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THE INFLUENCE OF DIFFERENT TYPES OF CHRONOTYPE ON SCAR FORMATION DURING THE USE OF PLACENTAL CRYOEXTRACT AT THE INTRAOPERATIVE STAGE*

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Для визначення індивідуальних особливостей організації добових ритмів був запропонований термін «хронотип», який стає дедалі популярнішим у дослідженнях в сфері медицини. Згідно аналізу даних літератури, біологічний ритм впливає не тільки на психічний стан, ожиріння, а на стан людини в цілому. Біологічні ритми є проявом фундаментальної властивості органічного світу, забезпечують здатність людини до адаптації та виживання в навколишньому середовищі. У цьому аспекті особливий інтерес представляє функціонування організму з урахуванням його індивідуальних особливостей з точки зору організації біоритмічних процесів. Дослідження проводилися на базі відділення щелепно-лицьової хірургії на базі КП «Полтавська обласна клінічна лікарня ім. М.В. Скліфосовського Полтавської обласної ради». Всього в дослідженні прийняло участь 24 пацієнтів. Для вивчення матеріалів нами був проведений аналіз пацієнтів які госпіталізувалися на планові оперативні втручання з приводу вроджених кіст шиї та пухлиноподібних утворень шкіри голови та шиї. З пацієнтами під час госпіталізації проводилися співбесіда, а також проводилося анкетування для визначення хронотипу. Пацієнти були розподілені на такі 2 групи, а саме: 1 група, в якій свою чергу містила ще 2 підгрупи: 1.1 – Пацієнти з ранковим хронотипом; 1.2 – Пацієнти з вечірнім хронотипом. Перша підгрупа (1.1 – з ранковим хронотипом) складалася з 7 осіб, яким проводилося оперативне втручання з ранку. Друга підгрупа (1.2 – з вечірнім хронотипом) складалася з 9 пацієнтів, яким оперативне втручання проводилося близько 15:00. У кожній з цих підгруп під час оперативного втручання було проведено інтрадермальне введення препарату «Кріоцел». 2 група – контрольна. Друга контрольна група складалася з 8 пацієнтів, всі пацієнти даної групи були прооперовані згідно класичної методики без використання додаткових профілактичних заходів. На 90-у добу клінічного дослідження ми могли спостерігати вірогідну різницю в порівнянні післяопераційних рубців, а саме у пацієнтів з ранковим хронотипом та у пацієнтів з вечірнім хронотипом вона складала 42%, різниця з контрольною склала 71% та різниця між 2 підгрупою і контрольною групою склала 50%. На 180-у добу досліджень ми спостерігали вірогідну різницю між групами, у пацієнтів 1 і 2 підгрупи в порівняні з контрольною групою клінічні дані при описі післяопераційних рубців були кращі на 25%. При порівнянні між собою 1 і 2 підгрупи різниці не відмічалось. Таким чином на 180-у добу при огляді пацієнтів клінічна картина була більш сприятлива у 1-й та 2-й підгрупі. Згідно клінічних даних ми можемо стверджувати, що пацієнти з ранковим типом хронотипу, яким оперативні втручання проводилися з ранку та вводили кріоекстракт плаценти формування рубця на 90-у добу відбувалося краще, ніж у пацієнтів з вечірнім хронотипом яких оперували в обідній час, та пацієнтів, яким оперативні втручання проводилися згідно класичної методики без використання додаткових профілактичних заходів.

Ключові слова: хронотип, біологічний ритм, рубець, інтраопераційна профілактика рубців.

To define the individual features of the organization of circadian rhythms, the term "chronotype" was proposed, which is becoming increasingly popular in research in the field of medicine. According to the analysis of literature data, biological rhythm affects not only the mental state, obesity but the human condition as a whole. Biological rhythms are a manifestation of the fundamental properties of the organic world, provide the ability of man to adapt and survive in the envi-

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ronment. In this aspect, of particular interest is the functioning of the organism, taking into account its individual characteristics in terms of the organization of biorhythmic processes. The research was conducted on the basis of the Department of Maxillofacial Surgery on the basis of CE «Poltava M. V. Sklifosovskyi Regional Clinical Hospital of the Poltava regional council». A total of 24 patients participated in the study. To study the materials, we analyzed patients who were hospitalized for routine surgery for congenital neck cysts and tumors of the head and neck. Patients were interviewed during hospitalization, as well as a questionnaire to determine the chronotype. Patients were divided into the following 2 groups, namely: group 1, which in turn comprised 2 subgroups: 1.1 - Patients with morning chronotype; 1.2 - Patients with evening chronotype. The first subgroup (1.1 - with the morning chronotype) consisted of 7 subjects who underwent surgery in the morning. The second subgroup (1.2 - with evening chronotype) consisted of 9 patients who underwent surgery at about 15:00. In each of these subgroups during surgery, intradermal administration of the drug "Cryocel" was performed. - group 2 (control). The second control group consisted of 8 patients, all patients in this group were operated on according to the classical method without the use of additional preventive measures. On the 90th day of the clinical study, we could observe a significant difference in the comparison of postoperative scars, namely in patients with morning chronotype and in patients with evening chronotype it was 42%, the difference with control was 71% and the difference between the subgroup 2 and the control group was 50%. On the 180th day of the study, we observed a significant difference between the groups, in patients of subgroups 1 and 2, as compared to the control group, clinical data in the description of postoperative scars were better by 25%. When comparing subgroups 1 and 2, no difference was observed. Thus, on the 180th day when examining patients, the clinical picture was more favorable in subgroups 1 and 2. According to the data obtained, we can say that in patients who underwent surgery in the morning and injected with placental cryoextract, wound healing and scar formation on the 90th day was faster and better than in patients who underwent surgery at lunchtime, and patients who underwent surgery according to the classical method without the use of additional preventive measures.

Key words: chronotype, biological rhythm, scar, intraoperative scar prevention.

To define the individual features of the organization of circadian rhythms, the term "chronotype" was proposed, which is becoming increasingly popular in research [1] in the field of medicine. According to the analysis of literature data, biological rhythm affects not only the mental state [2], obesity [3], but the human condition as a whole. Biological rhythms are a manifestation of the fundamental properties of the organic world, provide the ability of man to adapt and survive in the environment. In this aspect, of particular interest is the functioning of the organism taking into account its individual characteristics in terms of organization of biorhythmic processes.

In 1970, the Swedish psychologist O. Okvist began a scientific study of chronotypes and proposed a questionnaire to determine the chronotype of patients. He identified three types of chronotype in patients: morning ("larks"), intermediate (arrhythmic, asynchronous, "pigeons") and evening ("owls") [4]. Approximate frequency of chronotype distribution: 16% - morning type, 20% - evening and 65% - arrhythmic [5]. So according to the literature:

- Morning chronotype is characterized by early awakening, good performance before lunch and early falling asleep.
- Asynchronous type wakes up 1-2 hours later than the morning type, active all day.
- People of the evening type, if conditions allow, wake up late, slowly get to work and are unable to work until lunch. In the evening, the activity of people with the evening chronotype increases, and they can work productively until midnight and later. The asynchronous type is the most adapted to modern social living conditions. The least plastic biorhythms in the morning type and the shift of hours, especially evening and night work, have a negative impact on their well-being. The evening type occupies an intermediate position in the ability to adapt to the new temporary regime, but is best when working in the night shift [6].

The aim of our study was to determine how the biological rhythm of a person can affect the reparative functions of the body, namely wound healing and scar formation.

Materials and methods

The research was conducted on the basis of the Department of Maxillofacial Surgery on the basis of CE «Poltava M. V. Sklifosovskyi Regional Clinical Hospital of the Poltava regional council». A total of 24 patients participated in the study. To study the materials, we analyzed patients who were hospitalized for routine surgery for congenital neck cysts and tumor-like formations of the head and neck.

Patients were interviewed during hospitalization, as well as a questionnaire to determine the chronotype.

Patients were divided into the following 2 groups, namely:

- group 1, which in turn comprised 2 subgroups:
- 1.1 - Patients with morning chronotype
- 1.2 - Patients with evening chronotype.

The first subgroup (1.1 - with the morning chronotype) consisted of 7 subjects who underwent surgery in the morning.

The second subgroup (1.2 - with evening chronotype) consisted of 9 patients who underwent surgery at about 15:00.

In each of these subgroups during surgery, intradermal administration of the drug "Cryocel" was performed.

- group 2 (control).

The second control group consisted of 8 patients, all patients in this group were operated on according to the classical method without the use of additional preventive measures.

To obtain results and to assess wound healing and the quality of postoperative scar formation, we used the following parameters [7]:

P-1 - Vascularization (from 0 to 2 points);
P-2 - Pigmentation (from 0 to 2 points);
P-3 - Height of the scar (from 0 - 2 points);
P-4 - Surface (from 0 - 2 points);
P-5 - Scar density (from 0 - 2 points);
P-6 - Subjective feelings of the patient (itching) (from 0 to 2 points);
P-7 - Subjective feelings of the patient (pain) (from 0 - 2 points).

Research and discussion

Examination and photoregistration of patients with a description of the postoperative scar were performed 90 and 180 days after surgery. The first subgroup was characterized by the following data. Moderate scarring of the scar was observed in 14.2% (1 patient), close to intact skin was in 85.8% (6 patients), hypopigmentation was observed in 28.4% (2 persons), isopigmentation was in 71.6 % (5 subjects), the height of the scar above the skin surface in 100% (7 patients) was 1-2 mm, with a uniform increase in the scar was observed in 56.8% (4 cases), and the surface is unevenly raised above the level of intact - in 43.2% (3). In 71.6% (5 patients) there was a moderately compacted scar, and only in 28.4% (2 patients) soft-elastic, with regard to subjective sensations, we have the following data: 71.6% (5 cases) of complaints on itching were absent, and 28.4% (2 cases) noted mild discomfort. Minor pain was reported by 28.4% (2 patients), and 71.6% (5 patients) did not complain of pain.

As for group 1, subgroup 2 with the evening chronotype, on the 90th day after the examination, we have the following data.

In 22.2% (2 patients) moderate hyperemia, and 77.8% (7 cases) normal vascularization (close to intact skin). Normal skin pigmentation was present in 33.3% (3 cases), and hypopigmentation was noted in 66.6% (6 patients), scar height above the tissue level in 88.9% (7 cases) from 1-2 mm and in 11.1% (1 person) more than 2 mm, the skin surface is evenly increased above the level of intact skin in 66.6% (6 subjects) and unevenly increased in 33.3% (3 subjects). The scar is moderately compacted in 88.9% (8 patients), and in 11.1% (1 case) expressed tissue induration. Mild discomfort (slight itching) 55.5% (5 patients), no complaints in 44.4% (4 cases). Pain was observed in 66.6% (6 cases) and 33.3% (4 subjects) did not complain of pain.

The control group consisted of 8 patients. In patients of the control group, we have the following results of the study: moderate hyperemia was observed in 25% (2 persons), and 75% (6 cases) the skin was close to intact. Hypopigmentation of the scar - 100% (8 patients). The height of the scar above the level of the skin in 25% (2 cases) is more than 2 mm, 75% (6 patients) the height was 1-2 mm, the surface of the scar in 50% (4 cases) was evenly raised above the level of intact skin and 50%) when it was raised above the level, but unevenly. The moderately compacted scar was detected in 50% (4 patients), and severe tissue induration was observed in 50% (4 patients). Subjective sensations (itching), mild discomfort 75% (6 cases), severe discomfort was observed in 25% (2 subjects). 75% (6 patients) complained of pain and 25% (2 cases) of severe pain.

When assessing the scar in patients of group 1 and subgroup 1, we have the following results: in all 85.8% (6 patients) normal vascularization (close to intact skin) and in 14.2% (1 patient) moderate hyperemia. Isopigmentation 85.8% (6 cases), and 14.2% (1 patient) with hypopigmentation. The height of the scar above the level of the skin in 85.8% (6 subjects) was within normal limits and 14.2% (1 case) with scar tissue from 1-2 mm, the surface of the scar is close to intact skin in 57.4% (4 subjects), and 42.6% (3 cases) with a uniform increase above the level of intact skin. In 85.8% (6 patients) a soft-elastic scar and 14.2% (1 case) with a moderately compacted scar were observed. Subjective sensations, in most cases 85.8% (6 subjects) had no itching, and only 14.2% (1 patient) experienced mild discomfort, slight itching. No pain was observed in any case.

Group 1, subgroup 2: 9 subjects who underwent surgery from 14:00 to 16:00 received the following data: in 11.1% (1 patient) observed moderate hyperemia, in 88.9% (8 cases) scar was close to intact skin, isopigmentation 44.4% (4 patients), hyperpigmentation in 55.6% (5 subjects). The height of the scar above the surface of the skin - 33.3% (3 patients) with 1-2 mm, the other 66.6% (3 subjects) less than 1 mm., a uniform increase in the scar was observed in 44.4% (4 cases), and in 55.6% (5 patients) noted a height close to intact skin. 11.1% (1 case) moderately compacted scar and 88.9% (8 subjects) with mild elastic. 11.1% (1 person) had complaints of subjective sensations (itching), and 88.9% (8 cases) had no complaints. None of the patients complained of pain for 180 days.

Control group, 8 subjects, moderate hyperemia 25% (2 cases), normal vascularization in 75% (6 subjects), moderate pigmentation in 75% (6 cases), isopigmentation in 25% (2 patients), scar height above the skin surface 62.5% (5 patients) from 1-2 mm, the other 37.5% (3 patients) less than 1 mm., with a uniform increase in scarring was observed only in 75% (6 cases), and the surface is close to intact skin - in 25% (2 subjects). At 50% (4 patients) the moderately condensed scar was observed and at 50% (4 cases) softly elastic, concerning subjective sensations we have the following data: 37.5% (3 cases) with easy discomfort and 62.5% (6 cases) from the complaint were absent. Patients in this group did not complain of severe pain.

The obtained data of the clinical study are presented in table 1.

Indicator P-1, on the 90th day of the clinical study, the difference between the indicators of subgroups 1 and 2 was 50%, between the first and control 50%, between subgroup 2 and control group 0%, this can be justified by the fact that the clinical course was better in patients who underwent surgery in the morning. On day 180, we observed a significant change in values only between patients with morning chronotype and with patients in the control group of 50%; in other groups, there were no significant changes.

The difference between the indicators of P-2 on the 90th day in subgroups 1 and 2 was 66%, between the first and control 80%, between subgroup 2 and the control group 40%, on the 180th day we observed significant changes in indicators only between patients with morning chronotype and evening chronotype 80% and control group 85%, slight changes of 28% were when comparing subgroup 2 and control group.

P-3 on the 90th day the indicators did not differ much, and the difference was 7%, 6%, 13%, on the 180th day the difference was 0%, 42%, 42%.

P-4 in the subgroups on the 90th day did not differ significantly 7%, 6%, and the control group was 15%. On the 180th day, the difference in indicators was 0%, 42%, 42%.

P-5 or scar density on the 90th day 36%, 53%, 26%, and on the 180th the difference in indicators was 0%, 8%, 80%.

Table 1
Characteristics of the clinical condition of scars in patients with congenital cysts of the neck and tumor-like formations of the scalp and neck maxillofacial localization depending on the circadian rhythm

Indicator	Group 1				Group 2 (control)	
	subgroup 1 (Morning chronotype)		subgroup 2 (Evening chronotype)			
	Review (day)					
	90 (n=7)	180 (n=7)	90 (n=9)	180 (n=9)	90 (n=8)	180 (n=8)
P-1	0.1±0.14 ** ***	0.1±0.14 **	0.2±0.14	0.1±0.11 * **	0.2±0.16	0.2±0.16
P-2	0.2±0.18 ** ***	0.1±0.14 * ** ***	0.6±0.16 **	0.5±0.17 * **	1	0.7±0.16 *
P-3	1 ** ***	0.2±0.18 * ** ***	1.1±0.11 **	0.3±0.16 * **	1.2±0.1	0.6±0.18 *
P-4	1.4±0.20 ***	0.4±0.20 * ***	1.3±0.16 **	0.4±0.17 * **	1.5±0.18	0.7±0.16 *
P-5	0.7±0.18 ** ***	0.1±0.14 * ***	1.1±0.11 **	0.1±0.11 * **	1.5±0.18	0.5±0.18 *
P-6	0.2±0.18 ** ***	0.1±0.14 * ***	0.5±0.17 **	0.1±0.11 * **	1.3±0.18	0.3±0.18 *
P-7	0.2±0.18 ** ***	0 *	0.6±0.16 **	0 *	1.2±0.16	0 *
Total	0.4±0.15 ** ***	0.3±0.08 *	0.7±0.15 **	0.3±0.08 * **	1.4±0.16	0.4±0.10 *

Notes: ** - p <0.05 relative to the previous study period;*
*** - p <0.05 relative to the control group;*
**** - p <0.05 relative to subgroup 2.*

The difference between P-6 on the 90th day in subgroups 1 and 2 was 6%, between the first and control 84%, between subgroup 2 and control group 61%, on the 180th day we observed the same data between patients with morning chronotype and with evening chronotype 0% and control group 66%.

On the 90th day, the P-7 indicator, the difference between the indicator was 42%, 83%, 50%. On the 180th day, the indicator was the same, which indicated that all patients had no pain.

According to the data in Table 2, on the 90th day of the clinical study, we could observe a significant difference in the comparison of postoperative scars, namely in patients with morning chronotype and in patients with evening chronotype it was 42%, the difference with control was 71% and the difference between the subgroup 2 and the control group was 50%. On the 180th day of the study, we observed a significant difference between the groups, in patients of subgroups 1 and 2 as compared to the control group, clinical data in the description of postoperative scars were better by 25%. When comparing subgroups 1 and 2, no difference was observed. Thus, on the 180th day of examining patients, the clinical presentation was more favorable in subgroups 1 and 2.

Table 2.
The difference between clinical groups

Day	Between subgroups 1 and 2	Between subgroup 1 and control group	Between subgroup 2 and control group
90	42%	71%	50
180	0%	25%	25%

Conclusion

According to the data obtained, we can say that in patients who underwent surgery in the morning and injected with placental cryoextract, wound healing and scar formation on the 90th day was faster and better than in patients who underwent surgery at lunchtime, and patients who underwent surgery according to the classical method without the use of additional preventive measures.

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