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## Prevention and treatment of acute radiation injuries of the head and neck region

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The main dose-limiting factor in radiation therapy (RT) is a toxic effect of ionizing radiation on human body. One of the pressing issues in radiation oncology is prevention and treatment of mucositis arising during radiotherapy. This issue still remains important in radiation oncology not only for developing countries. The influence of consequences of severe acute injuries was demonstrated by Sonis S.T. in 2004 by US data showing the 6-30% mortality rates of patients with radiation-induced mucositis. In addition, the development of severe mucositis is a major cause of forced deviations from planned volume and regime of treatment. The aim of this study is to investigate the frequency and severity of mucositis and dermatitis arising in the dynamics of radiotherapy of patients with the head and neck squamous cell carcinoma (HNSCC).

### Materials

Work is based on results of treatment of 1423 patients with HNSCC, treated in Armenian National Oncology Center from 2000 to 2014. The analysis of incidence and degree of severity of acute radiation toxicity depending on applied treatment methods is performed.

The radiotherapy was conducted on the basis of a two-dimensional planning to all patients. The curative course of conventional RT has been assigned to 796 patients, including 107 patients after tracheostomy. The total dose was 60-66 Gy. In addition, another 194 patients underwent synchronous chemoradiation therapy. Adjuvant RT course received 433 patients.

Median age of patients was 60 years. The ratio of men to women was 8.5/1, and dramatically varied depending on tumor site and age of patients. Thus, the median age for nasopharyngeal tumors was 53 years, and the ratio m/f  $\approx$  2.8/1, while in the laryngeal cancer, the rate of the median age increased to 62 years, and the rate of the ratio m/f to 37.5/1, respectively.

### Results

The severity of mucositis and dermatitis was evaluated by RTOG toxicity scale. The toxic manifestation of radiation 0 - III degrees was detected in almost all patients. Only 13 (0.91%) of 1423 patients completed the course of RT without acute effects of radiation damage. The fourth degree of toxicity was not registered. Mucositis began to appear after 7 - 15 days after the start of RT. The data on the frequency and severity of mucositis registered is shown in Table 1 in dependence of type of treatment.

The detection rate of mucositis of second and third degrees is considerably increasing in the cases of RT after surgery and when it is combined with chemotherapy. This fact can be explained by deterioration of local blood flow after surgery and the treatment of surgical wound by chemically active substances, also by toxic influence of chemotherapy agents to mucosal covers. Additive interaction of two toxic agents at their simultaneous appointment with RT leads to an increase in frequency of mucositis II-III degrees.

The compelled breaks of treatment course, caused by acute mucositis, were registered in 313 patients, with duration 5-18 days. Also, treatment course was not finished in planned volume in 21 cases, because of dramatically decrease of performance status, including three cases with acute cerebral circulatory disorders and two cases due to the acute coronary insufficiency.

To avoid the compelled interruption of RT, 183 patients administered conventional means with preventive purpose: mouth rinse by herbs broths and different anti-inflammatory medicines.

Decoction of developed by us prescription of medicinal plants was used in 69 cases for prevention of radiation induced mucositis. All of these 69 patients completed the course of curative RT without forced interruption. Same recipe in form of inhalations, rinse was prescribed not only preventive but also for therapeutic purposes in already developed mucositis, however, in this case it turned out to be ineffective. Since 2009, we used a new recipe of herbs in 74 patients, which had a pronounced therapeutic effect in different grades of mucositis, shortening forced break of treatment up to 2 - 3 days.

#### Conclusions

1. The degree of mucosal and skin damage doesn't affect life expectancy, if the forced break doesn't exceed 15 days.
2. It is recommended to all patients to start administration of the prophylactic complex for mucositis and dermatitis prior to RT, regardless of the condition of the mucosa of the upper parts of air-digestive tract.
3. The proposed collection of medicinal plants has proven effective not only for prevention of mucositis, but also can be recommended for treatment after their development during RT.
4. The use of the proposed methods of prevention and treatment of radiation dermatitis and mucositis allows to achieve the planned volume and doses of RT on the tolerable acute toxicity without the use of high technology (3D-CRT, IMRT).
5. Sharp deviation in the ratio of male/female and the median age is revealed, depending on tumor location.

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