Article

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Application Effect of Diclofenac Sodium Combined With Eperisone on Managing Lumbar Disc Herniation

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Background: Lumbar disc herniation is a common cause of low-back and radicular leg pain, often resulting from degeneration or protrusion of the intervertebral disc that compresses adjacent nerve roots. This study aims to explore the impact of combining diclofenac sodium with eperisone on the treatment of lumbar disc herniation.

Methods: This retrospective study evaluated the clinical data from 200 lumbar disc herniation patients treated at Wuxi Ninth People's Hospital, between January 2023 and January 2024. Based on therapeutic regimen, patients were categorized into the combination group (n = 95) and the diclofenac sodium monotherapy group (n = 105). Both groups underwent treatment for 2 weeks and followed up for 6 months. Basic characteristics, pain intensity, degree of pain relief, lumbar function, and adverse drug events were analyzed and compared between groups.

Results: At rest or during exercise, the visual analogue scale (VAS) score was progressively reduced in both groups in contrast to the previous time point ($p < 0.05$). However, the decrease was more pronounced in the combination group at 2 weeks post-treatment ($p < 0.05$). Both at rest and during exercise, the rate of pain relief during the treatment stage and overall stage was greater in the combination group ($p < 0.05$). Furthermore, the Japanese Orthopaedic Association (JOA) score progressively increased in both groups ($p < 0.05$), with the combination group demonstrating a significantly greater JOA score 2 weeks after treatment ($p < 0.05$). Additionally, adverse drug events did not differ significantly between the two groups.

Conclusion: A 2-week combined treatment of diclofenac sodium and eperisone significantly attenuates pain and improves lumbar function in lumbar disc herniation patients compared with a diclofenac sodium monotherapy regimen, showing a superior safety profile.

Keywords: lumbar disc herniation; diclofenac sodium; eperisone; pain relief; lumbar function; safety

Introduction

Lumbar disc herniation (LDH) is a common spinal disease manifested as degenerative changes in the nucleus pulposus, annulus fibrous, and cartilaginous endplate, resulting in nucleus pulposus material protruding into the spinal canal and compressing nerves [1–3]. Clinical manifestations of lumbar disc herniation vary with the compression sites, and can cause low back pain, radicular leg pain, sensory or motor dysfunctions, and, in severe cases, bowel or bladder conditions [4]. The recurrence rate after surgical intervention is reported to be about 5% [5]. Lumbar disc herniation often lasts longer and is prone to recur, resulting in significant pain, functional limitation, and severely reduced quality of life. Although the disease is not fatal, timely and effective treatment is particularly essential to minimize disability and permanent paralysis.

Currently, conservative treatment of lumbar disc herniation in the clinical setting often involves diuretics, steroidal anti-inflammatory drugs (corticosteroids), non-steroidal anti-inflammatory drugs (NSAIDs), neurotrophic agents, and muscle relaxants, such as diclofenac sodium and eperisone [6,7]. Diclofenac sodium is an NSAID that reduces the production of prostaglandin, bradykinin and leukotrienes, providing analgesic, antipyretic and anti-inflammatory effects, and is commonly used for LDH-associated pain [6,8]. Eperisone is a key muscle relaxant that inhibits spinal reflexes and γ-motor neuron activity, thereby reducing muscle tone and reflex hyperexcitability [9]. Clinical studies reveal that eperisone may effectively relieve pain in patients with acute low back pain by improving paraspinal blood flow, and it has fewer adverse reactions [9]. Despite the widespread applications of diclofenac sodium and eperisone, their combined effects in LHD remain unclear. Therefore, this study aims to investigate the therapeutic impact of combined diclofenac sodium and eperisone in managing LDH, with a focus on improving clinical outcomes and long-term prognosis.

This retrospective study collected and reviewed clinical data from LDH patients who received either diclofenac sodium treatment alone or in combination with eperisone. Our objective is to evaluate the therapeutic efficacy of this

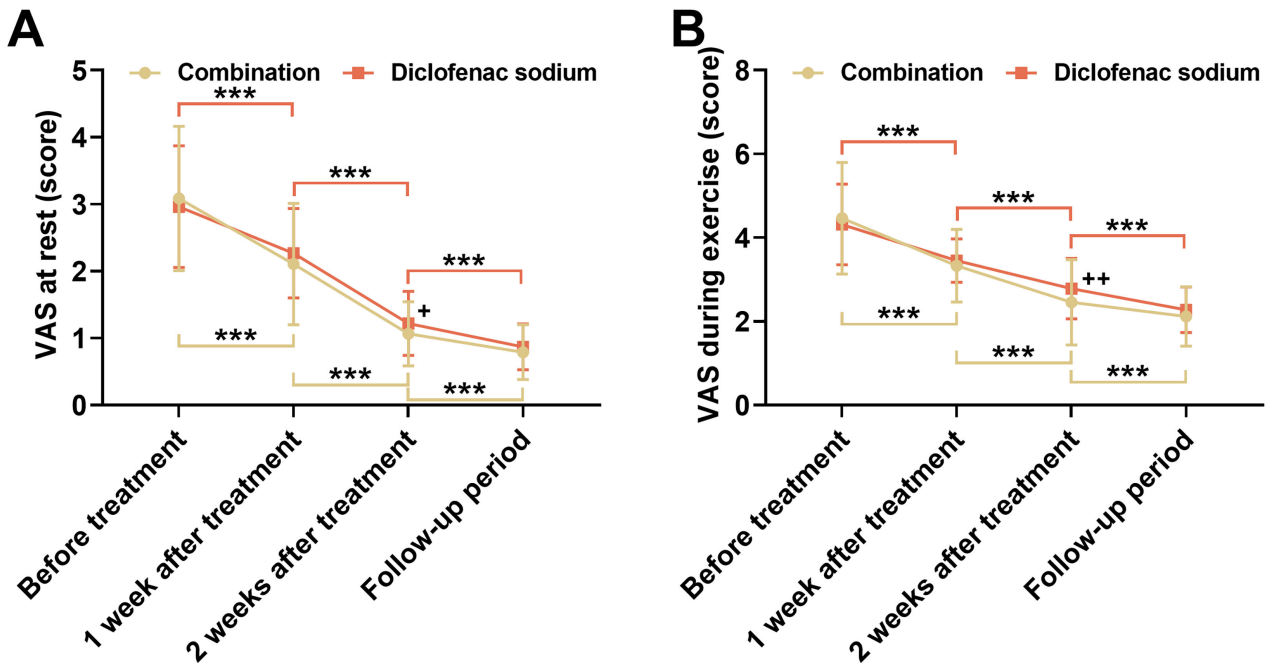

Fig. 1. Comparison of VAS score at rest and during exercise across predefined time points. (A) VAS score at rest. (B) VAS score during exercise. $^{***}p < 0.001$ vs. the previous time point in the same group. $^{+}p < 0.05$, $^{++}p < 0.01$ vs. the combination group. Abbreviation: VAS, visual analogue scale.

combined regimen compared with monotherapy and to elucidate its impact on clinical outcomes and long-term prognosis.

Methods

Patient Information

The study retrospectively collected clinical data from 200 patients with lumbar disc herniation treated at Wuxi Ninth People's Hospital between January 2023 and January 2024. The study design was approved by the hospital's Ethical Committee (No. KS2025035), exempting patients from informed consent by the ethics committee, and it was conducted in accordance with the Declaration of Helsinki.

Inclusion and Exclusion Criteria

Eligible LDH cases that met the predefined inclusion-exclusion criteria were selected for this analysis.

Inclusion criteria for patient selection were as follows: (1) confirmed diagnosis of LDH, (2) aged 35–55 years, (3) intact consciousness, and (4) availability of complete clinic data.

Exclusion criteria: (1) patients with known hypersensitivity to diclofenac sodium and eperisone, (2) patients pre-existing severe hepatic, renal, or other vital organ dysfunction, (3) and pregnant or lactating women.

Treatment Workflow

Treatment assignment was normalized and based on physician's preference and clinical judgment. Based on treatment regimen, patients were categorized into a combination group receiving diclofenac sodium in combination with eperisone (n = 95) and a diclofenac sodium monotherapy group (n = 105). Both treatment regimens were given for 2 weeks and were followed up 6 months. Diclofenac sodium (220509, Sichuan Huaxin Pharmaceutical Inc., Leshan, China, national medicine approval number H19991402) was administered orally at 0.1 g once daily. In the combination group, eperisone (220723, Weicai Pharmaceutical Inc., Shanghai, China, national medicine approval number H20041061) was given orally at 50 mg three times daily along with diclofenac sodium (0.1 g once daily).

Monitoring and Analysis of Clinical Indicators

Baseline Characteristics

Baseline variables were acquired from medical records and included sex, age and age strata, body mass index (BMI) and BMI strata, occupation, comorbidities, disease duration and its stratification, affected lumber segment, drug combination, visual analogue scale (VAS) score at rest and during exercise, follow-up duration, heart rate, systolic and diastolic blood pressure, platelet count, hemoglobin, aspartate transaminase (AST), γ-glutamyl transpeptidase (γ-GT), and blood urea nitrogen (BUN).

Pain Evaluation

Pain at rest or during exercise was evaluated using the VAS score at predefined time points: before treatment, 1 week after treatment, 2 weeks after treatment, and during follow-up. Higher VAS scores show greater pain level [10]. VAS assessments were conducted by treating physicians, who were not blinded to the treatment groups.

Degree of Pain Relief

The degree of pain relief at rest or during exercise was analyzed at predefined stages: treatment, follow-up, and overall. The degree of pain relief at these stages was calculated as follows: Degree of pain relief = $\Delta VAS_{\text{treatment stage}} = (VAS_{\text{before treatment}} - VAS_{\text{2 weeks after treatment}})/VAS_{\text{before treatment}}) \times 100\%$; Degree of pain relief = $\Delta VAS_{\text{follow-up stage}} = (VAS_{\text{2 weeks after treatment}} - VAS_{\text{follow-up period}})/VAS_{\text{2 weeks after treatment}}) \times 100\%$; Degree of pain relief = $\Delta VAS_{\text{overall stage}} = (VAS_{\text{before treatment}} - VAS_{\text{follow-up period}})/VAS_{\text{before treatment}}) \times 100\%$.

Lumbar Function Evaluation

Lumbar function was evaluated using the Japanese Orthopaedic Association (JOA) score (total 29 points) at predefined time points: before treatment, 1 week after treatment, 2 weeks after treatment, and during the follow-up period. This scale primarily assesses four domains: subjective symptoms, clinical signs, limitations in daily activities, and bladder function. A higher JOA score indicates better lumbar function [11]. JOA assessments were conducted by treating physicians, who were not blinded to the treatment groups.

Adverse Drug Events

Adverse drug events were evaluated before and after treatment, including dizziness, headache, insomnia, drowsiness, dysphoria, skin erythema, rash, gastrointestinal hemorrhage, peptic ulcer, allergic responses, nausea, vomiting, loss of appetite, stomachache (epigastric pain), abdominal distention, and constipation. Additionally, other parameters, including platelet count, hemoglobin, AST, γ-GT, and BUN, were evaluated before and after treatment.

Sample Size Calculation

Based on the previous literature, the sample size was determined using the expected pain relief rate [12]. We assumed the pain relief rate of 72.4% in the combination group and 46.7% in the diclofenac sodium monotherapy group. The sample size was calculated using PASS 21.0.3 software (NCSS Inc., Kaysville, UT, USA) with power = 90%, $\alpha = 0.05$, and a dropout rate of 20%; the required minimum number of individuals was 90 per group. Hence, 95 patients in the combination group and 105 in the diclofenac sodium group met the sample size requirements.

Statistical Analysis

Statistical analysis was performed using SPSS 26.0 software (IBM Corp., Armonk, NY, USA). Normality in data distribution was evaluated using the Kolmogorov-Smirnov test. Normally distributed continuous variables were expressed as mean $\pm$ standard deviation and analyzed using the independent sample *t*-test (between groups comparison) or the paired sample *t*-test (within group comparison across two time points). Non-normally distributed variables were presented as quartile M (P_{25}-P_{75}) and compared using the Mann-Whitney *U* test. The generalized estimation equation was used for within-group comparisons across multiple time points, and between-group comparisons were performed using the Bonferroni method. Qualitative data were expressed as rates or proportions and compared with the χ^2 test. Ordinal data were analyzed using the Kruskal Wallis *H* test. A bilateral *p*-value < 0.05 was considered statistically significant.

Results

Comparison of Basic Characteristics Between the Two Groups

As detailed in Table 1, 95 LDH patients were included in the combination group (54 males and 41 females), and 105 were assigned to the diclofenac sodium monotherapy group (50 males and 55 females). Mean age was 42.44 $\pm$ 11.60 years in the combination group and 41.51 $\pm$ 9.86 years in the diclofenac sodium monotherapy group. There were no significant differences between the two group regarding sex, age, age strata, BMI, BMI strata, occupation, comorbidities, course of LDH disease and its strata, lesion segment, drug combination, VAS scores at rest, VAS scores during exercise, follow-up duration, heart rate, systolic and diastolic blood pressure, platelet count, hemoglobin, AST, γ-GT, or BUN (Table 1, $p > 0.05$).

Pain Evaluation Across Predefined Time Points

Pain was evaluated using the VAS score at predefined time points: before treatment, 1 week after treatment, 2 weeks after treatment, and follow-up. At rest, the VAS score declined progressively at successive time points in both groups (Fig. 1A, $p < 0.05$). During exercise, the VAS score showed a similar stepwise decrease in both groups (Fig. 1B, $p < 0.05$). At the 2-week point, the decrease in VAS score was more pronounced in the combination group than in the diclofenac sodium group, both at rest and during exercise (Fig. 1A,B, $p < 0.05$).

Degree of Pain Relief

We further assessed pain-relief rates across predefined stages (treatment, follow-up, and overall) (Fig. 2A–F). At rest, pain relief during treatment stage and overall stage was greater in the combination group than in the diclofenac sodium group (Fig. 2A,C, $p < 0.05$). A similar pattern was

Table 1. Comparison of baseline characteristics between the combination and diclofenac sodium monotherapy groups.

Item	Combination group (n = 95)	Diclofenac sodium monotherapy group (n = 105)	$t/Z/\chi^2$	*p*-value
Sex [n (%)]			1.700	0.192
Male	54 (56.84)	50 (47.62)		
Female	41 (43.16)	55 (52.38)		
Age (year)	42.44 ± 11.60	41.51 ± 9.86	0.611	0.542
Age strata [n (%)]			1.941	0.164
18~34	22 (23.16)	30 (28.57)		
35~44	29 (30.53)	36 (34.29)		
45~54	29 (30.53)	28 (26.67)		
55~65	15 (15.79)	11 (10.48)		
BMI (kg/m^2)	22.54 ± 1.79	22.94 ± 1.87	–1.538	0.126
BMI strata [n (%)]			1.508	0.219
<18 kg/m^2	0 (0.00)	0 (0.00)		
18~25 kg/m^2	86 (90.53)	89 (84.76)		
>25 kg/m^2	9 (9.47)	16 (15.24)		
Occupation [n (%)]			2.834	0.418
Student	7 (7.37)	7 (6.67)		
Employee	62 (65.26)	67 (63.81)		
Farmer	18 (18.95)	27 (25.71)		
Inoccupation	8 (8.42)	4 (3.81)		
Comorbidities [n (%)]			0.643	0.423
No	47 (49.47)	46 (43.81)		
Yes	48 (50.53)	59 (56.19)		
High blood pressure	30 (31.58)	27 (25.71)	0.842	0.359
Diabetes	17 (17.89)	13 (12.38)	1.189	0.275
Cardiovascular disease	0 (0.00)	4 (3.81)	2.005	0.157
Gastrointestinal disease	17 (17.89)	24 (22.86)	0.754	0.385
Disease duration (year)	7.00 (5.00, 9.00)	8.00 (6.00, 9.00)	–0.995	0.320
Disease course strata [n (%)]			1.570	0.210
0~2	9 (9.47)	5 (4.76)		
3~5	22 (23.16)	18 (17.14)		
6~10	54 (56.84)	73 (69.52)		
>10	10 (10.53)	9 (8.57)		
Lesion segment [n (%)]			3.642	0.500
$L_{4\sim5}$	42 (44.21)	51 (48.57)		
$L_5\sim S_1$	46 (48.42)	48 (45.71)		
$L_{2\sim3}$	1 (1.05)	2 (1.90)		
$L_{3\sim4}$	3 (3.16)	0 (0.00)		
$L_{4\sim5}$ and $L_5\sim S_1$	3 (3.16)	4 (3.81)		
Drug combination [n (%)]			1.470	0.225
No	2 (2.11)	7 (6.67)		
Yes	93 (97.89)	98 (93.33)		
Antihypertensive drug	21 (22.11)	26 (24.76)	0.196	0.658
Antidiabetic drug	11 (11.58)	5 (4.76)	3.149	0.076
Antiplatelet drug	2 (2.11)	8 (7.62)	2.137	0.144
Antiacid drug	82 (86.32)	85 (80.95)	1.041	0.308
Vitamin	14 (14.74)	24 (22.86)	2.137	0.144
Steroid	52 (54.74)	67 (63.81)	1.704	0.192
Other	4 (4.21)	8 (7.62)	1.027	0.311
VAS scores at rest (score)	3.00 (2.00, 4.00)	3.00 (2.00, 4.00)	–0.550	0.582
VAS scores during exercise (score)	5.00 (4.00, 5.00)	4.00 (4.00, 5.00)	–1.004	0.316
Follow-up time (day)	165.00 (156.50, 172.00)	161.00 (155.00, 171.00)	–1.725	0.085
Heart rate (time/minute)	76.27 ± 14.14	78.73 ± 12.81	–1.291	0.198
Systolic blood pressure (mmHg)	122.34 ± 19.47	118.94 ± 9.49	1.542	0.126

Table 1. Continued.

Item	Combination group (n = 95)	Diclofenac sodium monotherapy group (n = 105)	$t/Z/\chi^2$	*p*-value
Diastolic blood pressure (mmHg)	76.00 (70.50, 83.00)	75.00 (68.00, 82.00)	–1.201	0.230
Platelet count (10^9/L)	175.65 ± 22.28	170.01 ± 30.34	1.509	0.133
Hemoglobin (g/L)	144.00 (133.00, 150.00)	139.00 (131.00, 149.00)	–1.319	0.187
AST (U/L)	25.00 (22.00, 29.50)	27.00 (22.00, 31.00)	–0.830	0.406
γ-GT (U/L)	25.00 (22.00, 28.00)	25.00 (21.00, 28.00)	–0.583	0.360
BUN (mmol/L)	5.69 ± 0.54	5.58 ± 0.49	1.453	0.148

Abbreviation: BMI, body mass index; VAS, visual analogue scale; AST, aspartate transaminase; γ-GT, γ-glutamyl transpeptidase; BUN, blood urea nitrogen.

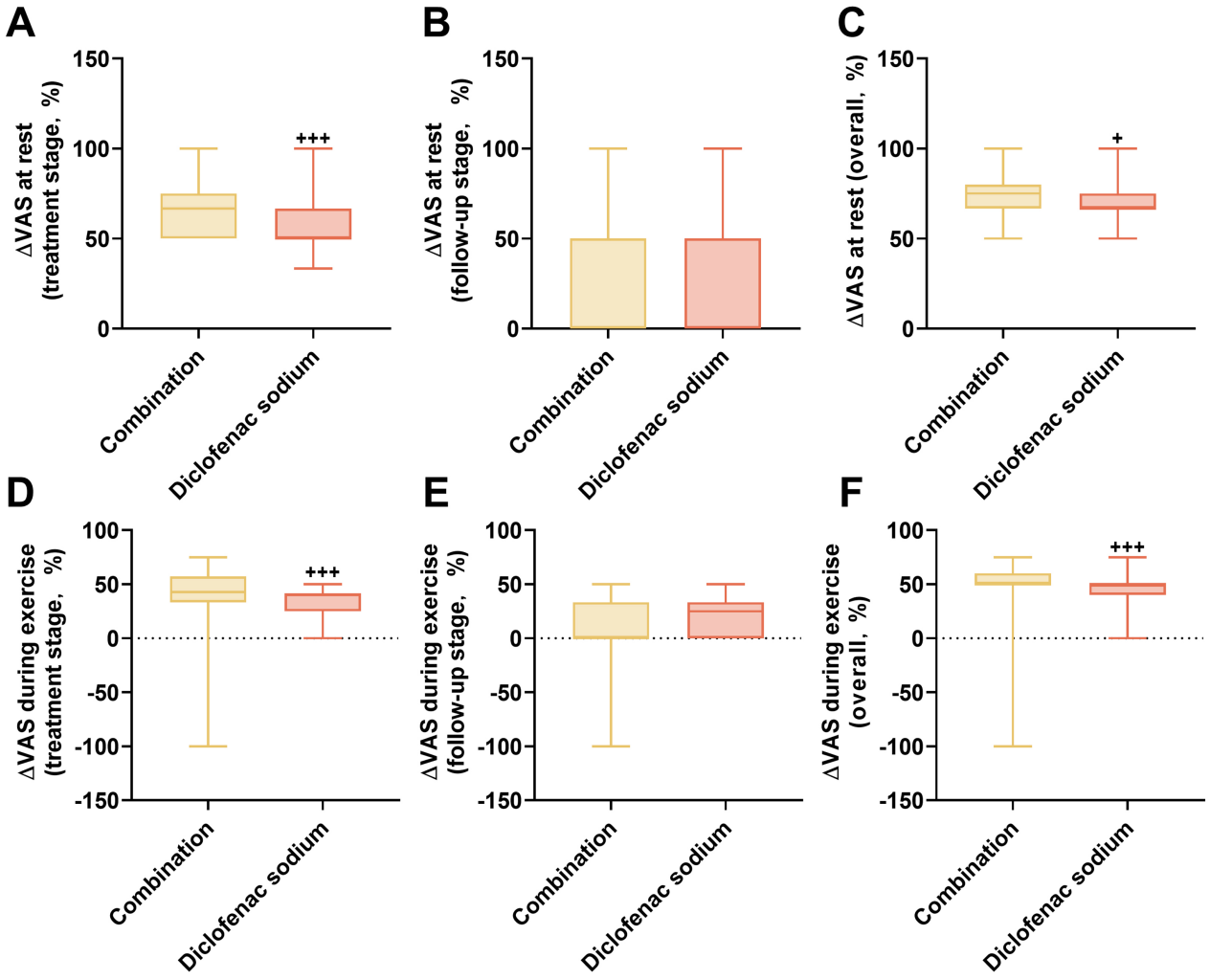

Fig. 2. Comparison of pain-relief rates at distinct stages. (A) VAS score at rest (treatment stage). (B) VAS score at rest (follow-up stage). (C) VAS score at rest (overall). (D) VAS score during exercise (treatment stage). (E) VAS score during exercise (follow-up stage). (F) VAS score during exercise (overall). $^{+}p < 0.05$, $^{+++}p < 0.001$ vs. the combination group. Abbreviation: VAS, visual analogue scale.

found during exercise, with the combination group demonstrating better pain relief at both the treatment and overall stages (Fig. 2D,F, $p < 0.05$). During follow-up stage, pain-relief rates did not differ between the two groups at rest or during exercise (Fig. 2B,E, $p > 0.05$).

Lumbar Function Evaluation

Lumbar function was evaluated using the JOA score at different time points: (before treatment, 1 week after treatment, 2 weeks after treatment, and follow-up period). JOA scores increased progressively at each time point in both groups (Fig. 3, $p < 0.05$). Moreover, the increase in JOA

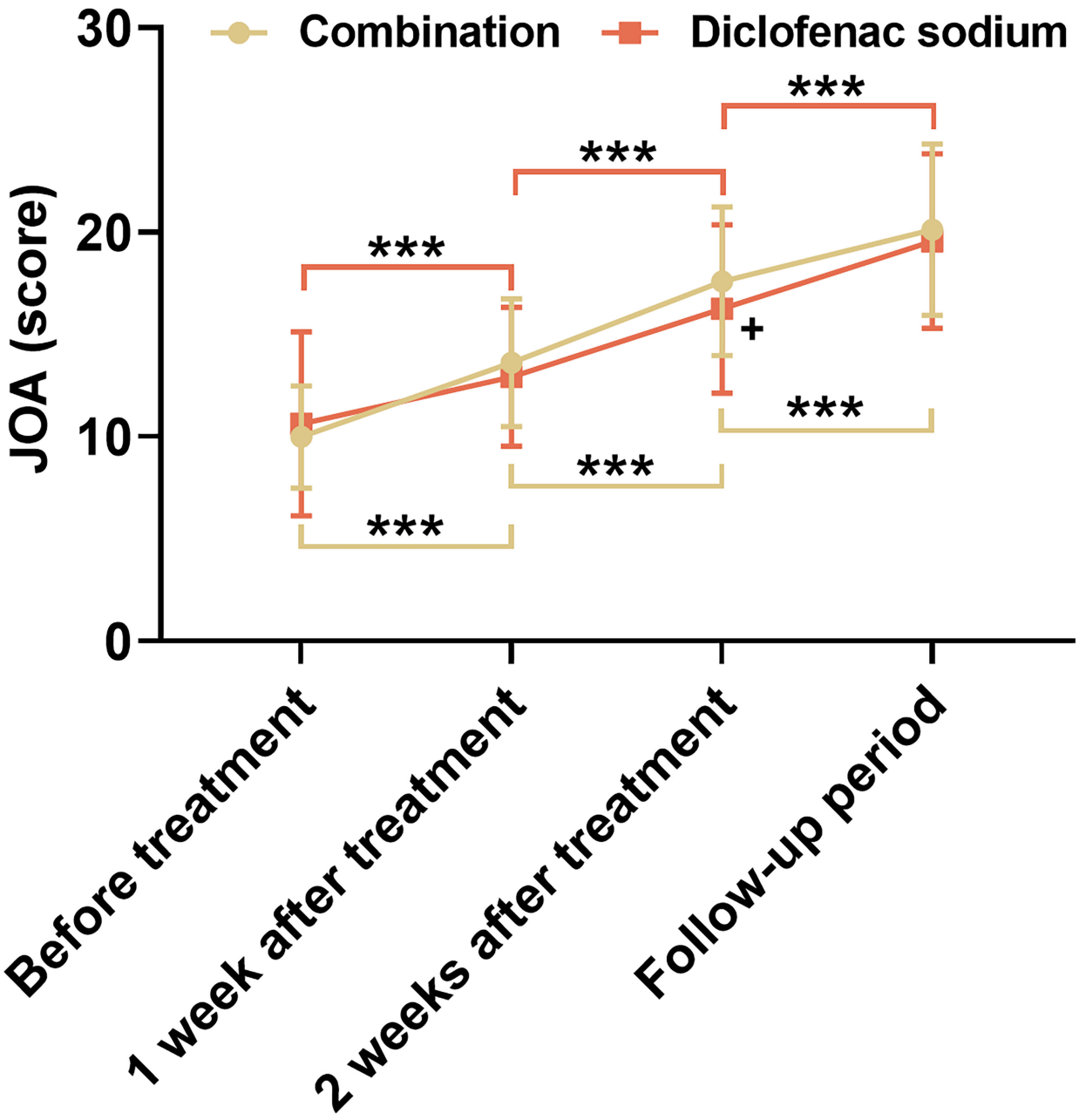

Fig. 3. Comparison of lumbar JOA score between groups at predefined time points. $^{***}p < 0.001$ vs. the previous time point in the same group. $^{+}p < 0.05$, vs. the combination group. Abbreviation: JOA, Japanese Orthopaedic Association.

scores at 2 weeks was more pronounced in the combination group than in the diclofenac sodium group (Fig. 3, $p < 0.05$).

Adverse Drug Events

Adverse drug events were evaluated before and after treatment. Before treatment, there were no adverse drug events in both groups (Table 2, $p > 0.05$). After treatment, the documented adverse events in the combination group were dizziness (11 cases), headache (5 cases), insomnia (2 cases), drowsiness (4 cases), dysphoria (4 cases), skin erythema (5 cases), rash (8 cases), nausea (3 cases), vomiting (2 cases), loss of appetite (3 cases), stomachache/epigastric pain (5 cases), abdominal distention (2 cases), and constipation (2 cases); whereas, no patient reported alimentary tract hemorrhage, peptic ulcer, or allergic responses (Table 2). Overall, the above adverse drug events did not differ substantially between the two groups (Table 2, $p > 0.05$).

Post-treatment adverse events recorded in the diclofenac group included dizziness (5 cases), headache (11 cases), insomnia (6 cases), drowsiness (8 cases), dysphoria (11 cases), skin erythema (10 cases), and rash (6 cases);

Table 2. Comparison of adverse drug events between the two groups.

Item	Combination group (n = 95)	Diclofenac sodium group (n = 105)	$t/Z/\chi^2$	p–value
Dizziness [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	11 (11.58)	5 (4.76)	3.149	0.076
Headache [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	5 (5.26)	11 (10.48)	1.842	0.175
Insomnia [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	2 (2.11)	6 (5.71)	0.882	0.348
Drowsiness [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	4 (4.21)	8 (7.62)	1.027	0.311
Dysphoria [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	4 (4.21)	11 (10.48)	2.822	0.093
Skin erythema [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	5 (5.26)	10 (9.52)	1.305	0.253
Rash [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	8 (8.42)	6 (5.71)	0.561	0.454
Alimentary tract hemorrhage [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	0 (0.00)	0 (0.00)	—	—
Peptic ulcer [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	0 (0.00)	0 (0.00)	—	—
Allergic responses [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	0 (0.00)	0 (0.00)	—	—
Platelet (10^9/L)				
Before treatment	175.65 ± 22.28	170.01 ± 30.34	1.509	0.133
After treatment	172.11 ± 19.15	168.79 ± 30.94	0.920	0.359
Hemoglobin (g/L)				
Before treatment	144.00 (133.00, 150.00)	139.00 (131.00, 149.00)	–1.319	0.187
After treatment	144.00 (134.50, 151.50)	142.00 (134.00, 150.00)	–0.743	0.458
AST (U/L)				
Before treatment	25.00 (22.00, 29.50)	27.00 (22.00, 31.00)	–0.830	0.406
After treatment	25.00 (21.00, 29.00)	27.00 (22.00, 32.00)	–1.837	0.066
γ-GT (U/L)				
Before treatment	25.00 (22.00, 28.00)	25.00 (21.00, 28.00)	–0.583	0.560
After treatment	24.00 (21.00, 27.00)	25.00 (22.00, 28.00)	–1.253	0.210
BUN (mmol/L)				
Before treatment	5.69 ± 0.54	5.58 ± 0.49	1.453	0.148
After treatment	5.63 ± 0.49	5.52 ± 0.46	1.637	0.103
Nausea [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	3 (3.16)	0 (0.00)	1.568	0.210
Vomiting [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	2 (2.11)	0 (0.00)	—	0.224

Table 2. Continued.

Item	Combination group (n = 95)	Diclofenac sodium group (n = 105)	$t/Z/\chi^2$	p–value
Loss of appetite [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	3 (3.16)	0 (0.00)	1.568	0.210
Stomachache [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	5 (5.26)	0 (0.00)	3.714	0.054
Abdominal distention [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	2 (2.11)	0 (0.00)	—	0.224
Constipation [n (%)]				
Before treatment	0 (0.00)	0 (0.00)	—	—
After treatment	2 (2.11)	0 (0.00)	—	0.224

Abbreviation: AST, aspartate transaminase; γ-GT, γ-glutamyl transpeptidase; BUN, blood urea nitrogen.

however, none of the patients reported alimentary tract hemorrhage, peptic ulcer, allergic responses, nausea, vomiting, loss of appetite, stomachache, abdominal distention, or constipation (Table 2). Overall, the rate of these adverse drug events did not differ substantially between the two groups (Table 2, $p > 0.05$).

Before and after treatment, platelet counts, hemoglobin, AST, γ-GT, and BUN showed no significant differences in either group (Table 2, $p > 0.05$). Similarly, between-group comparisons for these indicators also revealed no significant differences (Table 2, $p > 0.05$).

Discussion

Advances in medical research indicate that acute lumbar disc herniation triggers protective muscle tension due to pain, which in turn exacerbates pain and stiffness, and limits activity, creating a vicious cycle. The resulting pain significantly reduces the quality of life and work capacity, with the progressive clinical incidence of this disease in recent years posing a substantial burden on the health care system [4]. In this study, combined treatment with diclofenac sodium and eperisone offered greater pain relief and larger improvements in lumbar function than monotherapy, supporting its potential clinical application.

Diclofenac sodium relieves acute attacks or persistent swelling and pain in various chronic arthritis, including spinal arthropathy, gout, rheumatoid arthritis, and lumbar disc herniation [13,14]. Eperisone is primarily used to relieve local muscle spasm and rigidity, such as in scapulohumeral periarthritis, low back pain, and neck-shoulder-wrist syndrome [15]. However, the effect of combining diclofenac sodium with eperisone for mitigating pain in lumbar disc herniation patients remains inadequately investigated. In the present study, pain at rest and during exercise was assessed using the VAS score, a widely validated approach that correlates positively with pain intensity [16,17]. Our results revealed that, two weeks after treatment and across the treatment and overall periods, pain reduction was more pronounced in the combination therapy groups than in monotherapy. These findings support the clinical significance of the combined therapy (diclofenac sodium and eperisone) for improving pain in patients with lumbar disc herniation.

In clinical settings, lumbar function is usually evaluated using the JOA score, in which higher scores represent better function [18,19]. However, the effect of combining diclofenac sodium with eperisone on lumbar function remains unclear. In this study, the increase in JOA score at 2 weeks was greater in the combination treatment group (diclofenac sodium plus eperisone) than in the diclofenac monotherapy group. In contrast, during subsequent follow-up, the between-group difference did not differ significantly. The short-term improvement in the combination group may be attributed to the synergistic effect of the muscle relaxant (eperisone) and an NSAID (diclofenac), which alleviates muscle spasm and inflammation. Similar long-term outcomes suggest that both treatments eventually achieve comparable pain control, potentially due to natural healing or adaptive mechanisms.

These results indicate that combining diclofenac sodium with eperisone is a feasible strategy to enhance lumbar function in patients with LDH. Although no statistically significant differences were observed in adverse drug events between the two groups, some adverse events, such as dizziness and epigastric pain, were numerically more frequent with combination therapy, which warrants clinical attention.

Despite several promising outcomes, we acknowledge several limitations in the present study. First, its single-center, retrospective design introduces the possibility of selection and measurement biases, potentially limiting the universal applicability of the findings. Specifically, patients were assigned to the combination or monotherapy group based on physician preference and clinical judgment rather than randomization, which may have increased the

likelihood of selection bias. Second, due to the retrospective nature of the study, blinding was not possible; VAS and JOA assessments were performed by treating physicians who were aware of the treatment groups, which might have introduced measurement bias. Third, while baseline characteristics were well-balanced between the two groups, we did not include multivariable adjustment for potential confounders such as age, sex, BMI, and comorbidities. Future investigations should include a larger sample size, a prospective randomized double-blind design, and adjusted analyses to validate and extend these findings.

Conclusion

In summary, our findings reveal that among patients with lumbar disc herniation, a 2-week therapy of combined diclofenac sodium and eperisone shows greater short-term decreases in pain and improvement in lumbar function than a diclofenac monotherapy regimen. However, the long-term outcomes converges between the two groups, indicating that the advantage of combination therapy is particularly short-term.

Availability of Data and Materials

The analyzed data sets generated during the study are available from the corresponding author on reasonable request.

Author Contributions

KY and HY designed the research study; ZL performed the research; KY and ZL collected and analyzed the data. HY has been involved in drafting the manuscript and all authors have been involved in revising it critically for important intellectual content. All authors gave final approval of the version to be published. All authors have participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work in ensuring that questions related to its accuracy or integrity.

Ethics Approval and Consent to Participate

This research had been approved by the Ethical Committee of Wuxi Ninth People's Hospital (No. KS2025035).

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Conflict of Interest

The authors declare no conflict of interest.

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