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Burn Injuries in the Pediatric Population - The Experience of a Single Center Over a Period of Two Years

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Rezumat

Arsuri în populația pediatrică – experiența unui singur centru pe o perioada de 2 ani

Introducere: Studiul a investigat abordarea terapeutica şi managementul clinic al pacienților pediatrici cu arsuri internați în Clinica de Chirurgie şi Ortopedie Pediatrică din cadrul Spitalului Județean de Urgență Craiova, pe o perioadă de doi ani (2017-2018). Obiectivul principal a constat în evaluarea eficienței tratamentelor aplicate, inclusiv pe procedurile de grefare şi pe impactul acestora asupra prognosticului pe termen lung.
Material şi metode: Au fost analizate retrospectiv cazurile a 80 de copii cu arsuri de severitate variată. Pacienții au fost clasificați în funcție de gradul de severitate şi mecanismul de producere a arsurilor. Datele colectate au fost prelucrate folosind Microsoft Excel 2021. Lotul de pacienți analizați a fost stratificat în trei categorii în funcție de suprafața corporală afectată (Body Surface Area - BSA): pacienții de categoria 1, cu un BSA ≤ 10%, au prezentat rezultate foarte bune şi au necesitat îngrijiri mai puțin intensive. Pacienții de categoria 2, cu un BSA între 10% şi 50%, au avut rezultate bune, dar au avut nevoie de îngrijiri mai prelungite. Pacienții de categoria 3, cu un BSA ≥ 50%, au avut rezultate satisfăcătoare, dar s-au confruntat cu mai multe provocări în recuperare, evidențiind necesitatea ameliorarii măsurilor de prevenție şi revizuirea protocoalelor de tratament existente.
Rezultate: Majoritatea pacienților proveneau din mediul rural, iar arsurile termice au fost cele mai frecvente. Au fost evidențiate eficacitatea şi siguranța tratamentelor aplicate, cu un impact general favorabil asupra prognosticului pe termen lung. Tratamentul a inclus atât abordări chirurgicale, cât şi nechirurgicale, cu rezultate clinice în general favorabile.

Concluzie: Studiul subliniază diferențele semnificative în ceea ce privește apariția leziunilor de arsură între mediul rural şi mediul urban, aceste rezultate sugerând necesitatea unor campanii de prevenție şi educație în ceea ce privește arsurile pediatrice şi îmbunătățirea accesului la serviciile medicale. De asemenea, studiul indică necesitatea unui management integrat pentru a reduce severitatea şi complicațiile asociate. Rezultatele obținute oferă o bază solidă pentru strategii viitoare de îmbunătățire a îngrijirii pacienților pediatrici cu arsuri.

Cuvinte cheie: suprafața arderii, localizarea arsurilor, etiologia arsurilor, tratamentul arsurilor

Abstract

Introduction: The study investigated the therapeutic approach and clinical management of pediatric burn patients admitted to the Pediatric Surgery and Orthopedics Clinic of the County Emergency Hospital Craiova over a two-year period (2017-2018). The primary objective was to evaluate the effectiveness of the treatments applied, including grafting procedures and their impact on long-term prognosis.

Material and Methods: The cases of 80 children with burns of varying severity were retrospectively analyzed. Patients were classified according to the severity and the mechanism of burn injury. The collected data were processed using Microsoft Excel 2021. Patients were classified into three categories based on the affected body surface area (BSA): Category 1 patients, with a BSA ≤ 10%, showed very good results and required less intensive care. Category 2 patients, with a BSA between 10% and 50%, had good outcomes but needed more prolonged care. Category 3 patients, with a BSA ≥ 50%, had satisfactory results but faced more challenges in recovery, highlighting the need for enhanced prevention measures and better treatment protocols.

Results: The majority of patients came from rural areas, and thermal burns were the most common. The effectiveness and safety of the treatments applied were highlighted, with a generally favorable impact on long-term prognosis. Treatment included both surgical and non-surgical approaches, with generally favorable clinical outcomes.

Conclusion: The study highlights significant differences between rural and urban environments, suggesting the need for prevention and education campaigns regarding pediatric burns and improved access to medical services. It also emphasizes the need for integrated management to reduce the severity and complications associated with burns. The results provide a solid foundation for future strategies aimed at improving the care of pediatric burn patients.

Key words: burn surface area, burn localization, burn etiology, burn treatment

Introduction

This study aims to investigate and analyze the management of all pediatric burn patients treated at the Pediatric Surgery and Orthopedics Clinic of the Craiova County Emergency Hospital over a two-year period, from January 1, 2017, to December 31, 2018.
The purpose of this study was to evaluate, based on past data, the incidence, typology, risk factors, and clinical evolution of burns in children. Through this analysis, the study aims to identify common injury patterns, mechanisms of occurrence, and their impact on child development. Additionally, such a study may contribute to improving prevention measures, optimizing treatment protocols, and reducing the risks associated with complications.

Burns in children represent a significant

global health concern, often leading to long-term physical and psychological consequences. Advances in treatment have improved outcomes, but managing pediatric burns remains complex due to the unique physiological and psychological needs of children (1).

Studies confirm that burns are a leading cause of injury among children, with scalds being the most prevalent, particularly in younger age groups. Hot liquids such as water or milk, constitute the majority of pediatric burns, especially in children under five years old (1). The risk factors involving both environmental and socio-economic factors, with a higher incidence reported in low- and middle-income countries (2).

Initial management of pediatric burns focuses on resuscitation and wound care. Fluid resuscitation is critical in the acute phase, with the Galveston formula as the most commonly used in clinical settings, particularly for burns covering significant areas of body surface area (BSA). Studies have shown that the Galveston formula is preferred over others, such as the Parkland formula, due to its better adaptation to the pediatric population (3,4).

Wound care in pediatric burns has evolved with advances in dressing materials and techniques. The use of silver-based dressings, such as silver sulfadiazine, is common due to its antimicrobial properties, which are crucial in preventing infections during the healing process. However, silver-impregnated foam dressings may offer superior outcomes in terms of healing time and patient comfort (5, 6). Early excision and grafting remain the gold standard for deep partial-thickness and full-thickness burns, helping to reduce the risk of sepsis and improve functional outcomes.

Surgical intervention, particularly skin grafting, is often necessary for severe burns. The choice of graft type - whether autografts, allografts, or synthetic materials such as Biobrane® - depends on the depth and location of the burn (7).

Pain management in children with burns is challenging due to the intensity of pain and the need to balance effective analgesia with safety. Nonpharmacological methods, such as distraction techniques and cognitive-behavioral therapy, are increasingly used alongside pharmacological interventions to provide comprehensive pain management (8). The combination of these methods has been shown to improve pain control and reduce anxiety during procedures such as dressing changes.

The psychological impact of burns on children is profound, affecting both the child and their family. The literature highlights the importance of early psychological intervention to mitigate the long-term effects of trauma. Burns can lead to conditions such as post-traumatic stress disorder (PTSD), depression, and anxiety, which can persist into adulthood if not addressed (9).

Material and Methods

The study included a total of 80 patients, all diagnosed with burns of varying severity, who required hospitalization and specialized treatment.

The study was conducted in accordance with ethical guidelines and received approval from the ethics committee. Informed consent was obtained from each patient or their guardians, ensuring that the participants were fully aware of the nature, purpose, and potential risks of the study. The publication of patient data adheres strictly to confidentiality requirements, respecting the provisions of the Declaration of Helsinki, which emphasizes the importance of ethical standards in medical research and the protection of participants' rights and well-being.

Our inclusion criteria were: age between 0 and 18 years, burn injuries (thermal, electrical, chemical, radiations), patients hospitalized between 2017-2018 at the Pediatric Surgery and Orthopedics Clinic of the Craiova County Emergency Hospital, complete medical data available (history, treatment, post-treatment evolution), hospital presentation within 0-10 days after the accident.

Our exclusion criteria were: age over 18

years, non-burn injuries, presentation at the hospital 10 days after the accident, incomplete medical data or missing essential information, incomplete transfers from other medical facilities without complete history.

Clinical evaluation included detailed monitoring of patients observation charts.

In this retrospective study, 80 patients, all diagnosed with burns of varying degrees that required hospitalization and specialized treatment, were identified following the evaluation sheet from the archive of the department and their analyses. The investigation protocol was rigorously established, including a series of parameters for quantifying the severity of burns, as well as specific parameters for monitoring the progression of each case.

The investigations were structured around two main aspects: the clinical evaluation of each patient and the therapeutic management applied. The clinical evaluation included detailed monitoring of the patient's medical record, with a focus on the surface area and degree of the burn, as well as on establishing a prognosis based on the implementation of appropriate local and general treatment. Special emphasis was also placed on the objective monitoring of vital signs and clinical indicators that could suggest an unfavorable progression.

The patients included in the study were classified according to the body surface area affected by the burn and the degree of scalding.

We used the ABA (American Burn Association) classification.

Statistical Analysis

For the processing and interpretation of the collected data, Microsoft Excel 2021 and Microsoft Corporation Software was used. The results were classified according to severity, which determined the number of days of care needed. Each statistical analysis was aimed at improving treatment protocols and developing specialized burn care centers.

Results

During the 2017-2018 period, a total of 80 children who suffered burns were monitored, with 40 patients each year. The severity of the injuries varied, and each case was analyzed based on the severity of the burn and the circumstances under which it occurred. A particularly relevant aspect of the analysis was the patients' backgrounds, identified through a detailed statistical comparison. The results indicated a significant prevalence of cases originating from rural areas. In 2017, 75% of the patients came from rural environments, with a similar percentage observed in 2018, when 77% of the cases were from rural areas. This represents a significant difference compared to cases from urban areas, which constituted only 25% in 2017 and 23% in 2018.

The analysis continued with an evaluation of the incidence based on the patients' gender. In 2017, there were 21 cases of female patients and 19 of male patients, suggesting a slight prevalence of burns in girls that year. However, in 2018, this ratio reversed, with 16 cases in female patients and 24 in male patients, indicating an increase in the incidence of burns in boys.

To better evaluate the characteristics of these cases, the patients were divided into three categories based on the percentage of body surface area (BSA) affected by burns. The first category included patients with a burned BSA of ≤10% (this category of patients had a hospital stay ranging from 1 to 10 days), the second category comprised patients with a BSA between 10% and 50% (this category of patients had a hospital stay ranging from 10 to 30 days), and the third category included patients with a BSA of ≥50% (this category of patients had a hospital stay of more than 30 days). In 2017, 45% of the patients fell into the first category, 52% into the second, and 3% into the third. In 2018, the distribution was slightly different, with 55% of the patients in the first category, 45% in the second, and no patients in the third category.

In *Table 1* we presented the synthesis of

the main data of the study based on those discussed above.

In *Fig. 1 A* and *B*, comparing the years 2017 and 2018, a shift in the distribution of burn severity can be observed. In 2017, burns affecting between 10% and 50% of the Body Surface Area (BSA) were the most common, accounting for 52% of the cases. However, in 2018, less severe burns involving ≤10% of the BSA became the most frequent, representing 55% of the cases. These observations suggest a slight improvement in the level of protection or more rapid interventions that helped limit the severity of injuries in 2018 compared to the previous year.

Fig. 1 A and *B* compare the distribution of burn severity between 2017 and 2018. We expected to see a reduction in the severity of burns over time, reflecting improvements in early intervention and public awareness. The goal was to assess the impact of these improvements and identify areas for further enhancement.

The analyses of burn patients' medical histories revealed that the superinfection of wounds was a common cause of delayed hospital admission, underscoring the importance of continuous monitoring and early intervention. The study identified a variable number of patients presenting to the hospital depending on the time elapsed since the accident. In *Fig. 1 A*, we observe that in 2017, two patients were admitted within 1-5 days after the accident, while no patients were identified in the 5-10-days interval, and only one patient was admitted more than 10 days after the incident.

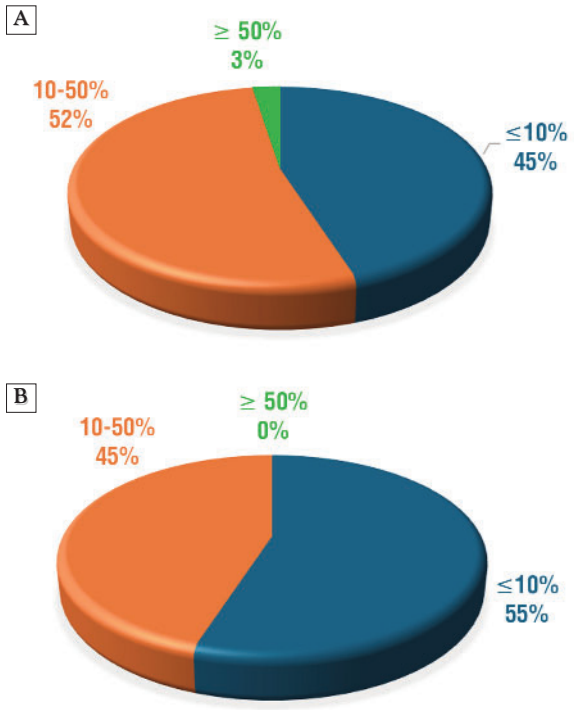


Figure 1. **(A)** A cutaneous area 2017; **(B)** A cutaneous area 2018

In *Fig. 1 B*, we observe that in 2018, there was an increase in the number of patients arriving at the hospital within the first five days following the accident, with seven patients recorded in this interval. Similar to the previous year, no patients were identified in the 5-10-days interval, and only one case was registered more than 10 days after the

Table 1. Synthesis of the main data of the study

Category	2017	2018
Total patients	40	40
Average distribution of origin	Rural: 75% Urban: 25%	Rural: 77% Urban: 23%
Distribution according to gender	Female: 21 cases Male: 19 cases	Female: 16 cases Male: 24 cases
Distribution according to BSA burned	≤ 10% BSA: 45% 10-50% BSA: 52% ≥ 50% BSA: 3%	≤ 10% BSA: 55% 10-50% BSA: 45% ≥ 50% BSA: 0%
Types of burns	Thermic burns 90% Electric burns 5% Chemical Burns 3% Radiation 0%	Thermic burns 92 % Electric burns 5 % Chemical Burns 2% Radiation 0%

accident. These data suggest a significant increase in early presentation cases in 2018 compared to 2017, which may reflect either better awareness of the risks associated with burns or improved access to medical services.

Regarding the classification of burns based on the etiology, the analysis indicated that thermal agents were the primary etiological factor in both periods analyzed. In 2017, 92% of burn cases were caused by exposure to thermal agents, with this percentage remaining relatively constant in 2018, where 90% of cases were attributed to the same mechanism. Additionally, burns caused by electrical agents accounted for 5% of cases in 2017, increasing slightly to 8% in 2018. Chemical burns had a low prevalence, representing 3% in 2017 and decreasing to 2% in 2018. No cases of radiation-induced burns were reported in either of the two years studied. This distribution emphasizes the importance of focusing preventive measures on thermal risks, which remain dominant in the etiology of burns, as well as on electrical risks, which saw a modest increase in 2018.

Those with a burned body surface area (BSA) of ≤ 10% generally received outpatient care or short-term treatment, while patients with BSA between 10% and 50% required longer hospital stays and surgical interventions, such as skin grafts, including grafting with PLD. Patients with BSA ≥ 50%, although they represented a small percentage in 2017 and were not present in 2018, required complex care, including multiple surgical interventions and intensive treatment..

In *Fig. 2 A* and *B*, the analysis of the distribution of burn injuries by affected anatomical segments revealed certain characteristic trends for 2017 and 2018. *Fig. 2 A* and *B* illustrate the anatomical distribution of burn injuries. We anticipated certain body regions to be more frequently affected and aimed to use these data to tailor prevention strategies more effectively, especially in high-risk areas.

In *Fig. 2 A*, we can observe that in 2017, the most frequently affected regions were the anterior thorax, abdomen, and calves, with these anatomical segments showing a significant number of cases. Particularly, the anterior thorax and calves recorded the highest number of injuries, suggesting pronounced exposure of these areas to burn-causing factors. The arms and thighs were also frequently affected, which can be attributed to the involvement of these segments in daily activities that predispose them to accidents.

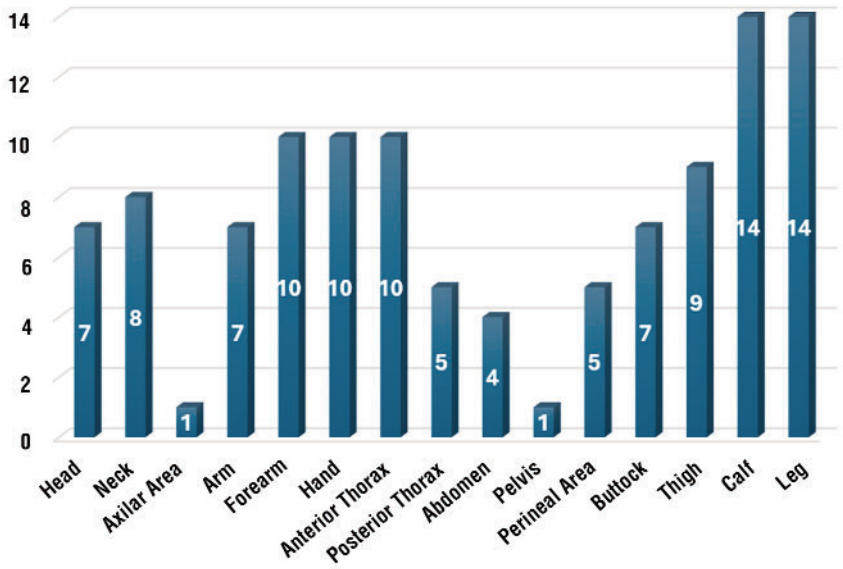


Figure 2. **(A)** Interested area 2017.

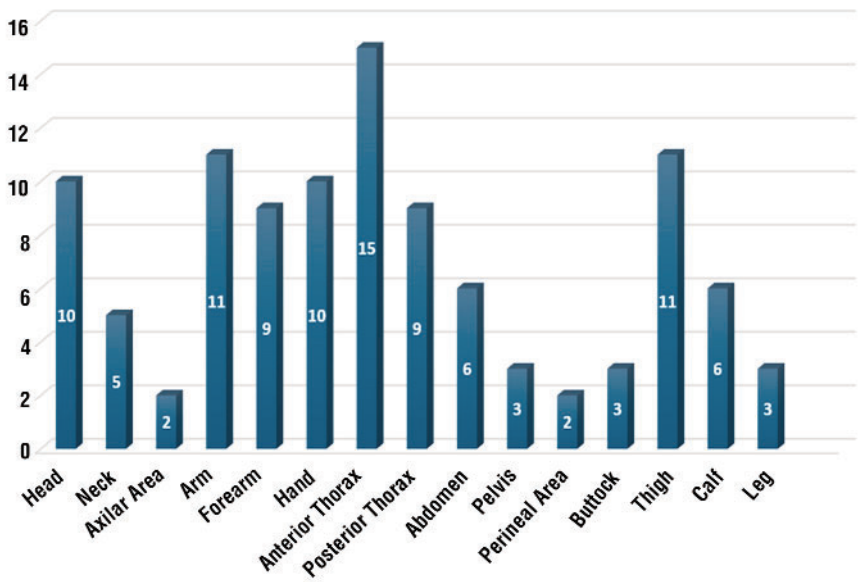


Figure 2. **(B)** Interested area 2018

In *Fig. 2 B*, we observe that in 2018, the distribution of injuries varies, with a notable increase in cases recorded in the anterior thorax and abdomen, making the anterior thorax the most affected region that year. This shift may indicate a change in exposure circumstances, possibly due to different activity patterns or a shift in the predominant type of risk. There is also an increase in injuries to the head and forearms, which may reflect accidents involving the instinctive protection of the head and the use of hands and forearms in contact with hazardous agents.

On the other hand, in 2018, there was a decrease in injuries to the lower limbs, including the thighs and calves, compared to 2017. This may suggest either a change in the type of activities that caused the burns or improved protection of these segments.

Fig. 3 A and *B* illustrate that, of the total patients admitted to the clinic, 56% received surgical treatment, as well as non-surgical treatment in the form of non-excisional debride-

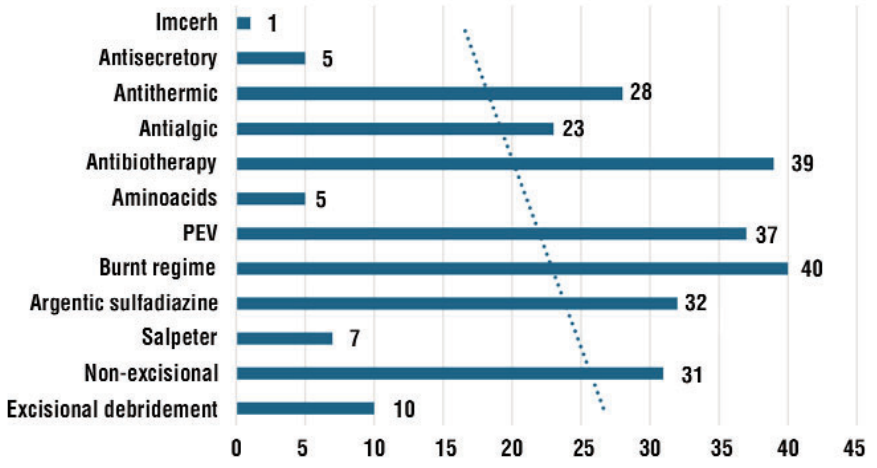
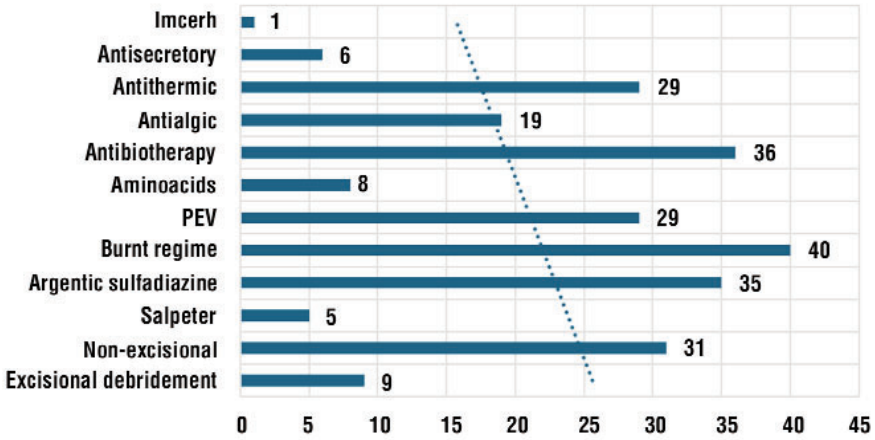


Figure 3. **(A)** Treatment 2017.

Figure 3. **(B)** Treatment 2018.



ment, both procedures being performed under general Anesthesia.

Figs. 3 A and *B* show the distribution of patients who underwent surgical and non-surgical treatments. We expected to confirm the necessity of combining these approaches, particularly in more severe cases, and sought to identify which treatment combinations yielded the best outcomes.

In *Figs. 3 A* and *B*, we can observe that the specific burn treatment regimen, as well as the administration of silver sulfadiazine, remained constant, being the most frequently applied interventions in both analyzed periods, with a maximum of 40 cases each year for the burn regimen and a slight variation in the use of silver sulfadiazine (35 cases in 2017 and 32 cases in 2018). This highlights the importance of these standardized treatments in the care of burn patients.

Antibiotic therapy saw a slight increase from 36 cases in 2017 to 39 cases in 2018, which may reflect a growing need for the prevention and control of burn-associated infections. This aspect is crucial for reducing the risk of severe complications and improving long-term outcomes.

Regarding excisional and non-excisional debridement, non-excisional debridement was preferred in both periods, with 31 cases each year. Conversely, excisional debridement, a more invasive treatment, was used in 9 cases in 2017 and 10 cases in 2018, reflecting a careful selection of patients requiring this surgical intervention.

The administration of analgesics and antipyretics remained consistent, with a slight increase in the use of analgesic treatments in 2018 (23 cases compared to 19 cases in 2017) and antipyretics (28 cases in 2018 compared to 29 in 2017). These treatments are essential for symptom management and patient comfort.

The use of amino acids and other adjunctive treatments remained relatively low, with a constant number of cases in both periods. Additionally, antisecretory agents were rarely used, indicating that these treatments were not necessary in most cases.

Fig. 4 A and *B* highlight the distribution of burn types recorded in the clinic in 2017 and 2018, with a clear prevalence of second-degree burns, which constituted the majority of cases in both analyzed periods.

Fig. 4 A and *B* categorize the burn degrees observed in patients. We aimed to evaluate the distribution of burn severity and to use these findings to refine treatment protocols, particularly for more severe burns that required extensive care.

In contrast, first-degree burns, the mildest form, saw a notable decrease from 12% in 2017 to just 3% in 2018. This decrease may indicate better prevention or quicker access to care, which has prevented the progression of

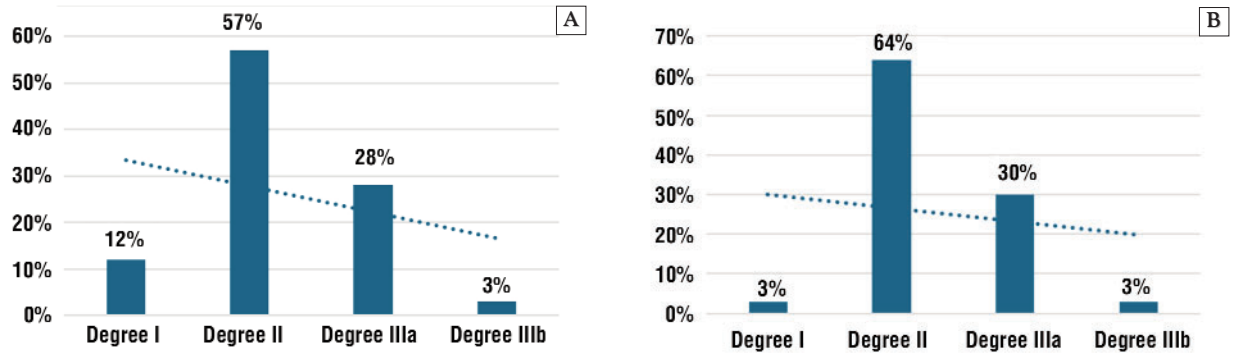


Figure 4. **(A)** Degree 2017; **(B)** Degree 2018

these burns into more severe forms.

In *Fig. 4 A* and *B*, in 2017, second-degree burns represented 57% of the total cases, and in 2018 this percentage increased to 64%, suggesting an upward trend in this type of injury. There is an important distinction between IIa and IIb – regarding prognosis, evolution, clinical management.

Third-degree burns, which involve the destruction of all skin layers, were the next most frequent, representing 28% of cases in 2017 and 30% in 2018. This consistency in percentage reflects the severity of the injuries and the need for surgical interventions and intensive care to ensure proper recovery.

Third-degree burns (Grade III), were rare in both periods, representing only 3% of cases each year. This highlights that, while extremely severe, such injuries are less common but require highly specialized and prolonged therapeutic approaches.

Fig. 5 A and *B* illustrate the evolution of patients' conditions at discharge in 2017, highlighting a significant contrast compared to the subsequent period.

Figs. 5 A and *B* detail the outcomes of patients at discharge. We expected to see a high percentage of patients with complete recovery or in a favorable state of regeneration. The goal was to measure the effectiveness of current treatments and identify any gaps that could be addressed to improve patient outcomes further.

In *Fig. 5 A* and *B*, we observe that in 2017, 29% of patients were discharged in a state of complete recovery, while the majority, 64%, were classified as being in the process of regeneration, meaning they were still

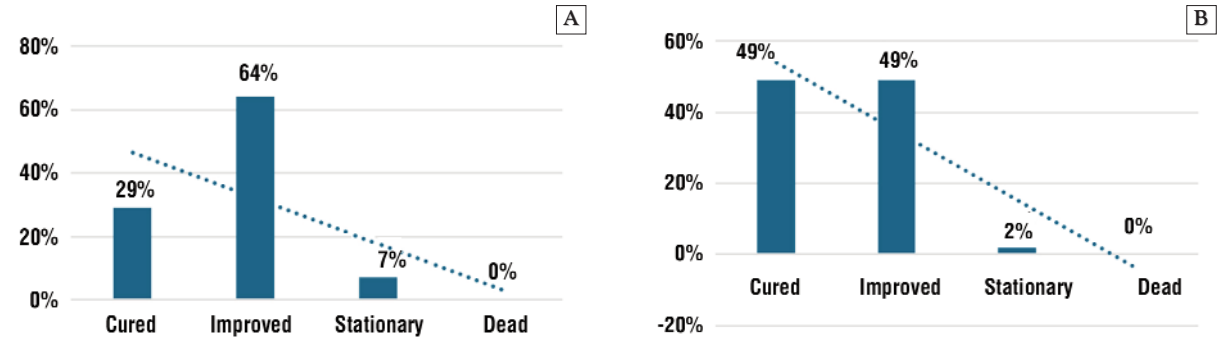


Figure 5. **(A)** State on discharge 2017. **(B)** State on discharge 2018.

recovering but not fully healed. A small percentage, 7%, remained in a stationary condition, with no significant changes in their clinical status. It is important to note that there were no recorded cases of mortality in 2017, indicating the effectiveness of treatments and proper management of critical cases.

In the subsequent period analyzed, there was a notable improvement in clinical outcomes, with 49% of patients being discharged fully recovered and another 49% in the process of regeneration. This equal distribution suggests an increased efficiency in therapeutic interventions, which allowed a larger number of patients to reach an optimal health state at the time of discharge. The percentage of patients in a stationary condition decreased to 2%, reflecting improvements in managing complicated or treatment-resistant cases.

Maintaining a 0% mortality rate in both periods is a positive indicator of the quality of care provided in the medical unit, underscoring the commitment to complete patient recovery and the prevention of severe complications. These data suggest significant progress in the care and recovery of burn patients, demonstrating an effective adaptation of treatment strategies to improve clinical outcomes and the quality of life for patients after discharge.

Although there are few cases in category 3, and the mortality rate is 0%, however, this is not a reliable indicator.

The total number of patients discharged from the clinic was 66, of whom six were discharged upon request. Additionally, three cases were transferred to other hospital units, either due to medical necessity or on the legal request of the parents. Regarding patients who left the medical unit without medical approval, five such cases were recorded, highlighting a sensitive aspect of patient management that requires additional attention to ensure continuity and appropriateness of treatment.

The length of hospitalization varied significantly, with a substantial majority of patients, 92%, being hospitalized for short periods of 1 to 10 days, in both 2017 and 2018. This short duration of hospitalization suggests efficiency in the treatment and recovery of patients with less severe burns. In contrast, cases that required prolonged hospitalization, of more than 10 days, were limited to 8% of the total, indicating a small proportion of patients with severe injuries or complications that required extended medical care.

Category 1: Patients with a BSA $\leq$ 10% were treated conservatively and showed very good results with rapide healing. The goal here was to evaluate the effectiveness of conservative treatments in minor burns and to reinforce existing protocols to maintain or improve outcomes. This category of patients had a hospital stay ranging from 1 to 10 days.

Category 2: Patients with a BSA between 10% and 50% exhibited good results, but experienced slower recovery. These patients required a combination of conservative and surgical treatments. This category of patients had a hospital stay ranging from 1 to 30 days.

Category 3: Patients with a BSA $\geq$ 50% had severe burns and underwent both conservative and surgical treatments. The recovery was slow but favorable, highlighting the need for more intensive care and long-term management strategies. This category of patients had a hospital stay of more than 30 days.

Surgical Treatment

In terms of surgical intervention, particularly debridement, a favorable evolution was observed. The combined preoperative, surgical, and postoperative care significantly improved the prognosis of patients, demonstrating the critical role of a well-coordinated surgical approach. The aim was to confirm the effectiveness of surgical treatments and to explore opportunities for refining these procedures to further enhance patient recovery.

In summary, Category 1 patients benefitted from conservative treatment with very good results and faster recovery, underscoring the efficacy of non-invasive approaches for minor burns. Category 2 patients achieved good

results, though recovery was slower, requiring a combination of conservative and surgical treatments. Finally, Category 3 patients, who had severe burns, underwent both conservative and surgical treatments, with a slow but favorable evolution. The surgical interventions, particularly debridement, played a crucial role in improving outcomes. The focus was to confirm the success of these combined treatment strategies and to identify areas for potential improvement in care protocols (*Figs. 6, 7*).

The algorithmic approach to the treatment of burn injuries varied depending on the degree of the burn and the size of the affected area. The initial approach included patient stabilization, assessment of the burn degree, calculation of the burned surface area, electrolyte balance management, prevention and local treatment.

Subsequently, constant evaluation, infection management, surgical treatment, and long-term rehabilitation became important factors in the favorable evolution of cases.

Fig. 6 shows the preoperative and postoperative images of a severe burn injury, classified as a third-degree burn.

Fig. 7 shows preoperative images of a severe third-degree burn injury, followed by the surgical grafting procedure.

Figure 6. Preoperative and postoperative appearance of severe burn injuries. (source: the author)

Discussion

The management of burns in pediatric patients has undergone a paradigm shift with the adoption of multidisciplinary approaches and personalized care strategies. The literature emphasizes the importance of early intervention, comprehensive wound care, and advanced therapeutic options such as skin grafting, mesh skin grafting, and the use of engineered tissues to promote healing and minimize scarring (10-12). These approaches align with our clinical observations, where a significant proportion of patients, approximately 56%, underwent surgical interventions and non-excisional debridement under general anesthesia, reflecting the critical role of early and aggressive treatment in improving outcomes.

The consistent use of treatments such as silver sulfadiazine and antibiotic therapy across various studies underscores their continued relevance in burn care. These treatments, which were common in 40 cases as reported in the review, are essential for infection prevention, a common and serious complication in

Figure 7. Preoperative and postoperative appearance following a skin grafting procedure. (source: the author)

burn injuries (13,14). Additionally, the use of supportive therapies, such as amino acids and pain management strategies, is crucial for enhancing recovery, as noted in both the literature and clinical practice (15-17).

Our clinical data from the surgical review indicate that a significant proportion of patients recovered, with 49% being fully healed on discharge and another 49% in a state of regeneration. These figures are consistent with findings from recent studies that highlight the variability of recovery trajectories in burn patients. Factors influencing these outcomes include the extent of the burn, the timeliness of intervention, and the quality of post-burn care (18-20).

Our study shows that our results are consistent with those of other international studies.

Furthermore, the literature highlights that the length of stay (LOS) and the number of surgical interventions are critical determinants of patient outcomes. For instance, a longer LOS, which was necessary for approximately 8% of cases with severe burns, often correlates with more extensive injuries and the need for multiple surgical interventions. These factors are associated with lower health-related quality of life (HRQL), particularly in cases involving significant burn severity and psychological distress, such as post-traumatic stress disorder (PTSD) (21,22).

HRQL in burn patients is influenced by a complex interplay of physical, psychological, and social factors. The literature identifies burn severity, psychological issues (such as depression and PTSD), and socioeconomic factors as key predictors of HRQL. For example, patients with more severe burns, those requiring extensive surgical interventions, or those experiencing significant psychological distress often report lower HRQL (23, 24). These findings are consistent with clinical data, where more severe burns (i.e., second- and third-degree burns) were predominant, and the extent of the injury was a major factor in determining the recovery process.

Moreover, studies have shown that interventions aimed at improving mental health and providing social support are essential for enhancing HRQL among burn survivors (25). This suggests that while physical recovery is crucial, addressing the psychological and social aspects of burn care is equally important for ensuring long-term well-being.

Rehabilitation plays a crucial role in the long-term recovery of burn patients. The implementation of comprehensive rehabilitation programs, including physical therapy, occupational therapy, and psychological support, is essential for maximizing functional recovery and improving quality of life after a burn injury (26). Patients who receive early and continuous rehabilitation tend to have better outcomes in terms of mobility, pain management, and returning to work or daily activities (27).

Conversely, the absence of adequate rehabilitation or delays in initiating these programs can lead to prolonged disability and poorer outcomes. This is particularly relevant in cases where patients suffer from extensive burns that require long-term care and multiple surgical interventions, as observed in some of the clinical cases (28,29).

The retrospective study allowed for the analysis of a significant number of cases over a period of 2 years, which can provide additional statistical relevance. The data already collected allows for a quicker evaluation compared to prospective studies.

Variables such as age, burn severity, types of burns, treatments applied, and length of hospitalization offer a comprehensive perspective on the evolution of cases.

The analysis used in our study was based on real data from clinical practice, which may increase the relevance of the results in practical settings.

Our discussions of our study regarding the prevention of burn injuries in pediatric patients are based on the fact that we identified risk factors such as the prevalence in rural areas and the frequency of burn injuries following exposure to thermal agents. These results necessitate the promotion of educational and infrastructural measures to reduce the incidence of these injuries. Parental and caregiver education is absolutely

essential, as is raising awareness about thermal risks.

The presence of informational campaigns in rural areas, where access to information and educational campaigns may be limited, could make significant contributions.

Being a retrospective study, the quality of the data depends on how it was initially recorded, and documentation errors may affect the results.

Another limitation of the study could be influenced by the availability of data, which may lead to the underrepresentation of certain patient groups.

Future research directions focus on multi-center studies to provide a clearer and more generalizable picture of the incidence and treatment of burns at a national level. Additionally, analyzing the effectiveness of different treatment methods and a detailed identification of prevention strategies for children could provide valuable insights.

Conclusion

The conclusions of this study underscore the importance of continuing prevention and education efforts regarding pediatric burns, particularly in rural areas where the incidence and severity of these injuries are higher. The significant differences which were observed between rural and urban settings highlight the need for targeted interventions, including awareness campaigns and improved access to emergency medical services. The study reveals a positive trend in the reduction of burn severity and an increase in early hospital presentations, suggesting improved awareness and rapid intervention. However, complications remain a challenge, especially in the case of severe burns, which require multidisciplinary management and long-term rehabilitation strategies.

We conclude that, while the current methods have generally yielded positive results, they are not entirely sufficient and require improvements in both treatment and prevention strategies. The study emphasizes the need of burn prevention efforts, particularly in rural areas, and to employ an integrated management approach to reduce the severity and complications associated with burns. Further research and innovation in burn care are essential to optimize recovery and long-term outcomes for these vulnerable patients.

The findings of the study provide a solid foundation for the development of future strategies aimed at enhancing both the prevention and treatment of burns in children, thereby reducing the incidence, severity, and long-term impact on patients' quality of life. Continued research and innovation in burn care are essential to optimize the recovery and prognosis of these vulnerable patients.

Declaration of Competing Interest

None of the authors has any financial support or relationships that may pose a conflict of interest.

Ethics Approval

The study was conducted in accordance with ethical guidelines and received approval from the ethics committee. Informed consent was obtained from each patient or their guardians, ensuring that the participants were fully aware of the nature, purpose, and potential risks of the study. The publication of patient data adheres strictly to confidentiality requirements, respecting the provisions of the Declaration of Helsinki, which emphasizes the importance of ethical standards in medical research and the protection of participants' rights and well-being.

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