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DEPENDENCE OF THE COURSE OF ODONTOGENIC PHLEGMONS OF MAXILLOFACIAL LOCALIZATION ON CIRCADIAN RHYTHMS

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In the development of odontogenic phlegmons, a significant role is played by the causative microflora, general and local protective factors of organisms, anatomical-topographic features of the maxillofacial area. In addition to standard therapy, patients were prescribed intravenous administration of cryopreserved placenta extract in combination with local administration of this drug as part of Chloramphenicol-Methyluracil ointment. Patients with morning and evening chronotypes were determined according to the Khorn-Ostberg questionnaire. The among the indices of the general condition, the P-1.3 index decreased on 0.47 % on the 3rd day, the score was 67.8 %, and on the 5th day – by 0.83 % score of 83.7 % regardless of the patient's chronotype. Among the indices of local changes in the wound, the most reliable decrease was recorded in the P-2.2 index: by 1.52 %±0.17 % on the 5th day after surgery in 83.0 % of patients with a morning chronotype who were operated on in the morning.

Key words: odontogenic phlegmon, chronotype, placenta cryoextract.

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ЗАЛЕЖНІСТЬ ПЕРЕБІГУ ОДОНТОГЕННИХ ФЛЕГМОН ЩЕЛЕПНО-ЛИЦЕВОЇ ЛОКАЛІЗАЦІЇ ВІД ЦИРКАДНИХ РИТМІВ

У розвитку одонтогенних флегмон значну роль відіграє мікрофлора, загальні та місцеві захисні фактори організму, анатомо-топографічні особливості щелепно-лицевої ділянки. Пацієнтам, на тлі стандартної терапії, призначали внутрішньовенне введення кріоконсервованого екстракту плаценти у поєднанні з місцевим застосуванням цього препарату у складі мазі на основі Хлорамфенікола та Метилурацила. Хронотип пацієнта визначали за опитувальником Горна-Остберга. Серед показників загального стану пацієнтів показник П-1,3 на 3-тю добу знизився на 0,47 % , на 67,8 % на 5-ту добу – на 0,83 % на 83,7 % незалежно від хронотипу хворого. Серед показників локальних змін у рані найбільш достовірне зниження зафіксовано за показником Р-2,2: на 1,52 %±0,17 % на 5 добу після операції у 83,0 % хворих ранкового хронотипу, оперованих в ранок.

Ключові слова: одонтогенна флегмона, хронотип, кріоекстракт плаценти.

The study is a fragment of the research project "Diagnosis, surgical and medical treatment of patients with inflammatory diseases of maxillofacial localization", state registration number 0119U102862.

In the development and course of purulent-inflammatory diseases of the head and neck, a significant role is played by the concentration of the causative microflora, general and local nonspecific and specific protective factors of the organism, the state of various organs and systems, as well as anatomical and topographic features of the tissues of the maxillofacial area. All of the above determines the nature of the inflammatory reaction: normergic, hyperergic, hypoergic, anergic. Infectious processes of maxillofacial localization can be of odontogenic or non-odontogenic origin [1, 2].

Odontogenic infection is a product of interdependent and synergistic metabolism of various pathogenic microorganisms that cause it. They produce metabolites necessary for an appropriate growth environment for other microorganisms in the group, including a favorable pH and available nutrients and oxygen levels [6, 9].

There is an opinion that the most aggressive, lightning-fast forms of the course of purulent-inflammatory processes, which are characterized by significant necrotic lesions, with a high probability of the presence of gas in the soft tissues, are caused by the presence of anaerobic species of microorganisms in purulent foci. However, it has been proven that associations of microorganisms exhibit greater pathogenic properties than monocultures. As a rule, bacterial associations consist of 1–7 species of anaerobes and 1–2 species of aerobes [7, 12].

In the treatment of maxillofacial phlegmon, the leading place is occupied by the surgical method. Regardless of the severity of the pathological process, surgical treatment is based on two main principles: elimination of the causative center of infection and surgical emptying of the affected anatomical spaces together with adequate drainage [5, 14].

Circadian rhythms are cyclic fluctuations in the intensity of various biological processes associated with the change of day and night, the most famous of which is the sleep-wake rhythm. The circadian system does not depend only on the activity of these clocks. Effective operation of the system involves the synchronization of internal clocks with stimuli in the environment [4, 8]. Disruption of the coordination of these internal and external processes contributes to the disruption of the circadian rhythm, which, in turn, can lead to disruption of glucose content, lipid regulation, and cholesterol levels. Once this pattern is disturbed, cytokines are produced in excess and directly cause immune disturbances, which subsequently lead to chronic inflammation and tissue damage [11, 13].

Recently, in connection with the development of new directions in cryobiology, the possibilities of clinicians regarding the use of preparations made from the placenta have expanded. These drugs retain their biological effects even during long-term storage. Cryoextract of the placenta is one of the easiest to store and use cryopreparations, has pronounced immunocorrective and regenerative properties, favorably different from drugs that undergo heat treatment [10].

Thus, it can be stated that cryoextract of the placenta has broad positive and multidirectional effects on the physiological and reparative processes of the body, which creates the prerequisites for further research into the properties of this drug on the mechanisms of purulent wound healing and optimization of the clinical course of odontogenic phlegmons of alveolar-facial localization.

The purpose of the study was to provide an evaluation of clinical indices in patients with odontogenic phlegmons of maxillofacial localization against the background of the use of cryopreserved placenta, depending on the correspondence of circadian rhythms to the time of surgical intervention.

Material and methods. The study was carried out on the Poltava Regional Clinical Hospital in the Department of Maxillofacial Surgery.

30 patients with maxillofacial odontogenic phlegmons took part in the research. The age of the patients ranged from 18 to 68 years. In addition to standard therapy, all patients were prescribed intravenous administration of cryopreserved placenta extract in combination with local administration of this drug as part of Chloramphenicol-Methyluracil ointment. Patients with certain morning and certain evening chronotypes were determined according to the Khorn-Ostberg (1976) questionnaire and selected into subgroups: with a morning chronotype – in group 1, with an evening chronotype – in group 2 (15 people in each subgroup). Individuals of each subgroup underwent operative treatment depending on the time of hospitalization (morning – 8 people in each subgroup or evening – 7 people in each subgroup) [15].

According to standardized tables, the following clinical indices (markers) were evaluated: General condition of patients: M-1.1 — temperature (0–3 points); M-1.2 – pulse (0–3 points); M-1.3 – pain (0–3 points); M-1.4 – violation of chewing function (0–1 points); M-1.5 – violation of swallowing function (0–1 points); M-1.6 – violation of speech function (0–1 points).

Markers characterizing the dynamics of local changes in the wound: M-2.1 – collateral edema (0–1 points); M-2.2 – mouth opening (0–3 points); M-2.3 – restriction of tongue movements (0–1 points); M-2.4 – fibrous spaces involved in the purulent-inflammatory process and their number (0–3 points); M-2.5 – features of the condition of wound tissues (0–3 points).

Indices characterizing the dynamics of clinical changes in the wound: M-3.1 – presence of purulent exudate (0–2 points); M-3.2 – presence of granulation tissue (0–2 points); M-3.3 – epithelization of the wound (0–2 points).

The research data were processed by the method of variational statistics on a personal computer with the determination of the reliability of differences between the values of the studied indices, as well as by the method of correlation using the Statistica program package and Excel 2010 spreadsheets.

Results of the study and their discussion. The dynamics of changes in the index M-1.1: we have concluded that it acquires its maximum value on the first day after surgery, this is a reaction to the traumatic effect against the background of inflammation (Table 1.). But on the 5th day we have recorded its minimum digital value by an average of 1.56±0.21 points compared to the previous period of the study. In 75.6 % of cases, this fact was recorded in patients with a morning chronotype operated on in the first half of the day.

A gradual and uniform decrease in the M-1.2 index was recorded with complete normalization on the 7th day in 92.7 % of patients with a morning chronotype operated on in the first half of the day, and in 91.7 % of patients with an evening chronotype operated on in the second half of the day. A digital decrease of the M-1.3 index is observed already on the 3rd day in 67.8 % of cases, and on the 5th – in 83.7 % of cases, while depending on the chronotype and circadian we did not set the rhythm. Analyzing the dynamics of indices M-1.4 and M-1.5, we trace a similar linear decrease in their digital values. In the dynamics of

M-1.4 and M-1.5 indices, a linear synergism is observed in the reduction of their digital values, only it should be noted that a reliable decrease of the M-1.4 index for 5 days was recorded in 82.9 % of cases, and in the M-1.5 index in 81.9 % of cases.

Table 1

Dynamics of clinical indices of patients with maxillofacial phlegmons when including intravenous injections of cryopreserved placenta in combination with local administration as part of conservative treatment

Marker	Day of supervision							
	1		3		5		7	
	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2	Group 1	Group 2
M-1.1	2.03±0.16	2.05±0.19	1.12±0.19 *	1.20±0.16 *	0.47±0.11 *	0.51±0.17	0.16±0.04	0.17±0.04
M-1.2	1.94±0.19	2.03±0.16	1.43±0.16	1.51±0.18	1.27±0.14	1.31±0.13	1.12±0.09	1.14±0.12
M-1.3	2.03±0.39	2.09±0.31	1.54±0.27	1.59±0.29	1.29±0.19	1.32±0.16	1.12±0.21	1.19±0.21
M-1.4	0.72±0.21	0.76±0.24	0.44±0.21	0.49±0.18	0.31±0.12	0.36±0.14	0.24±0.11	0.29±0.13
M-1.5	0.36±0.17	0.39±0.19	0.21±0.16	0.26±0.18	0.09±0.06	0.11±0.04	0.06±0.03	0.06±0.04
Total 1	7.08±1.12	7.32±1.09	4.74±0.99	5.05±0.99	3.43±0.62	3.61±0.64	2.7±0.48	2.85±0.54
M-2.1	0.71±0.11	0.74±0.13	0.52±0.13	0.61±0.19	0.41±0.12	0.43±0.15	0.37±0.09	0.43±0.11
M-2.2	2.55±0.21	2.59±0.19	2.11±0.29	2.16±0.26	1.39±0.15	1.41±0.18	1.36±0.29	1.49±0.38
M-2.3	2.43±0.22	2.52±0.24	2.01±0.28	2.09±0.21	1.54±0.32	1.59±0.41	1.41±0.97	1.48±0.19
M-2.4	1.96±0.31	2.03±0.42	1.31±0.32	1.42±0.35	0.89±0.24	0.96±0.38	0.26±0.11	0.28±0.16
Total 2	7.65±0.85	7.88±0.98	5.95±1.02	6.28±1.01	4.23±0.83	4.39±1.12	3.4±1.46	3.68±0.84
M-3.1	1.76±0.15	1.79±0.18	1.22±0.24	1.26±0.31	0.97±0.31	1.06±0.35	0.61±0.19	0.69±0.22
M-3.2	1.81±0.09	1.84±0.08	1.33±0.14 *	1.37±0.19	0.99±0.23	1.07±0.27	0.73±0.14	0.83±0.21
M-3.3	1.92±0.05	1.94±0.07	1.31±019	1.33±0.22	1.01±0.19	1.09±0.23	0.74±0.15	0.89±0.28
Total 3	5.49±0.29	5.57±0.33	3.86±0.57	3.96±0.72	2.97±0.73	3.22±0.85	2.08±0.48	2.41±0.71

Note. * – $p < 0.05$ relative to the previous term of the study.

Analyzing the change in the digital data of all four indices that provide an assessment of the dynamics of changes in the general condition, it should be noted that the additional local injection of the cryopreserved placenta drug affects the dynamics of pain relief and faster normalization of the chewing function against the background of a significant improvement in the patient's general condition that plays an important role in the wound healing and reparative processes of the organism [14].

It should be noted the higher amplitude of the M-2.1 index decrease, especially in patients with an evening chronotype operated on in the second half of the day. We can note its sharp decrease on the 5th day of the postoperative period, especially in patients operated on in the second half of the day. Similarly, variations in the dynamics of the M-2.2 index were recorded, the maximum decrease of which was recorded on the 5th day on average by 1.16±0.27 relative to the 1st and 1.52±0.17 relative to on the 3rd day of the postoperative period.

A similar dynamic is demonstrated by the M-2.3 index, which probably decreases by 0.89±0.11 on the 5th of supervision and by 0.47±0.06 relative to the 3rd day after surgery. It was marked that in patients with a morning chronotype operated on in the first half of the day, this fact was recorded in 91.5 % of cases, and with an evening chronotype operated on in the second half of the day – in 87.6 % of cases.

The fact of a sharp decrease in the M-2.4 index on the seventh day is of supervision: it decreases by an average of 1.69±0.21 points. Analyzing in general the dynamics of indices of local changes, we obtained the best dynamics of reduction of all four digital components with the best dynamics of M-2.1 and M-2.3, which indicates the expediency of local introduction into the wound of cryopreserved placenta as part of Chloramphenicol+Methyluracil ointment [3].

During analysis of third group of clinical marcers a minimal but significant decrease in all three indices on average by 0.05±0.02, 0.06±0.02 and 0.02±0.01, which is obviously associated with additional local injection of cryopreserved placenta. It should also be noted that the difference in points between the 1st and 7th days was on average 1.12±0.09 in all three indices, which also indicates the benefit of the combined use of the placenta cryoextract for the most part (92.5% of such changes were observed in patients with a morning chronotype operated on in the first half of the day). This is probably due to additional local injection of cryopreserved placenta directly into the wound [3, 10].

Conclusion

The greatest changes were achieved by the M-1.3 index with a decrease of 0.47 % on the 3rd day to a score of 67.8 %, and on the 5th day – by 0.83 % to a score of 83.7 %, regardless of the patient's chronotype. Among the indices of local changes in the wound, the most reliable decrease was recorded in the M-2.2 index: by 1.52 %±0.17 % on the 5th day after surgery in 83.0% of patients with a morning chronotype who were operated on in the morning. Among the indices of clinical changes in the purulent wound, a significant decrease of all three indices was established in the 2nd clinical group, especially on the 7th day of observation, with a difference in scores of 1.15 %±0.21 %, 1.08±0.15 % and 1.18±0.17 %, respectively, on the 1st day after surgery (87.2 % of cases in patients with a morning chronotype, operated in the morning, and 74.4 % of cases in patients with an evening chronotype, operated in the evening), which makes it possible to apply secondary sutures already on the 7th day, shortens the time of stay of patients in the hospital by an average of 1.47 days and emphasizes the effectiveness of the proposed treatment.

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