

Analysis of application of docetaxel combined therapy scheme in treating advanced head and neck neoplasm

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Abstract: Docetaxel is a semi-synthetic taxoid anti-cancer drug, which can basically freeze intracellular skeleton that is composed of microtubules, so as to inhibit cell division. Under normal condition, Docetaxel can make microtubule in a cell cycle follow the rule of first polymerization and then depolymerization. Moreover, docetaxel can further promote the microtubule polymerization while inhibiting cell depolymerization, so as to prevent cells division, lead to cancer cells death, and improve the therapeutic efficiency of tumor and cancer. However, as a newly developed drug, docetaxel's specific clinical effect has not been fully verified yet. Therefore, in this research, 2000 patients of advanced head and neck neoplasm were selected as research objects, which were treated with docetaxel combined with DDP and fluorouracil. By observing indexes such as patient's condition, complication condition, and life quality, the clinical effect of docetaxel combined therapy scheme in treating head and neck neoplasm was analyzed. Results show that such therapy scheme is of sound therapeutic effect and high application value.

Keywords: Clinical effect docetaxel, head and neck neoplasm, advanced stage, clinical effect.

INTRODUCTION

Head and neck neoplasms include neck tumor, otolaryngology tumor, and oral-maxillofacial tumor. Head and neck region is the most important part of a human body, Head and neck tumors are various in type and complex in pathogenesis, seriously threatening human life. Surgery treatment is the common treatment method for head and neck tumors; however this method is inferior for its high risk. In recent years, Tian Zhongkai, Wang Cailing and Wang Mancai, *et al.* have made large amounts of clinical experiments and analyzed the effect of docetaxel combined with other drugs in treating head and neck neoplasms, and results showed that docetaxel combined therapy can achieve significant effect (Tian, 2010). To further verify such opinion and provide better medical service for patients of head and neck neoplasms, 2000 patients with head and neck neoplasms who had been treated by such therapy scheme were taken into the research of this paper, and related specific situation are shown below (Wang and Wang, 2009; He et al., 2016; Shareef et al., 2016).

MATERIALS AND METHODS

General data

Research objects in this research are 2000 head and neck tumor patients who had been treated with docetaxel combined therapy in domestic and overseas hospital from January 2012- October, 2014. Among them, male patients are 1239, female patients are 761. Patients' age ranges from 24-73, ending with average age of 45.3 ± 12.9 . Symptoms of all patients are consistent with the

diagnostic criteria of advanced head and neck tumor, and prior to this docetaxel combined therapy, all had been treated with surgery or local radiotherapy prior to this docetaxel combined therapy, which achieved insignificant treatment effect.

Among 2000 patients, there are 680 npc patients, 320 patients with thyroid carcinoma, 123 patients with maxillary sinus carcinoma, 87 patients with lower sinus carcinoma, 265 patients with laryngeal squamous cell carcinoma, 274 patients with oropharyngeal squamous cell carcinomas, and 251 patients with swallow poorly differentiated squamous cell carcinomas. According to datum of cases, it can be seen the KPS score ranges from 70-100 and their predicted life lengths are 90-100. All patients and relatives were clear about the purpose and significant of this therapy research, agreed to take part in the research and voluntarily signed the informed consent. The head and neck tumor-prone parts is shown as fig. 1 (Wang and Yang, 2011; Abu-Taweel, 2016; Chen and Gong, 2016).

Therapeutic method

In this treatment process, docetaxel combined with low dose fluorouracil and cis-platinum is used, wherein docetaxel is given at the first day and the eighth day of the treatment cycle, respectively. To effectively avoid nausea caused by docetaxel, docetaxel is processed with dexamethasone and 5-HT₃ receptors before being given. For administration method, 35 mg/m² docetaxel drug is firstly dissolved into 250mL normal saline and then intravenous drip of drug is given to patients at a proper rate in case of causing stimulation to patients caused by over fast dripping rate. Drip time should be controlled

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within 60min and 3 weeks is regarded as a treatment cycle.

Cis-platinum should be given from the first day when treatment begins and kept given for consecutive 5 days before being stopped and then re-given for the second round from the 5th-8th day of the treatment. The method of administration is to dissolve 5-10 mg cis-platinum into 250 mL normal saline.

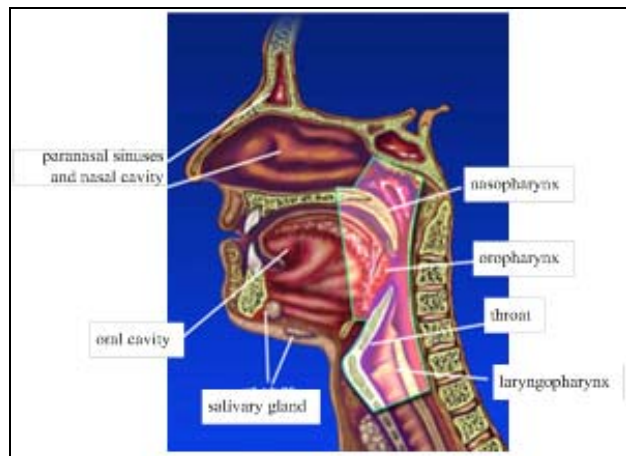


Fig. 1: Head and neck tumor-prone parts.

Fluorouracil is given to patients in the way of pump injection for consecutive 2 weeks before being stopped. The specific administration dose is 300mg being given by intravenous pumping for 24h a day.

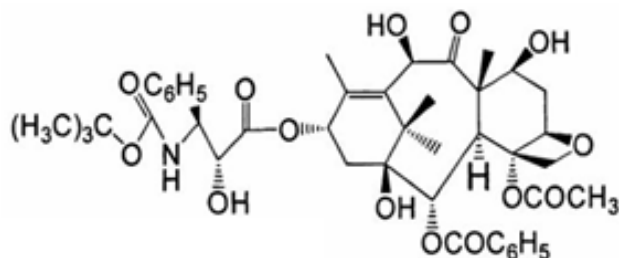


Fig. 2: Structure of docetaxel drug.

Observation Method

From the beginning of this treatment scheme, follow-up examinations should be conducted once for every 3 weeks in an effort to record patients' disease development situation until patients' death or losing connection (Wu and Yu, 2010; Meng et al., 2016; Swieca, 2015; Wongsawad and Peerapornpisal, 2015).

The actual therapeutic effect of drug therapy for head and neck tumor can be categorized into complete remission (CR), partial remission (PR), stable development (SD), and progress development (PD). Effective clinical treatment = $(CR+PR)/\text{number of researchers} \times 100\%$ (Ren and Wang, 2010). In addition, we observed patients' life quality during treatment duration including feeling pain or

not after treatment, decreasing analgesic drugs dosage or not, and mental status during treatment duration (Feng and Zhou, 2011; Liu and Liu, 2010; Al-Sadoon and Paray, 2016).

STATISTICAL ANALYSIS

Regarding the clinical effect research of docetaxel combined therapy scheme in treating head and neck tumors, SPSS19.0 statistical software is employed for multibase integration, and the treatment effective rate is represented by n,%.

RESULTS

Follow-up visit in this research normally lasts for 4-20 months, and treatment cycle duration per each patient is 3.2 weeks. After treatment 464 out of 2000 patients show CR, 516 patients show PR, proving that the overall effective rate of this therapy is 49%.

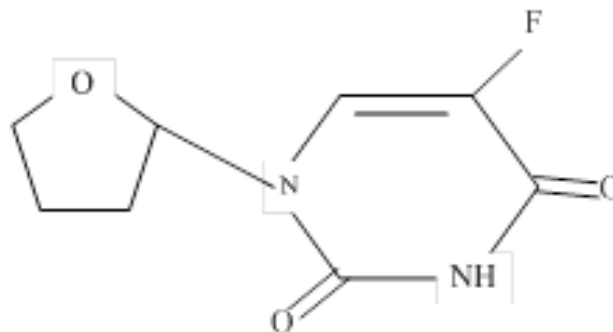


Fig. 3: Structure of cisplatin structure.

On this hand, in this research, 1120 patients, accounting for 56%, have over 12 months of life cycle. 1200 patients (60%) enjoy a significantly increased life quality, and a significantly decreased frequency of using pain medication as compared to that before treatment, in addition, the living conditions of the patients are significantly improved.

DISCUSSION

Result of this research indicates that docetaxel combined therapy scheme is of sound effect in treating head and neck tumor. In this treatment, docetaxel combined with cis-platinum and fluorouracil was given to patients for treatment.

As a newly developed taxol derivative in recent years, docetaxel is synthesized by medical researchers through restructuring paclitaxel. This drug is of sound bioavailability, and small toxic and side effect, therefore patients after docetaxel therapy enjoyed a significantly increased living condition, significantly decreased pain, and significantly decreased usage frequency of pain

suppressing medications. Docetaxel is a kind of taxol antineoplastic drug, which exerts anti-tumor effect through interfering cell mitosis and the microtubule network required by cell function during division period (Chen and Huang, 2012; Soni and Yadav, 2016). Being mutually combined with free-state microtubulin, docetaxel can make microtubulin assembled into stable microtubule, so as to effectively inhibit the depolymerization, leading to large and continuous loss of normal function of microtubulin, inhibition of cell division, and inhibition of tumor cell from being further deteriorated and diffused (Liu and Zhang, 2011; Lee et al., 2016). The structure of docetaxel drug is shown as fig. 2.

Cis-platinum drug is a metal-complex in which bivalent platinum in the center is connected with two chlorine atoms and two ammonia molecule. Similar to double-function alkylating agent, Cis-platinum can restrain the replication of DNA. As a cell-cycle type nonspecific drug, cis-platinum is of strong cytotoxicity, which can effectively inhibit the DNA replication of tumor cells, and damage the structure of cell membrane, so as to exert its broad-spectrum anti-tumor effect. Cis-platinum drug can only realize its drug effect through intravenous drip. After drug drip, the drug will begin to be widely distributed in liver, kidney, large and intestine and skin, and accumulate with most quantity in kidney after 18-24h. Clinical researches prove that the discharge process of cis-platinum IDE is slow, which is also the reason for it long-lasting pharmacological function. Normally only 19%~34% can be discharged within 1 day, and only 25%~44% being discharged within 4d, moreover within 5 days after full dosage injection, only 27%~43% can be discharged (Wang and Yang, 2011). Currently, cis-platinum drug has been widely used for clinical chemotherapy with advantages of abroad anticancer spectrum, accurate therapeutic effect. However researches also show that cis-platinum will cause severe harm to patients, for example, after taking drug for 1-2 h, patients tend to display symptoms such as decreased food appetite, nausea, vomiting and diarrhea. Therefore, therapy scheme which combine cis-platinum and other drugs is the optimal therapy scheme. It is worth noting that in order to reduce the side effect, after drug injection, patients are strongly requested to take more water to relieve the drug stimulation. The Structure of cis-platinum (Jin and Mei, 2013; Arasu et al., 2016; Balkhair, 2016; Gong and Chen, 2016; Huang and Li, 2016).

Fluorouracil is a cell-cycle special drug, which is mainly to restrain s phase cells. After entering into human body, it is first transformed into 5 - fluoro - 2 - deoxidation uracil nucleotides, which is to inhibit thymidylate synthase, to prevent deoxyuridine triphosphate from transforming into deoxidized thymidine phosphorylase, so as to inhibit DNA biosynthesis. In addition, by preventing uracil and orotic acid from being mixing into RNA, it realizes the inhibition of RNA synthesis. On the other hand, this drug

may cause significant adverse drug reactions such as nausea, loss of appetite and vomit. To reduce such adverse reactions, this research use small dosage of fluorouracil. However during the treatment period, patients with poor physical conditions displayed different degress of oral mucositis or ulcer, abdominal discomfort or diarrhea, leukopenia (most reach the lowest point within 2-3 weeks after treatment course starts, and recover to normal level after 3-4 weeks), and thrombocytopenia. Cough, wheeze or cerebellar ataxia were rare but still can be seen. Long-term use of fluorouracil can lead to toxicity to nervous system. It is occasional to observe myocardial ischemia, angina and ECG changes after drug use. Drug should be immediately stopped upon the confirmation of adverse cardiovascular response such as arrhythmia, angina pectoris, and ST segment changes. The structure of fluorouracil is shown as fig. 4.

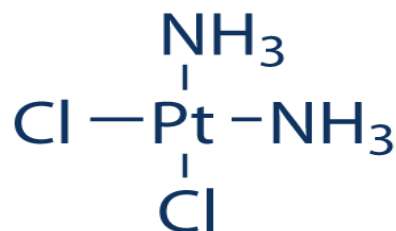


Fig. 4: Structure diagram of fluorouracil.

In conclusion, docetaxel combined therapy scheme has outstanding therapeutic effect, which can effectively relieve toxic and side effects and adverse drug reactions in the treatment process and reduce pain. In addition, docetaxel combined drug is of significant effect of inhibiting cancer cell proliferation, prolong patients' life cycle, and improve patients' living quality. Therefore, the results of this research fully indicate the effectiveness of docetaxel combined therapy scheme, which should be promoted for being applied in clinical practice.

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