

# Original Article: Investigating the Results of Amniocentesis in the Operating Room on Children's Acute Second Degree Burn Wounds in Patients Referred to Shahid Motahari Hospital in Tehran in 2021-2022

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## ABSTRACT

**Objective:** This study was conducted with the aim of investigating the results of amnion implantation in the operating room on children's acute second degree burn wounds in patients referred to Shahid Motahari Hospital in Tehran in 2022-2023. **Study method:** In this cross-sectional study, which retrospectively examines the results of amniocentesis in children referred to Shahid Motahari Hospital in Tehran in 2022-2023, patient records are examined to collect information. Variables including demographic variables and other variables are extracted from the patient file list and the medical records management system of Shahid Motahari Hospital. The information is coded and entered into spss v.26 software and then analyzed. **Findings:** The information of 203 children under 16 years of age who underwent amniocentesis in Shahid Motahari hospital with 2nd degree burns between 2022 and the end of December 1401 were analyzed. Their average age was  $4.86 \pm 3.937$ . 59.6% of the subjects were boys and 40.4% were girls. The average duration of hospitalization was  $6.62 \pm 4.483$  days. 96.1% of the burns happened at home, 1.9% in the park and 1.5% in the street. The frequency

of burn percentage of patients is 37.4% in the range of 10-19%, 29.1% in the range of 20-29%, 20.7% in the range of 0-9%, 11.3% in the range of 30-39%, 1% in the range of 40-49%, and 0.5% was in the range of 50-59%. 64.5% of children with boiling water, 12.8% with food, 7.9% with gasoline, 4.4% with flames, 3% with alcohol, 2.5% with gas canisters, 2% with city gas, 2% with flammable materials, 0.5% with coal. And 0.5% were burned by a hot object. 75.4% of patients had trunk burns, 68.5% had arm and forearm burns, 50.7% had head and neck burns, 48.8% had thigh and leg burns, 35% had hand burns, 12.8% had leg burns, and 2% had whole body burns. 20.7% of patients needed grafting during hospitalization. Out of 131 people who suffered scald burns, 27 people needed grafting. Out of 26 people who suffered food burns, 3 people needed grafting. Out of 16 people who were burned with gasoline, 6 people needed grafting. Out of 9 people who got burned by fire, 1 person needed a graft. Out of 6 people who suffered alcohol burns, 3 people needed grafting. Out of 5 people who suffered gas capsule burns, 1 person needed grafting. Out of 4 people who were burned with city gas, 1 person needed grafting. **Conclusion:** Burns in children are one of the most common and stressful events for parents. Proper and timely treatment has a significant impact on the quality of children's future life by reducing scarring caused by burn wounds. According to the findings of the research, the highest number of burns occurs at home with boiling water, which as a result of educating parents primarily prevents the occurrence of burns and it also seems that the use of modern treatment methods, including amnion Reducing the need for grafting reduces the complications caused by these burns in children, so more studies on the effectiveness of amnion implantation are recommended.

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## Introduction

**P**hotocatalysts Burns are a type of damage to the skin that leads to the destruction of soft tissue and body organs. Many people suffer from burns every year, and a percentage of them need to be admitted to the hospital, which causes considerable medical expenses and irreparable complications for the patients [1-3]. Unintentional injuries are the most common causes of death for children under 14 years old, and the most common causes of these injuries are burns, poisoning, suffocation, and falls. Burns and fires are the fifth cause of accidental death for children and adults, which is about 3500 people per year. On the other hand, burns are the second cause of sudden death in children under 4 years old and the third cause in older children. Timely and proper treatment of burns can reduce its complications. Local treatment of burn wounds is one of the most important steps in burn treatment and includes wound washing, debridement and wound dressing. Different types of methods are used for the initial covering of burns to accelerate wound healing and prevent mortality [4-6]. The choice of wound dressing and topical ointments used in it

depends on the nature, severity and extent of wound contamination, as well as the patient's history of sensitivity. Today, various coatings are used for primary wound coating, which includes three groups of biological, synthetic, and combined types of coatings. One of the types of coatings that can be used is biological coatings that can be placed on the skin temporarily [7]. The basis of using various types of biological coverings as a primary skin substitute is to create a moist and suitable environment that accelerates the healing of burn wounds. The use of human amniotic membrane as a biological covering for wounds of relative thickness has been successful [8-10]. However, concerns about transmission of infection have limited its use. Previous studies have shown proven benefits of amniotic membrane in terms of rapid drying of the burn site, improvement of wound epithelialization, reduction of pain and loss of skin surface water, and reduction of scar formation, as well as antimicrobial effects. In children, the rate and speed of wound healing is very high, and if the wound is properly taken care of, the possibility of healing is very high. According to the materials mentioned in this study, we will examine the results of amine

application on acute grade 2 wounds of children referred to Shahid Motahari Hospital in Tehran in 2022 and 2023.

### Review of the research done

- In a study in 2016, Skanderlo et al. compared the use of amniotic dressing and routine dressing at the skin graft wound site in terms of pain intensity, infection rate, and duration of wound scaling.
- In another study in 2017, Mohammadi et al investigated the effect of using amniotic membrane in skin grafts of patients with 2nd and 3rd degree burns.
- In a study in 2020, Puyana et al compared the use of amniotic membrane and cryo-rich allograft in the treatment of genital burns.
- In a study in 2008, Branski et al. compared the use of amniotic membrane and antibiotic membrane in terms of hospital stay, infection rate, dressing change rate, and wound healing time.

### Type of study

- **Descriptive cross-sectional retrospective**
- **Study population:** children under 16 years of age referred to Shahid Motahari Hospital between 2022 and the end of December 2023 who underwent amniocentesis in the operating room with 2nd degree burns.
- **Criteria for inclusion in the study:** All children under 16 years of age who were referred to Shahid Motahari Hospital with 2nd degree burns in the mentioned time period from the beginning of 2022 to the end of December 2023 and were hospitalized and underwent amniocentesis in the operating room, are the criteria for entering patients into our study.
- **Exclusion criteria**
  - ✓ Incomplete data in the file.
  - ✓ Patient information is not available.
  - ✓ 1st and 3rd degree burns.

Sampling method and calculation of sample volume

Sampling was done by census.

### Study method

In this cross-sectional study, the results of amniocentesis in children referred to Shahid Motahari Hospital in Tehran in 2022-2023 were examined retrospectively. After obtaining the necessary approval to carry out the project from the ethics committee of the university and receiving its ethics code number (IR.IUMS.FMD.REC.1401.502), we started to carry out the study. In order to collect information, patients' files were reviewed. Demographic information, including age and sex, as well as information related to hospitalization, including duration of hospitalization, percentage of burns, degree of burns, grafting, location of burns and cause of burns, were extracted from patient files and the medical records management system of Shahid Motahari Hospital. At the end, the information collected from the studied subjects was entered into spss v.26 analysis software, coded and evaluated and analyzed.

**Specifications of the data collection tool and how to collect it:** Information including demographic variables (age and gender) as well as other variables (hospitalization duration, need for grafting, caustic agent, burn location, and percentage and degree of burn) were extracted by examining the patients' files and stored in an Excel file.

**Data analysis method:** The obtained information was analyzed using SPSS v.26 statistical software. The results obtained for quantitative variables were expressed as mean and standard deviation, and for categorical qualitative variables as frequency and frequency percentage. The normality of different study parameters was measured based on the Kolmogorov-Smirnov test. To compare two qualitative variables together, chi square test, two qualitative and quantitative variables Mann-Whitney-U test and two quantitative variables Pearson correlation coefficient test and in cases

of non-normal distribution, Spearman was used. A significance level of less than 0.05 was considered.

**Ethical Considerations:** After obtaining approval from the ethics committee of Iran university of medical sciences and receiving the ethics code of the project under the number (IR.IUMS.FMD.REC.1401.502), all the data were collected, kept confidential and anonymous and analyzed.

### Implementation limitations of the plan

- ✓ Incomplete filling of questionnaires and lack of access to patients who did not fill the questionnaire correctly.
- ✓ The lack of satisfaction of the patients to complete the questionnaire, we tried to solve this limitation with full explanations to them.
- ✓ Having a history of previous surgery, we excluded these patients from the study and replaced them with patients without a history of surgery.

### Findings

In this study, we obtained the following results, which are reported as descriptive results: The condition of the people participating in the study and the frequency or the average of the demographic and clinical variables in all the studied people, according to the reviews of the patients' files in the period of 2022 to the end of December 2023, 426 children under the age of 16 were hospitalized and under Surgical measures were performed, 203 of whom underwent amniocentesis with 2nd degree acute burns. After collecting the necessary data and information, all of them were coded and then entered into SPSS software. While classifying the data for analysis, their results are also reported in detail below. In the following, the frequency or the average of the demographic and clinical variables of the studied people can be seen in the table and graphs.

### Descriptive results

The average age of the study subjects: The mean age of the study subjects was  $4.86 \pm 3.937$  (0-16) years (Table 1).

**Table 1.** Average age of study subjects

| Standard deviation | Average | The most | The least | Variable |
|--------------------|---------|----------|-----------|----------|
| 3.937              | 4.86    | 16       | 0         | Age      |

### Status of gender distribution of the studied subjects

121 patients were boys and other patients were girls (Table 2).

**Table 2.** Percentage frequency of education in study subjects

| Abundance percentage | Number | The gender |
|----------------------|--------|------------|
| 59.6                 | 121    | Man        |
| 40.4                 | 82     | Woman      |

### Status of the average duration of hospitalization

Patients were hospitalized for an average of 6.62 days (Table 3).

**Table 3.** The average length of hospitalization of the study subjects

| Standard deviation | Average | The most | The least | Variable   |
|--------------------|---------|----------|-----------|------------|
| 4.483              | 6.62    | 24       | 0         | <b>Age</b> |

**Scattered state of the burn site**

The highest rate of burns (96.1%) occurred at home (Table 4).

**Table 4.** Frequency percentage of burn site

| Abundance percentage | Number | place of burn  |
|----------------------|--------|----------------|
| 96.1                 | 195    | <b>Home</b>    |
| 1.5                  | 3      | <b>Street</b>  |
| 1.9                  | 4      | <b>Park</b>    |
| 0.5                  | 1      | <b>Unknown</b> |

**Frequency status of burn percentage in hospitalized patients**

The highest percentage of burns was in the range of 10-19% (Table 5).

**Table 5.** Frequency percentage of burn percentage of the studied subjects

| Abundance percentage | Number | place of burn |
|----------------------|--------|---------------|
| 20.7                 | 42     | <b>9-0</b>    |
| 37.4                 | 76     | <b>19-10</b>  |
| 29.1                 | 59     | <b>29-20</b>  |
| 11.3                 | 23     | <b>39-30</b>  |
| 1                    | 2      | <b>49-40</b>  |
| 0.5                  | 1      | <b>59-50</b>  |
| 0                    | 0      | <b>100-60</b> |

**Dispersion of the cause of the burn**

Boiling water was the most common cause of burns (64.5%) in the studied subjects (Table 6).

**Table 6.** Frequency percentage of cause of burn

| Abundance percentage | Number | Cause of burns               |
|----------------------|--------|------------------------------|
| 12.8                 | 26     | <b>Food</b>                  |
| 64.5                 | 131    | <b>Boiling water</b>         |
| 2                    | 4      | <b>Municipal gas</b>         |
| 0.5                  | 1      | <b>Hot object</b>            |
| 0.5                  | 1      | <b>coal</b>                  |
| 2.5                  | 5      | <b>Gas cylinder</b>          |
| 2                    | 4      | <b>Inflammable materials</b> |
| 7.9                  | 16     | <b>Petrol</b>                |
| 3                    | 6      | <b>alcohol</b>               |
| 4.4                  | 9      | <b>fire flame</b>            |

**Scattering condition of burned areas in the body**

The highest amount of burn injury (75.4) was caused in the trunk of the patients (Table 7).

**Table 7.** Frequency percentage of burned areas

| Abundance percentage | Number | Burned area          |
|----------------------|--------|----------------------|
| 50.7                 | 103    | <b>Head and neck</b> |

**Status of the need for grafting in the studied subjects**

20.7% of the patients who underwent amniocentesis needed a graft (table).

**Table 8.** Grafting

| Abundance percentage | Number | Grafting status |
|----------------------|--------|-----------------|
| 20.7                 | 42     | <b>Done</b>     |
| 79.3                 | 161    | <b>Undone</b>   |

Investigating the need for grafting according to the cause of the burn

**Table 9.** Grafting according to the cause of the burn

| Total | Grafting |    | Burn agent            |
|-------|----------|----|-----------------------|
|       | -        | +  |                       |
| 26    | 23       | 3  | Food                  |
| 131   | 104      | 27 | Boiling water         |
| 4     | 3        | 1  | Municipal gas         |
| 1     | 1        | 0  | Hot object            |
| 1     | 1        | 0  | Coal                  |
| 5     | 4        | 1  | Gas cylinder          |
| 4     | 4        | 0  | Combustible materials |
| 16    | 10       | 6  | Petrol                |
| 6     | 3        | 3  | Alcohol               |
| 9     | 8        | 1  | Fire flame            |
| 203   | 161      | 42 | <b>Total</b>          |

### Examining the need for grafting according to the burn percentage

**Table 10.** Grafting according to burn percentage

| Total | Need for grafting |    | Burn percentage |
|-------|-------------------|----|-----------------|
|       | -                 | +  |                 |
| 42    | 39                | 3  | 0-9 %           |
| 76    | 64                | 12 | 10-19%          |
| 59    | 49                | 10 | 20-29%          |
| 23    | 8                 | 15 | 30-39%          |
| 2     | 0                 | 2  | 40-49%          |
| 1     | 1                 | 0  | 50-59%          |
| 203   | 161               | 42 | <b>Total</b>    |

The frequency of amnion placement compared to grafting in all patients hospitalized in the period of 1400-1401



**Table 11.** Frequency of amnion and grafting

| Total | Amnion implantation |     | +<br>-             | Grafting |
|-------|---------------------|-----|--------------------|----------|
|       | -                   | +   |                    |          |
| 182   | 113                 | 69  | +                  | Grafting |
| 235   | 33                  | 202 | -                  |          |
| 9     | 9                   | 0   | Premature grafting |          |
| 426   | 155                 | 271 | Total              |          |

### Discussion

In this study, children under 16 years of age who underwent amniocentesis between 2022 and the end of December 2023 with acute 2nd degree burns in Shahid Motahari hospital were examined. Their average age was  $4.86 \pm 3.937$ . 59.6% of the subjects were boys and 40.4% were girls [11-13]. The average duration of hospitalization was  $6.62 \pm 4.483$  days. 96.1% of the burns happened at home, 1.9% in the park and 1.5% in the street. The frequency of burns in patients is 37.4% in the range of 10-19%, 29.1% in the range of 20-29%, 20.7% in the range of 0-9%, 11.3% in the range of 30-39%, 1% in the range of 40-49%. and 0.5% was in the range of 50-59%. 64.5% of children with boiling water, 12.8% with food, 7.9% with gasoline, 4.4% with flames, 3% with alcohol, 2.5% with gas canisters, 2% with city gas, 2% with flammable materials, 0.5% with coal and 0.5% were burned by a hot object. 75.4% of patients had trunk burns, 68.5% had arm and forearm burns, 50.7% had head and neck burns, 48.8% had thigh and leg burns, 35% had hand burns, 12.8% had leg burns, and 2% had whole body burns [14-16]. 20.7% of patients needed grafting during hospitalization. Out of 131 people who suffered scald burns, 27 people needed grafting. Out of 26 people who suffered food burns, 3 people needed grafting. Out of 16 people who were burned with gasoline, 6 people needed grafting. Out of 9 people who got burned by fire, 1 person needed a graft. Out of 6 people who suffered alcohol burns, 3 people needed grafting [17]. Out of 5 people who suffered gas capsule burns, 1 person needed grafting. Out of 4 people who were

burned with city gas, 1 person needed grafting. According to the above information, it can be concluded that most of the 2nd degree burns in children occur at home with boiling water. According to the research findings, it seems that the use of amnionization reduces the need for grafting [18]. In another survey that was conducted, all the patients who were admitted to Shahid Motahari hospital and underwent surgical procedures during the mentioned period were examined [19]. The total number of patients was 426, of which 271 underwent amniocentesis. 191 people underwent grafting, of which 9 cases were early grafting. Among the 271 people who underwent amniocentesis, 69 people needed grafting, and among the 155 people who did not receive amniocentesis, 113 people needed grafting [20].

### Conclusion

Burns in children are one of the most common and stressful events for parents. Appropriate and timely treatment measures have a significant impact on the quality of children's future life by reducing scarring caused by burn wounds. According to the findings of the research, the highest number of burns occurs at home and with boiling water. As a result, educating parents primarily prevents burns, and it also seems that the use of new treatment methods, including amniocentesis, reduces the complications of these burns in children by reducing the need for grafting. More investigations regarding the effectiveness of amnion implantation are recommended.



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