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Study on Efficacy and Safety of Bortezomib in Combination with Lenalidomide and Dexamethasone in the Treatment of Newly Diagnosed Multiple Myeloma

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Abstract: *Objective:* To investigate the clinical effects of combining bortezomib with lenalidomide and dexamethasone in patients with newly diagnosed multiple myeloma. *Methods*: This study was conducted in Shaanxi Provincial People's Hospital from January 2020 to January 2022. 25 patients were selected for the study and divided into two groups: 12 patients in one group, the control group, were treated with bortezomib and thalidomide in combination with dexamethasone, and 13 patients in the other group were treated with bortezomib and dexamethasone. The other group of 13 patients, given bortezomib combined with lenalidomide and dexamethasone, was named as the experimental group, and the treatment effects of the two groups were compared and analyzed. *Results:* Comparing the treatment efficiency of the two groups, the incidence of patients in the experimental group was 92.31%, which was significantly higher than that of the control group (33.33%), with a significant difference, indicated as $P<0.05$. At the same time, the incidence of adverse reactions in the experimental group was lower, the clinical index scores were closer to normal values, and the level of inflammatory response was lower, with significant differences in all data in the control group ($P < 0.05$), and the experimental group had better treatment results. *Conclusion:* Bortezomib combined with lenalidomide and dexamethasone is clinically effective in the treatment of newly diagnosed patients with multiple myeloma, and is of positive significance in promoting recovery.

Keywords: Bortezomib; Lenalidomide; Dexamethasone; New diagnosis; Multiple myeloma

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1. Introduction

In the case of patients with multiple myeloma, the disease occurs mostly in older patients, poses a greater threat to their health and has shown a gradual increase in incidence, with approximately 86,000 people newly diagnosed with multiple myeloma each year, accounting for 1% of all cancer patients [1-3]. Multiple myeloma first occurs as a malignant clonal plasma cell disorder of post-centrally terminally differentiated B cells. After the onset of the disease, patients mainly present with malignant clones of plasma cells in the bone marrow and form secretory monoclonal immunoglobulins, resulting in patients exhibiting problems with target organ dysfunction such as heart, brain, kidney, bones and also mental problems. In actual development, affected by multisystem involvement and the limitations of treatment methods, the prognosis of patients with bone marrow cancer is poor, and traditional treatments are mostly treated with vincristine combined with doxorubicin and dexamethasone, which have a greater impact on patients and are not well

tolerated by patients [4-6]. In recent years, various new drugs have gradually emerged and played a positive role in clinical treatment. In this study, bortezomib was combined with lenalidomide and dexamethasone to treat patients in our hospital, and the comparative analysis of its clinical treatment effects is as follows.

2. General information and methods

2.1. Data analysis

This study was carried out in Shaanxi Provincial People's Hospital, from January 2020 to January 2022, and a total of 25 patients were selected for this study, all of whom were newly diagnosed multiple myeloma patients. The patients were divided into two groups: a control group of 12 patients, 7 males and 5 females, with an age range of 38-88 years and a mean age of (54.33 ± 1.33) years. The experimental group consisted of 13 patients, 7 males and 6 females, with a maximum age of 87 years and a minimum age of 36 years, corresponding to a mean age of (54.55 ± 1.22) years. A comparison of the general data of the two groups of patients in this study showed that the data were not significantly different at $P>0.05$ and met the criteria for comparative studies.

Inclusion criteria: patients who met the diagnostic criteria for multiple myeloma; patients who had received hematopoietic stem cell therapy; patients who had active myeloma; patients who were informed about the study and agreed to participate in the study.

Exclusion criteria: all patients requiring other specific treatment; patients requiring regular follow-up observation patients with smoldering myeloma entering clinical trial; patients with a history of psychiatric disorders; patients with incomplete information. **Table 1** shows the comparison of general information between the two groups of patients.

Table 1. Comparison of general information between the two groups of patients

Item	Number of men/women	Age range	Average age
Experimental group (n=13)	7/6	36-87	54.55±1.22
Control group (n=12)	7/5	38-88	54.33±1.33
X^2	0.051	/	0.431
P	0.821	/	0.670

2.2. Research Methodology

Patients in the control group were treated with bortezomib, thalidomide and dexamethasone, of which bortezomib was mainly applied by the drug manufactured by Xi'an Janssen Pharmaceutical Co., Ltd, and the dose of the drug was 1.3mg/m^2, which was given subcutaneously on day 1, day 4, day 8 and day 11 respectively. Thalidomide was provided by Changzhou Pharmaceutical Factory and administered at a dose of 100mg/D, all administered orally in the evening on days 1–28. The dexamethasone drug was purchased from Guangzhou Pharmaceutical Group Co., Ltd. and the dose of the drug was 20mg/D, applied on days 1–2, 4–5, 8–9 and 11–12, respectively, by intravenous drip, and the patients were given a course of treatment for 28 consecutive days.

In the experimental group, bortezomib, lenalidomide and dexamethasone were used, with bortezomib and dexamethasone being administered in the same way and at the same dose as in the control group, while lenalidomide was administered by Natco, India, at a dose of 25mg/D on days 1–28, all taken at night and orally. Patients were given 4 consecutive courses of treatment.

2.3. Observation indicators

The treatment effects of the two groups of patients were compared and analyzed. The main three indicators were significant, effective and ineffective. Significant mainly refers to the improvement of the patients' signs after taking the medicine, the patients' lower incidence of adverse reactions and better tolerability. Effective means that patients' signs improve after treatment, but the incidence of adverse reactions has a greater impact on patients' quality of life. Ineffective means that there is no significant change in the patient's signs before and after treatment and that the patient has serious adverse reactions. The total rate of effectiveness was determined by excluding the rate of ineffectiveness. The incidence of adverse reactions was also recorded while clinical indicators and immune levels were measured and compared between the two groups of patients.

2.4. Statistical methods

The statistical software SPSS 20.0 was used as a tool to statistically analyze the data presented in this study. The results of the comparison of the measurement data (± s) were verified by t-values and the results of the comparison of the count data [n (%)] were verified by 2-values, and when the results showed $P < 0.05$, it indicated that the differences between the groups were statistically analyzed.

3. Results

3.1 Clinical efficacy

Comparing the treatment efficiency of the two groups of patients, their data differed significantly, expressed as $P < 0.05$, where the incidence of patients in the experimental group was 92.31%, which was significantly higher than that of the control group, 33.33%, as shown in **Table 2**.

Table 2. Comparison of treatment efficiency between the two groups of patients [n (%)]

Group	Significant	Effective	Non-effective	Efficient
Experimental group (n=13)	8 (61.54)	4 (30.77)	1 (7.69)	12 (92.31)
Control group (n=12)	2 (16.67)	2 (16.67)	8 (66.7)	4 (33.33)
X^2				6.838
P				0.009

2.2. Adverse reactions

The specific occurrence of adverse reactions in the two groups of patients is shown in **Table 3** below.

Table 3. Comparison of the incidence of adverse reactions between the two groups of patients [n (%)].

Group	Leukopenia	Thrombocytopenia	Indigestion	Respiratory tract infections	Incidence rate
Experimental group (n=13)	0 (0.00)	0 (0.00)	1 (7.69)	1 (7.69)	2 (15.38)
Control group (n=12)	1 (8.33)	2 (16.67)	3 (25.00)	2 (16.67)	8 (66.67)
X^2					6.838
P					0.009

2.3. Patient-related clinical indicators

The patients in the experimental group had lower blood sedimentation, higher hemoglobin values and lower bone marrow plasma cell and serum M protein values, and the data were statistically significant at P<0.05. See Table 4 for details.

Table 4. Comparison of relevant clinical indicators between the two groups ($\bar{x} \pm s$)

Group	Erythrocyte sedimentation rate (mm/h)	Hemoglobin (g/L)	Bone marrow plasma cells (%)	Serum M protein (g/L)
Experimental group (n = 13)	50.32 ± 2.98	85.32 ± 4.93	15.33 ± 2.31	24.34 ± 3.21
Control group (n = 12)	53.34 ± 3.00	68.78 ± 4.23	28.76 ± 4.11	42.31 ± 4.54
t	2.523	8.965	10.179	11.501
P	0.019	0.000	0.000	0.000

2.4. Immunity levels of patients after treatment

The specific immune indicators of the two groups of patients after treatment are compared as shown in **Table 5** below.

Table 5. Comparison of the immune levels of patients in the two groups after treatment ($\bar{x} \pm s$).

Group	$CD3^+CD4^+$ (%)	$CD3^+CD8^+$ (%)	$CD3^+CD4^+CD3^+CD8^+$
Experimental group (n = 13)	43.23 ± 2.54	22.32 ± 2.45	1.87 ± 0.15
Control group (n = 12)	37.66 ± 3.86	30.29 ± 3.22	1.22 ± 0.12
t	4.296	6.999	11.897
P	0.000	0.000	0.000

3. Discussion

Multiple myeloma occurs mostly in elderly patients, and the onset of the disease is often accompanied by impaired cardiopulmonary function, which is not well tolerated by patients, resulting in them often struggling to tolerate the intensity and risks of transplantation. Current developments have seen an increasing number of investigators joining the study in an effort to find a treatment option with long survival and good tolerability. Bortezomib used in combination with lenalidomide and dexamethasone is significantly effective in patients with refractory multiple myeloma, extending their survival period [7-9]. Lenalidomide, a derivative of thalidomide, is a second-generation immunomodulatory drug that preserves the clinical efficacy of thalidomide but has better activity and higher and lower neurotoxicity in the fight against multiple myeloma, effectively reducing adverse effects such as constipation in patients and not leading to deformity problems [10-14]. Lenalidomide is already the current first-line drug for the clinical treatment of patients with multiple myeloma [15-18]. It has been demonstrated in several trials that lenalidomide attacks multiple targets, improves the myeloma cell environment of patients, and affects the immune system by altering the production of cellular transmitters, counteracting the proliferation of myeloma cells, reducing the breakdown of abnormal cells, protecting B cells and promoting the return of normal hematopoiesis in the bone marrow, in addition to consistent vascular growth [19-20]. The combination of dexamethasone and bortezomib can improve the clinical efficacy and is effective.

4. Conclusion

In conclusion, the combination of bortezomib with lenalidomide and dexamethasone in the treatment of newly diagnosed patients with multiple myeloma is clinically effective and has positive significance in promoting patients' recovery, and can be used in clinical practice.

Disclosure statement

The authors declare no conflict of interest.

References

[1] Lu J, Zhu XJ, 2020, Clinical Efficacy and Toxic Side Effects of Bortezomib Combined with Cyclophosphamide and Dexamethasone in the Treatment of Multiple Myeloma. Hebei Medicine, 26(4): 537–540.

[2] Xu J, Cao YJ, Du J, et al., 2020, New Targets and Therapeutic Strategies in Multiple Myeloma Research—A Report on the Hot Topics of the 17th International Symposium on Myeloma. Journal of Translational Medicine, 9(3): 181–184.

[3] Wang X, Xu K-L, 2020, Application of Multi-Targeted CAR-T Cell Therapy in Relapsed Refractory Multiple Myeloma. Journal of Clinical Hematology, 33(7): 446–450.

[4] Zhang Y, ZM, 2022, Clinical Efficacy of Bortezomib Combined with Lenalidomide and Dexamethasone (VRD) Regimen and Bortezomib Combined with Thalidomide and Dexamethasone (VTD) Regimen in the Treatment of Multiple Myeloma. Systemic Medicine, 7(1): 102–105.

[5] Gu X, Yin S, Zhao F, et al., 2020 Efficacy of Bortezomib Combined with Lenalidomide and Dexamethasone in the Treatment of Multiple Myeloma. Journal of Aerospace Medicine, 31(11): 1353–1354.

[6] Tang Q, 2020, Clinical Effects of Bortezomib Combined with Dexamethasone and Thalidomide in The Treatment of Primary Multiple Myeloma. Clinical Medicine Research and Practice, 5(4): 39 + 40 + 76.

[7] Ouyang X, Luo P, Hu F, et al., 2021, Analysis of Bortezomib and Thalidomide Combined with Dexamethasone in the Treatment of Multiple Myeloma in the Elderly. Jiangxi Medicine, 56(1): 57–58 + 74.

[8] Fan L, Ma YP, Zhang M, et al., 2020, Meta-Analysis of the Efficacy of Lenalidomide in the Treatment of Patients with Multiple Myeloma and Its Associated Serious Infections. International Journal of Blood Transfusion and Hematology, 43(1): 34–42.

[9] Ding X, Chen J, Wang W, et al., 2021, A Case of Multiple Myeloma with Tumor Lysis Syndrome Treated with Isazomib and Review of The Literature. Chinese Rural Medicine, 28(16): 41 + 42.

[10] Liu J, He HY, Li L, et al., Efficacy and Safety of Daratumumab for Relapsed/Refractory Multiple Myeloma. Chinese Journal of Hematology, 42(1): 27–32.

[11] Jing L, Lan XJ, 2020, Efficacy and Safety of Lenalidomide Combined with Low-Dose Dexamethasone in the Treatment of Multiple Myeloma in the Elderly. Primary Care Forum, 24(4): 492–493.

[12] Wang G, 2021, Analysis of the Effective Value of Using Lenalidomide in Combination with Low-Dose Dexamethasone in the Treatment of Relapsed Refractory Multiple Myeloma. Northern Pharmacology, 18(6):125–126.

[13] Lv P, 2020, Clinical Observation of Lenalidomide Combined with Cyclophosphamide and Low-dose

Dexamethasone in the Treatment of Multiple Myeloma. China Practical Medicine, 15(3): 145 + 146.

[14] Guo Q, Wang J, Liu Y, et al., 2021, Effect of Lenalidomide on Autologous Transplantation of Hematopoietic Stem Cells in Patients with Multiple Myeloma. Journal of Clinical Military Medicine, 49(1): 37–39 + 43.

[15] Li J, 2020, Effectiveness and Prognosis of Lenalidomide Combined with VAD Regimen in the Treatment of Multiple Myeloma. Clinical Medicine, 40(9): 92–94.

[16] Zhao GX, Cheng Z, Wei RH, et al., 2022, A Case of Chimeric Antigen Receptor T Cells Combined with Lenalidomide for the Treatment of Grade 3 Refractory Multiple Myeloma After Chimeric Antigen Receptor T Cell Therapy and Review of the Literature. Leukemia-Lymphoma, 31(02): 122–124.

[17] Zhao GX, Cheng Z, Wei RH, et al., 2021, A Case of Relapsed Refractory Multiple Myeloma Treated with Lenalidomide Combined with Anti-B-Cell Maturation Antigen Chimeric Antigen Receptor T Cells and Review of the Literature. Leukemia; Lymphoma, 30(4): 224–227.

[18] Sun H, Du Y, Xu LZ, et al., 2020, Correlation of CD56 and CD117 Expression Levels with the Efficacy of Lenalidomide in the Treatment of Multiple Myeloma. Modern Biomedical Advances, 20(1): 72–75.

[19] Jiang W, Luo P, 2021, Clinical Efficacy and Safety of Lenalidomide in the Treatment of Multiple Myeloma. Journal of Clinical Rational Drug Use, 14(21): 30–32.

[20] Luo M, Hu LW, Gu XK, et al., 2021, Clinical Efficacy and Prognosis of Long-Term Maintenance Treatment with Lenalidomide in Patients with Multiple Myeloma. Chinese Journal of Experimental Hematology, 29(2): 540–546.