

Clinical Efficacy of Dasatinib in the Treatment of Chronic Myeloid Leukemia (CML) Patients with Different Clinical Stages

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Abstract: *Objective:* To study the efficacy of dasatinib treatment in different clinical stages of patients with chronic myeloid leukemia (CML). *Methods:* A total of 80 patients with chronic myeloid leukemia (CML) were selected for experimental research. According to different clinical stages, they were divided into chronic phase, accelerated phase and blast phase, and all of them were treated with dasatinib. *Results:* The complete cytogenetic response remission rate, complete hematologic remission rate, and major molecular biological remission rate in the chronic phase were significantly higher. Besides, the overall survival time and relapse-free survival time in the chronic phase were significantly longer, and the mortality during the follow-up period in the chronic phase was also significantly higher. Furthermore, the incidence of hematological adverse reactions of grades III to IV in the chronic phase was significantly lower compared with the corresponding data of patients in the accelerated phase and blast phase with $P < 0.05$. *Conclusion:* Different clinical stages of CML patients have different curative effects of dasatinib, which can effectively treat patients in chronic stage.

Keywords: Dasatinib; Different clinical stages; Chronic myeloid leukemia; Clinical efficacy

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1. Introduction

Common clinical leukemias, including chronic myeloid leukemia (CML), are characterized by specific cytogenetic changes. Due to the cross-exchange of chromosomes 22 and 9^[1-3], the Ph chromosome will be generated, resulting in abnormal BCR/ABL fusion gene. This causes hematopoietic stem cells to proliferate out of control when the downstream signaling pathway is activated. A series of experiments were conducted on a total of 80 patients to study the efficacy of dasatinib treatment in patients with chronic myeloid leukemia (CML) in different clinical stages.

2. Materials and methods

2.1. Information

From April 2020 to March 2021 in our hospital, 80 patients with chronic myeloid leukemia (CML) were randomly selected for grouping. Grouped according to different clinical stages, including chronic phase, accelerated phase, blast phase patients, 47 cases, 16 cases, and 17 cases, respectively. In chronic phase patients, there were 23 and 24 males and females, aged 22-65 (33.6 ± 4.2) years old whereas among the accelerated phase patients, there are 8 males and 8 females, aged 21-65 (33.5 ± 4.1) years old. Lastly, among the blast phase patients, males and females were 9 cases and 8 cases, aged 22-64 (33.0 ± 4.0) years old. The

basic data of three groups of people were compared and the statistical results were $P > 0.05$.

2.2. Methods

All patients were treated with dasatinib in several ways which were: oral medication, 100 mg per day for chronic phase patients, once a day whereas the initial medication for patients in the accelerated phase and blast phase is 70 mg each time, twice a day, once in the morning and once in the evening. During the treatment, the dosage was adjusted with reference to the patient's tolerance and adverse drug reactions. When grade II-III hematological toxicity occurred, the dosage was decreased, 50 mg each time, orally administered twice a day. In the event of grade II-III non-hematological toxicity, the dosage was reduced to 50 mg, once a day, orally. In the event of grade IV toxicity or grade III cardio-liver-nephrotoxicity, central nervous system reaction toxicity, the drug should be suspended [4-6]. After the patient's symptoms are relieved, the drug should continue to be used for the patient. The drug withdrawal time is within 21 days, and the course of treatment is 6 months.

2.3. Judgment criteria [7-10]

Ph-chromosome-positive cells in metaphase disappearing cells are in remission of complete cytogenetic response.

If PLT and WBC are within $450 \times 10^9/L$ and $10 \times 10^9/L$, respectively, the proportion of blast cells in bone marrow is within 0.05, the peripheral blood has normal classification, there are no myeloid immature cells, and there are no signs and symptoms of leukemia, it is considered complete Hematologic remission.

Quantitative PCR examination showed that no BCR-ABL was within 0.1%, or before the comparison treatment, the decrease was 3log or more, which was the main molecular biological remission.

2.4. Data verification

SPSS 25.0 statistical software proposed that the count data should be tested by χ^2 , and the measurement data should be tested by t test., expressed in %, [$\bar{x} \pm s$], $P < 0.05$, with statistical significance.

3. Results

Table 1. Comparison of complete cytogenetic, complete hematologic, and major molecular biology response rates among the three groups (%)

Group	Complete cytogenetic response remission rate	Complete hematologic response rate	Major molecular biology response rate
Chronic phase (n=47)	40 (85.10)	46 (97.87)	37 (78.72)
Accelerated phase (n=16)	9 (56.25)	12 (75.00)	7 (43.72)
Blast phase (n=17)	9 (52.94)	11 (64.70)	7 (41.17)

The comparison of complete cytogenetic, complete hematologic, and major molecular biology response rates among the three groups are shown in **Table 1**. Comparing the corresponding data of patients in accelerated phase and blast phase, the remission rate of complete cytogenetic response, complete hematological remission rate, and major molecular biology remission rate in chronic phase and the rate of complete cytogenetic response remission was significantly higher at $\chi^2 = 5.7507, 7.1980$. The complete hematological remission rate was $\chi^2 = 8.5464, 14.0978$ while the main molecular biology remission rate was $\chi^2 = 6.9315, 8.1921$.

Table 2. Comparison of overall survival time and recurrence-free survival time in chronic phase among three groups

Group	Chronic phase overall survival time	Recurrence-free survival time
Chronic phase (n = 47)	34.4 ± 2.5	21.5 ± 2.1
Accelerated phase (n = 16)	18.2 ± 1.2	12.1 ± 1.5
Blast phase (n = 17)	15.5 ± 1.6	9.0 ± 2.1

Table 2 shows the comparison of overall survival time and recurrence-free survival time in chronic phase among three groups. Based on **Table 2**, the overall survival time and recurrence-free survival time in the chronic phase were significantly longer, the overall survival time was $t = 24.8639, 29.0135$, the recurrence-free survival time was $t = 16.4898, 21.0317$

Table 3. Comparison of mortality rates among the three groups during follow-up (%)

Group	Mortality during follow-up
Chronic phase(n=47)	1 (2.12)
Accelerated phase(n=16)	4 (25.00)
Blast phase(n=17)	4 (23.52)

Table 3 shows comparison of mortality rates among the three groups during follow-up (%). Based on **Table 3**, the mortality rate during the follow-up time in the chronic phase was significantly lower which is $\chi^2 = 8.5464, 7.9397$.

Table 4. Comparison of the incidence rates of grade III-IV hematological adverse reactions among the three groups (%)

Group	Incidence of grade III-IV hematological adverse reactions
Chronic phase (n = 47)	2 (4.25)
Accelerated phase (n = 16)	6 (37.50)
Blast phase (n = 17)	6 (35.29)

Lastly, **Table 4** shows the comparison of the incidence rates of grade III-IV hematological adverse reactions among the three groups (%). Based on **Table 4**, the incidence of hematological adverse reactions of grade III to IV in chronic phase was significantly lower at $\chi^2 = 11.9001, 10.9966, P < 0.05$.

4. Discussion

According to different clinical stages of the disease, CML can be divided into chronic phase, accelerated phase, and blast phase. Dasatinib treatment regimens in clinical studies can effectively inhibit the process of generating BCR/ABL fusion genes [11-15] thus inhibiting the progression of CML disease. Clinical practice has confirmed that dasatinib has different curative effects in different clinical stages of CML patients [16-20]. For patients with chronic CML, it can potentially act as a therapeutic as it increases the rate of deep molecular response and improves the remission rate, after drug withdrawal. Hence, the curative effect is definite.

This series of experiments concluded that the effects of dasatinib on CML patients are as follows: the complete cytogenetic response remission rate, complete hematological remission rate, and major molecular biology remission rate in the chronic phase were significantly higher, and the overall survival time and recurrence-free survival time in the chronic phase were significantly longer. During the follow-up period, the mortality rate was significantly lower, and the incidence of hematological adverse reactions of grade III to IV in the chronic phase was significantly lower.

From the above, it can be concluded that the efficacy of dasatinib in the treatment of CML patients is different in different clinical stages. For patients with chronic stage, it is the preferred option with good efficacy and high safety.

Disclosure statement

The author declares no conflict of interest.

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