very important in the pediatric burn population, and verbalizing complaints is lacking (8).

No significant difference was found between female and male patients in terms of pain scores or the need for painkillers during wound dressing. Age was also not a significant factor associated with the need for painkillers. However, the need for painkillers increased with an increase in the total burn surface area; this result is consistent with that of Laezar et al. (9).

According to our study, patients often felt the need for painkill-

ers at the time of wound dressing, while one of the times they needed painkillers the least was between 13 and 17 in the afternoon. Although our study showed that the need for painkillers increased after surgery, the need for painkillers during wound dressing did not.

According to a study on lower back pain, intravenous dexketoprofen, morphine, and acetaminophen are not superior to one another (13). In a dysmenorrhea study, dexketotoprofen was associated with a higher visual analog scale score, which was not clinically significant. (14). We found no statistically significant differences in visual analog scale changes between dexketoprofen and paracetamol in our burn inpatients. In addition, the efficacy of these painkillers during the day was higher than during dressing changes.

CONCLUSION

The need for painkillers in patients with burns varies throughout the day. The effectiveness of acetominophen and dexketoprofen during the day was higher than that during dressing changes. The patient's total body surface area should be considered when determining the amount and frequency of painkiller used.

Ethics Committee Approval:
This research complies with all the relevant national regulations, institutional policies and is in accordance with the tenets of the Helsinki Declaration, and has been approved by the Akdeniz Medical Faculty Ethical Committee, Akdeniz University (approval number: KAEK-439).

Informed Consent:
All the participants' rights were protected and written informed consents were obtained before the procedures according to the Helsinki Declaration.

Author Contributions:
Concept –M. T.; Design – M. T. Supervision – Ö. Ö., Ö. Ö.; Resources – T. A., İ. K., M. C.; Materials -M. T., T. A., İ. K., M. C.; Data Collection and/or Processing – T. A., İ. K., M. C. Analysis and/ or Interpretation – M. T. Literature Search – M. T.; Writing Manuscript – M. T.; Critical Review – Ö. Ö., Ö. Ö.

Conflict of Interest:
The authors have no conflict of interest to declare.

Financial Disclosure:
The authors declared that this study has received no financial support.

REFERENCES

1. Bohnert AS, Valenstein M, Bair MJ, Ganoczy D, McCarthy JF, Ilgen MA, Blow FC. Association between opioid prescribing patterns and opioid overdose-related deaths. JAMA 2011;305:1315–21.

2. Schechter NL, Walco GA. The potential impact on children of the CDC guideline for prescribing opioids for chronic pain: above all, do no harm. JAMA Pediatr 2016;170:425–6.

3. Dowell D, Haegerich TM, Chou R. CDC guideline for prescribing opioids for chronic pain–United States, 2016. JAMA 2016;315:1624–45.

4. Gaither JR, Shabanova V, Leventhal JM. US national trends in pediatric deaths from prescription and illicit opioids, 1999–2016. JAMA Netw Open 2018;1:e186558.

5. James DL, Jowza M. Principles of Burn Pain Management. Clin Plast Surg. 2017; 44(4):737-47.

6. Forrest JA, Clements JA, Prescott LF. Clinical pharmacokinetics of paracetamol. Clin Pharmacokinet. 1982;7:93-107.

7. Barbanoj MJ, Antonijoan RM, Gich I. Clinical pharmacokinetics of dexketoprofen. Clin Pharmacokinet 2001;40(4):245-62.

8. Shahi N, Meier M, Phillips R, Shirek G, Goldsmith A, Recicar J, Zuk J, Bielsky A, Yaster M, Moulton S. Pain Management for Pediatric Burns in the Outpatient Setting: A Changing Paradigm? J Burn Care Res. 2020; 41(4):814-9.

9. Leazer ST, Nyland JE, Escolas SM, Aden JK, Rauschendorfer CA, Cancio LC, Chung KK. Analgesic use in contemporary burn practice: Applications to burn mass casualty incident planning. Burns. 2020; 46(1):90-6.

10. Gregorian RS, Kavanagh S. Importance of side effects in opioid treatment: a trade off analysis with patients and physicians. J Pain 2010;11:1095–108.

11. Marret E. Effects of nonsteroidal antiinflammatory drugs on patient-controlled analgesia morphine side effects: meta-analysis of controlled trials. Anesthesiology 2005;102:1249–60.

12. American Burn Association, 2011. Advanced Burn Life Support Course Provider Manual. American Burn Association, Chicago, IL, 25-26.

13. Eken C, Serinken M, Elicabuk H, Uyanik E, Erdal M. Intravenous paracetamol versus dexketoprofen versus morphine in acute mechanical low back pain in the emergency department: a randomised double-blind controlled trial. Emerg Med J. 2014;31(3):177-81.

14. Serinken M, Eken C, Karcıoğlu Ö. Intravenous Dexketoprofen versus Intravenous Paracetamol for Dysmenorrhea: A Randomized Controlled Trial. Balkan Med J. 2018; 35(4):301-5.