Abstract
Introduction: Pressure sores are a serious health problem that is common in the intensive care unit (ICU), increasing the length of hospital stay, cost and mortality rate, and should be prevented first. This study was conducted in order to determine the risk factors that may affect our pressure sore prevalence and development.

Materials and Methods: The pressure sore data of the patients treated in the Anesthesia Intensive Care Unit for six months between June 1, 2019 and December 31, 2019 were examined. The demographic characteristics, hospitalization diagnoses, pressure sore risk factors, locations and stages of the patients with pressure sores were recorded.

Results: The number of patients followed up during the six-month period was 275 and 52 of the patients had pressure sores (18.9%). Forty of the patients were 65 years and older, and advanced age was found to be a significant risk factor (p <0.01). Considering the patients who developed pressure sores in our intensive care follow-up, it was seen that the average pressure sore development day was 17.1st day. (3rd-44th day) Pressure sores were most common in the sacral region and stage two.

Conclusion: While the most important risk factors for pressure ulcer development were emphasized as advanced age; in our study, in parallel with the literature, advanced age was the most common. Pressure sores rate and analysis, which is one of the mandatory parameters as an indicator of quality in intensive care, is one of the issues that should be dominated by every intensive care worker.

Key Words: Pressure sores, intensive care quality indicators, Braden risk scale
Introduction

Pressure sores are necrosis and ulcerations that occur as a result of impaired circulation in the subcutaneous tissues of the skin due to repetitive and prolonged pressures, especially in areas with bony protrusions. It is more common in areas with bones just under the skin such as the ear, shoulder, elbow, sacral area, hip, knee, heel, compared to other body parts. Advanced age, higher or lower body weight, immobility, diabetes, fecal incontinence, urinary incontinence and hypoalbuminemia can be listed as the main risk factors for pressure sores.

Pressure sores are a serious health problem that is common in the intensive care unit (ICU), increasing the length of hospital stay, cost and mortality rate, and should be prevented first. Studies have shown that while the prevalence of pressure sores in intensive care varies between 4-49%, the incidence is between 4-12%. The reasons for pressure sores in intensive care patients can be listed as bedridden dependency, the use of sedative and muscle relaxant drugs, the need for mechanical ventilation, loss of consciousness and metabolic problems. Patients in the intensive care unit are regularly evaluated with the Braden scale, which is the most frequently used scale for evaluating the risk of pressure sores. Sensory perception, humidity, activity, nutrition, movement, friction and tearing are evaluated on the Braden scale.

This study was conducted in order to determine the risk factors that may affect our pressure sore prevalence and development.

Materials and Methods

After obtaining ethical approval from Eskişehir Osmangazi University Non-Invasive Clinical Research Ethics Committee with the decision number 11 dated 14.01.2020, the pressure sore data of the patients treated in the Anesthesia Intensive Care Unit for six months between June 1, 2019 and December 31, 2019 were examined. The demographic
characteristics, hospitalization diagnoses, pressure sore risk factors, locations and stages of the patients with pressure sores were recorded. Pressure sores were graded as stage 1-4 and unstageable stage. Stage 1; The presence of a rash that does not disappear with pressing on the skin, but the integrity of the skin is not impaired, Stage 2; partial depth tissue loss affecting the epidermis and / or the upper layer of the dermis, Stage 3; Full-depth tissue loss or necrosis including all tissues starting from the epidermis to the fat layer and extending to the upper fascia. Stage 4; As in the 3rd stage, with the loss of tissue at full depth, the progression of necrosis under the fascia, to the bone tissue, to the supporting structures such as the tendon and joint capsule. Unstageable stage; the damage to all of the skin and subcutaneous tissues, as the surface is covered with eschar, the depth of the underlying wound is not fully known, were classified. In the intensive care unit, the Braden risk scale was applied weekly at admission and afterwards. Unless indicated in the physician’s request, patients were routinely given positions every 2 hours, pads were placed on pressure points, the skin was tried to be kept dry and clean, and measures were taken to protect skin integrity.

While evaluating the data in the research, besides the descriptive statistical methods (mean, standard deviation), while comparing the quantitative data, the Mann Whitney U test; Chi-square test was used when comparing qualitative data. All data were evaluated by transferring them to SPSS for Windows program.

**Results**

The number of patients followed up during the six-month period was 275, and 52 of the patients had pressure sores (18.9%). Twenty-one of the 52 patients recorded had pressure sores on ICU submission, and thirty-one of 52 patients developed pressure sores during our follow-up. When patients who were admitted to the intensive care unit with pressure sores were removed, it was observed that the rate of actual pressure sore development decreased up to 12.2%. The mean age of the patients was 69.4 (std.dev 16.09) and the ratio of the men was 61.5% (n: 32). Forty of the patients were 65 years and older, and advanced age was found to be a significant risk factor (p <0.01).

| Table 1. Demographic datas of patients |
|---------------------------------------|
| Level | Counts | Proportion | p    |
|-------|--------|------------|------|
| Gender |        |            |      |
| M     | 32     | 0.615      | 0.136|
| F     | 20     | 0.385      | 0.126|
| Decubitus History | | | |
| Yes   | 21     | 0.404      | 0.126|
| No    | 31     | 0.596      | 0.212|

| Table 2. Descriptive Statistics |
|---------------------------------|
| Age | Length of stay (day) | Pressure sore formation (day) |
|-----|----------------------|-------------------------------|
| Mean | 69.481 | 30.294 | 17.097 |
| Median | 71.500 | 25.000 | 13.000 |
| Std. Deviation | 16.093 | 19.685 | 11.571 |
| p     | < .001 | 0.002 | 0.008 |
The average length of stay in the intensive care unit was 51 days (4-82 days). (Table 1,2) Considering the patients who developed pressure sores in our intensive care follow-up, it was seen that the average pressure sore development day was 17.1st day. (3rd-44th day) Pressure sores were most common in the sacral region and stage two. (table 3,4)

| LOCATION      | COUNT (%) |
|---------------|-----------|
| SACRUM        | 41 (%78.8)|
| TROCENTERIC   | 2 (%3.84) |
| OXYPITAL      | 1 (%1.92) |
| HEEL          | 3(%5.76)  |
| SCAPULA       | 1 (%1.92) |
| MULTIPLE      | 4(%7.69)  |

**Table 4. Percentages of pressure sores according to their stages**

| STAGE | COUNT (%) |
|-------|-----------|
| 1     | -         |
| 2     | 28(%53.8) |
| 3     | 18 (%34.6)|
| 4     | 2 (%3.84) |
| UNSTAGEABLE | 4 (%7.69) |

Thirty-three patients had stabilization at the same stage; there was improvement in 16 patients and worsening in only three patients. The second most common risk factor was diabetes mellitus (DM) with the presence of 18 patients (34.6%). No significant difference was found between the group with and without DM in terms of the mean day of pressure ulcer development (p: 0.493). No significant difference was found between the recovery rates in the group with and without DM. (P: 0.484) The third most common risk factor in patients was hypoalbuminemia with 12 patients.

**Discussion**

Patients in intensive care are susceptible to pressure sores due to many risk factors. Therefore, making regular evaluations to prevent its development, eliminating risk factors and, if pressure sore are developed, treating them effectively, reduces morbidity and mortality in intensive care.

In our study, in line with the literature, the most important risk factor for the development of pressure sores was found to be advanced age. Deterioration of skin perfusion and turgor pressure, decrease in immune response, loss of tissue elasticity in elderly patients contribute to the development of pressure sores. In addition, changes in consciousness and nutritional problems that we frequently see in elderly patients worsen the current picture.

In poorly controlled DM patients, the risk of easy pressure sores development and difficult wound healing are present, while the risk of infection of the wound also increases. In our study, no statistically significant difference was found in DM patients when compared with other patients in terms of mean time of wound opening and wound healing.

Edema caused by hypoalbuminemia due to reasons such as increased catabolism, inflammation, ineffective nutrition of patients in intensive care unit negatively
affects wound healing. Hypoalbuminemia was the third most common risk factor in our patients, and when we compared it with other patients, no significant difference was found in terms of wound healing.

While frequently positioning intensive care patients, putting pads on pressure points, early mobilization if possible, keeping the skin clean and dry can be counted as the main protection and treatment strategies, stabilization can be achieved at least at the same stage with appropriate interventions. In our patients, stabilization at the same stage was observed in 63.4% (n: 33) of the patients, and improvement in the stage in 30.7% with appropriate and necessary treatments.

Conclusion

Pressure sores rate and analysis, which is one of the mandatory parameters as an indicator of quality in intensive care, is one of the issues that should be dominated by every intensive care worker.

Conflict of Interest

The authors declared they do not have anything to disclose regarding conflict of interest with respect to this manuscript.

Ethics

Ethical approval for this study was obtained by Eskişehir Osmangazi University Non-Invasive Clinical Research Ethics Committee. (11-14.01.2020)

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