RESEARCH ARTICLE

Phase II Study on Javanica Oil Emulsion Injection (Yadanzi®) Combined with Chemotherapy in Treating Patients with Advanced Lung Adenocarcinoma

Yan-Yan Lu¹, Xin-En Huang¹*, Jie Cao¹, Xia Xu¹, Xue-Yan Wu¹, Jin Liu¹, Jin Xiang², Lin Xu³*

Abstract

Purpose: To investigate the efficacy and safety of Javanica oil emulsion injection (Yadanzi®) combined with pemetrexed and platinum (PP) for treating patients with advanced lung cancer. Patients and Methods: From June 2011 to June 2013, we recruited 58 patients with advanced lung cancer, and divided them into two groups. Twenty eight patients received Yadanzi® (from ZheJiang Jixu Pharmaceutical Co., Ltd.) together with PP chemotherapy (combined group), while the others were given only PP chemotherapy (control group). After two cycles of treatment, efficacy and safety of treatment were evaluated. Results: The overall response rate [(CR+PR+SD)/(CR+PR+SD+PD)] of the combined group was higher than that of control group (89.7% vs. 86.2%, p>0.05). Regarding rate of life improvement, it was 82.8% in combined group, and 51.7% in the control group (p<0.05). In terms of side effects, leukopenia in combined group was less frequent than that in control group (p<0.05). More patients in the control group were found to suffer liver toxicity. Conclusions: Javanica oil emulsion injection combined with chemotherapy could be considered as a safe and effective regimen in treating patients with advanced lung adenocarcinoma. It can improve the quality of life and reduce the possibility of leukopenia. Further clinical trials with a large sample size should be conducted to confirm whether addition of Yadanzi® to chemotherapy could increase the response rate, reduce toxicity, enhance tolerability and improve quality of life for patients with advanced lung cancer.

Keywords: Javanica oil emulsion injection - lung adenocarcinoma - toxicity - tolerability

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Introduction

According to WHO statistics, the incidence and mortality rate of lung cancer increase year by year. And in China, more than 75% of patients with non-small cell lung cancer (NSCLC) present with locally advanced (stage III) or metastatic (stage IV) disease at diagnosis (Rosell R et al., 2011). Chemotherapy is a main treatment option for patients with advanced or metastatic lung cancer. However, chemotherapy is reported to be associated with a series of adverse reaction, e.g., bone marrow suppression, gastrointestinal toxicity, immunosuppression, etc (Yamamoto and Iwase, 2012). It was reported that Chinese herbal medicine (CHM) may increase effectiveness of platinum based chemotherapy in this setting (McCulloch, M., et al., 2006).

Javanica oil emulsion (Yadanzi®) is a product with Brucea Jen petroleum ether extracts as raw materials, and purified soybean lecithin as emulsifier. Although main active ingredient is not well clarified (Liu et al., 2012), javanica oil emulsion is reported to be active in treating patients with lung cancer, brain metastases from lung and gastrointestinal cancer (Wang et al., 2012). Possible mechanism of anti-cancer effect includes inhibition of topoisomerase II, blockage of cell cycle in S phase and a direct damage on plasma membrane.

On this background, we conduct this study to detect safety and efficacy of Javanica oil emulsion injection (Yadanzi®) when combined with chemotherapy.

Materials and Methods

Patients

Patients recruited in this study were required to be pathologically/ cytologically diagnosed with lung adenocarcinoma in Jiangsu Cancer Hospital & Research Institute; to sign an informed consent before treatment; to expose to long term chemotherapy or supportive care; to have a score of Karnofsky performance status (KPS) ≥ 50 with expectancy life span more than 3 months; to be classified in stage IV according to TNM-classification with no surgical indications and no contraindications for chemotherapy.

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Table 1. Patient Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Combined group (N=29)</th>
<th>Control group (N=29)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
<td>21</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40-50</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>50-60</td>
<td>11</td>
<td>12</td>
</tr>
<tr>
<td>60-70</td>
<td>11</td>
<td>8</td>
</tr>
<tr>
<td>&gt;70</td>
<td>2</td>
<td>5</td>
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<tr>
<td>KPS</td>
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<td>12</td>
<td>10</td>
</tr>
<tr>
<td>70-80</td>
<td>12</td>
<td>14</td>
</tr>
<tr>
<td>&gt;80</td>
<td>3</td>
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</tr>
</tbody>
</table>

Methods

Chemotherapy of pemetrexed and platinum (PP) was applied to all patients. The dose of pemetrexed and platinum was in accordance with NCCN guideline: PEM 500 mg/m², platinum (cisplatin 60-80 mg/m², ivgtt, d1-3; or carboplatin 300 mg/m², ivgtt, d1; nedaplatin 100 mg/m², ivgtt, d2).

For control group, only PP regimen was given. For combined group, PP regimen was combined with javanica oil emulsion injection (Yadanzi®, made by ZheJiang Jiuxu Pharmaceutical Co., Ltd.). Yadanzi® 30 ml, was dissolved in 250 ml normal saline, intravenously infused during chemotherapy, once daily and continued for 2 cycles. Antiemetics were given conventionally, and routine blood test, eg., blood biochemistry and tumor markers were examined prior, during and after chemotherapy. CT scan was reviewed after two cycles of treatment to evaluate efficacy.

Efficacy evaluation

Before chemotherapy, all patients received physical examination, routine blood test, and imaging test (including CT, MRI, or PET-CT).

Treatment efficacy was evaluated after at least two cycles of chemotherapy according to RECIST criteria (Response Evaluation Criteria In Solid Tumor) (Sohaib, 2012), in which complete response (CR), partial response (PR), stable disease (SD), and progressive disease (PD) was separately defined. Toxicities were assessed and graded according to WHO criteria (De Angelis, 2004). Quality of life was designated increasing if KPS score increased by 10 after treatment, decreasing if the score decreased by 10 and otherwise stable.

Table 2. Treatment Efficacy of Two Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>NO.</th>
<th>CR</th>
<th>PR</th>
<th>SD</th>
<th>PD</th>
<th>(CR+PR+SD)%</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined group</td>
<td>29</td>
<td>0</td>
<td>4</td>
<td>22</td>
<td>3</td>
<td>0.897</td>
<td>&gt;0.05</td>
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<tr>
<td>Control group</td>
<td>29</td>
<td>0</td>
<td>5</td>
<td>20</td>
<td>4</td>
<td>0.862</td>
<td></td>
</tr>
</tbody>
</table>

*NO., number of patient; CR, Complete Remission; PR, Partial response; SD, stable disease; PD, progressive disease; combined group was chemotherapy combined with javanica oil emulsion injection; control group was chemotherapy

Table 3. Change of Karnofsky Performance Status Score

<table>
<thead>
<tr>
<th>Group</th>
<th>NO.</th>
<th>Improvement</th>
<th>Stable</th>
<th>Ineffectiveness (Improvement)%</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Combined Group</td>
<td>29</td>
<td>24</td>
<td>2</td>
<td>3</td>
<td>0.828</td>
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<tr>
<td>Control Group</td>
<td>29</td>
<td>15</td>
<td>8</td>
<td>6</td>
<td>0.517</td>
</tr>
</tbody>
</table>

*KPS, score; increased, ≥10 after treatment; stable, <10; decreased, ≥10

Results

From June 2011 to June 2013, we recruited 58 patients, including 29 patients (male 17, female 12, age 43-80 ) in combined group, and 29 (male 21, female 8, age 46-74) in control group. The general information between two groups e.g., sex, age, and Karnofsky performance status was comparable (Table 1).

The response rate [(CR+PR+SD)/(CR+PR+SD+PD)] of combined group was 89.7% while the control group 86.2% (p>0.05). The detail was listed in Table 2. Regarding rate of life improvement, that was 82.8% in combined group, and 51.7% in control group (p<0.05) (Table 3), indicating that combined group had advantages on the
improvement of quality of life. Both group experienced myelosuppression. In Table 4, it is demonstrated that leukopenia in combined group is less than control group with statistical significance (p<0.05). As for liver injury, no statistical significance was detected between two groups as showed in Table 5.

Discussion

The purpose of treating patients with advanced cancer is to prolong survival time and to improve quality of life. Combination chemotherapy is associated with significantly prolonged survival time and improved quality of life for patients with non-small-cell lung cancer (Bunn, 2002). However, chemotherapy is also associated with toxicities e.g., gastrointestinal reactions and bone marrow depression, affecting quality of life of patients, and resulting in discontinuation of therapy due to intolerability (Bunn, 2002). Chinese herbal medicine (CHM) is reported to reduce these side effects of chemotherapy (Taixiang et al., 2005; Liu et al., 2013). And further studies on CHM will focus on how to improve the quality of life and extend survival time for patients with advanced cancers.

Javanica oil emulsion is produced by using Brucea Jen petroleum ether extracts as raw materials, and purified soybean lecithin as emulsifier (Liu et al., 2012). The main active ingredient is oleic acid and linoleic acid, and the antitumor activity of both was confirmed by previous studies (Ding et al., 2006). Javanica oil emulsion is mainly used in lung cancer, brain metastases from lung or gastrointestinal cancer, with mild efficacy (Ma et al., 2004). Its possible mechanism of action includes specifically inhibiting the vitality of topoisomerase II, arresting cell cycle in S phase and directly damaging the structure of plasma membrane (Ding et al., 2006). It was also reported to control tumor through regulating immunological function. Javanica oil emulsion was suggested to protect bone marrow hematopoietic stem cells, and promote its proliferation (Ping et al., 1996).

In our study, it was demonstrated that the response rate of combined group was higher than control but was not statistically significant (p>0.05), probably due to inadequate sample size. From this perspective, further study with larger sample size and longer follow up period should be considered.

In conclusion, our study showed that Javanica oil emulsion injection combined with chemotherapy could be considered as a safe and effective regimen in treating patients with advanced lung cancer. It is able to improve quality of life of patient and reduce side effect of chemotherapy. And further study is needed to confirm whether the response rate of a combination of Javanica oil emulsion injection and chemotherapy is superior to chemotherapy alone.

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References


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