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욕창 환자에서 치유 결과 및 예측 인자에 대한 후향적 연구

Retrospective Analysis of Healing Outcomes and Associated Factors in Patients with Pressure Ulcers



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**Purpose:** Pressure ulcers are serious complications among immobilized or chronically ill patients, often resulting in prolonged hospitalization, morbidity, and increased healthcare costs. Despite therapeutic advances, predictors of long-term healing remain unclear. This study aimed to identify factors associated with one-year healing outcomes in patients with advanced pressure ulcers.

**Methods:** This retrospective cohort study included adult patients diagnosed with pressure ulcers of grade 2 or higher between January 2020 and January 2025. Clinical, laboratory, and wound-related variables were obtained from electronic records, including demographic data, comorbidities, nutritional indicators, ulcer features (stage, location, size, infection, and bone exposure), and treatment modalities such as negative pressure wound therapy and surgical debridement. The primary outcome measure was complete wound healing within 12 months. Univariate and multivariate logistic regression analyses identified independent predictors of healing.

**Results:** A total of 240 patients (mean age, 61.5 ± 10.6 years; 69.6% male) were included in the final analysis. Complete healing at 12 months was achieved in 48.8% of the patients. In the multivariate logistic regression model, negative pressure wound therapy (NPWT), hospital-based treatment, lower initial ulcer stage, and absence of paralysis were independently associated with complete healing, with all predictors reaching statistical significance (all  $p < 0.01$ ).

**Conclusion:** NPWT, hospital-based management, lower initial ulcer stage, and absence of paralysis were strongly associated with improved one-year healing outcomes in patients with advanced pressure ulcers. These findings highlight the importance of early, structured wound care and suggest that both the treatment setting and patient mobility status play critical roles in long-term recovery.

Variable/Category	Complete Healing (n=117)	Incomplete Healing (n=123)	OR/ Mean Diff	p-value	Test
<b>Continuous Variables</b>					
Age (years)	61.16±10.79	62.91±10.39	-	0.20	t-test
BMI (kg/m <sup>2</sup> )	23.92±3.82	24.39±3.27	-	0.30	t-test
Hemoglobin (g/dL)	11.58±1.53	11.37±1.65	-	0.31	t-test
Albumin (g/dL)	3.12±0.59	3.17±0.57	-	0.50	t-test
CRP (mg/L)	3.51±2.89	3.70±2.92	-	0.64	Mann-Whitney U
ESR (mm/h)	44.40±14.58	44.89±14.96	-	0.80	t-test
Initial Ulcer Size (cm <sup>2</sup> )	53.08±20.76	60.62±35.84	-	0.44	Mann-Whitney U
Initial Stage	2.94±0.81	3.39±0.75	-	<0.01***	t-test
<b>Categorical Variables</b>					
<b>Dressing Type</b>				<0.01***	Chi-square
NPWT	40/50 (80.0%)	10/50 (20.0%)	5.87		
Conventional	77/190 (40.5%)	113/190 (59.5%)	Ref		
<b>Treatment Location</b>				<0.01***	Chi-square
Hospital	86/139 (61.9%)	53/139 (38.1%)	3.66		
Home	31/101 (30.7%)	70/101 (69.3%)	Ref		
<b>Paralysis Status</b>				0.025*	Chi-square
No Paralysis	73/131 (55.7%)	58/131 (44.3%)	Ref		
Paralysis	44/109 (40.4%)	65/109 (59.6%)	0.54		
<b>Sex (Female)</b>				0.76	Chi-square
Diabetes Mellitus	29/66 (43.9%)	37/66 (56.1%)	0.77	0.44	Chi-square
Chronic Kidney Disease	31/67 (46.3%)	36/67 (53.7%)	0.87	0.74	Chi-square
Cardiovascular Disease	21/49 (42.9%)	28/49 (57.1%)	0.74	0.44	Chi-square
Infection Status	42/78 (53.8%)	36/78 (46.2%)	1.35	0.34	Chi-square

Ref, reference category. \*\*\* p<0.001, \* p<0.05

Data presented as mean ± standard deviation for continuous variables and n/N (%) for categorical variables.

NPWT, negative pressure wound therapy.

**Table 1.** Univariate Analysis of Variables Associated with One-Year Complete Healing

Variable	Coefficient	Odds Ratio	95% CI	Std Error	Z-Value	P-value
NPWT (vs. Conventional)	2.080	8.005	3.321-19.298	0.449	4.633	<0.01 ***
Hospital (vs. Home)	1.494	4.457	2.367-8.392	0.323	4.629	<0.01***
Initial Stage (per unit)	-0.973	0.378	0.252-0.567	0.207	-4.708	<0.01***
No Paralysis (vs. Paralysis)	0.987	2.684	1.442-4.997	0.317	3.114	<0.01***

Model Performance: ROC-AUC=0.8124, Accuracy=75.00%, Sensitivity=65.81%, Specificity=83.74%, PPV=79.38%, NPV=72.03%.

NPWT, negative pressure wound therapy.

**Table 2.** Multivariate Logistic Regression Analysis – Independent Predictors of Complete Healing