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FORMATION OF OPTIMAL SCAR ON THE BACKGROUND OF SURGICAL TREATMENT OF MAXILLOFACIAL DISEASES OF DIFFERENT ORIGINS

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The concept of "optimal scar" has a significant impact on the planning and implementation of surgical treatment of patients with diseases of maxillofacial localization of various origins, and also determines the direction of development of surgical treatment. A retrospective analysis of inpatient logs, patient histories, and reports on the work of the maxillofacial department of the Poltava Regional Clinical Hospital for 2021 and 2022 years was conducted. Surgical interventions were more often carried out by the extraoral method, which provides the shortest way to the purulent center, but without taking into account the features of deformation and relaxation of the intact skin of this area. The most widespread was the submandibular access. The healing mechanism of a surgical wound formed against the background of bacterial insemination, determined by the type of surgical pathology, has a significant impact on the stage and quality of postoperative scar formation.

Key words: surgical access, pathological scar, maxillofacial localization, surgical treatment.

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ФОРМУВАННЯ ОПТИМАЛЬНОГО РУБЦЯ ЗА УМОВ ХІРУРГІЧНОГО ЛІКУВАННЯ ЗАХВОРЮВАНЬ ЩЕЛЕПНО-ЛИЦЕВОЇ ЛОКАЛІЗАЦІЇ РІЗНОЇ ЕТІОЛОГІЇ

Концепція «оптимального рубця» має значний вплив на планування та проведення хірургічного лікування пацієнтів із захворюваннями щелепно-лицевої локалізації різноманітного походження, а також обумовлює напрямок розвитку проведення хірургічного лікування. Проведено ретроспективний аналіз журналів стаціонарного лікування, історій хвороби та звітів про роботу щелепно-лицевого відділення Полтавської обласної клінічної лікарні за 2021 та 2022 роки. Хірургічні втручання частіше проводили позаротовим методом, який забезпечує найкоротший шлях до гнійного осередку, але без урахування особливостей деформації та розслаблення непошкодженої шкіри цих ділянок. Найбільшого поширення набув піднижньощелепний доступ. Суттєвий вплив на стадію та якість формування післяопераційного рубця має механізм загоснення операційної рани, що утворюється на тлі бактеріального обсіменіння, що визначається типом хірургічної патології.

Ключові слова: хірургічний доступ, патологічний рубець, щелепно-лицева локалізація, хірургічне лікування.

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The concept of "optimal scar" has a significant impact on the planning and implementation of surgical treatment of patients with diseases of maxillofacial localization of various origins, and also determines the direction of development of surgical treatment [5]. The formation of a normotrophic postoperative scar is an important factor not only in minimizing functional and aesthetic disorders, but also in improving the patient's psychological and social status [3].

The quality of the formation of scarred tissue is affected by a huge constellation of factors, both exogenous and endogenous. Particular attention should be paid to the mechanism of wound healing by primary or secondary tension. This is determined by the reason for the surgical intervention ("clean" or purulent wounds) [12, 14].

Surgical treatment of maxillofacial diseases of various origins is a standard and generally accepted method. It should be noted that standard incisions are most often used, which have become widespread in maxillofacial surgery, which is justified by the anatomical features of the innervation and blood supply of the head and neck. Correspondence of surgical approaches to the lines of skin relaxation, which are widely known as Langer's lines, as well as the continuity of the incision leads to optimization of the formation of scarred tissue. Suturing technique, types of suture material, degree of stretching of the skin, use of intra- and postoperative methods of preventing the formation of pathological scars also have a significant impact on this process [11, 15].

Carrying out planned surgical interventions is accompanied by the occurrence of aseptic inflammation in the wound, but at the same time, the risk of pathological scars is minimized, which is due to the mechanisms of primary wound healing [1, 8].

Odontogenic purulent-inflammatory processes, which, despite the rapid development of modern dentistry, are widespread, have different degrees of importance the course of the disease and can be characterized by various complications. Among them, we can single out the spread to neighboring anatomical areas, the generalization of the purulent-inflammatory process, as well as the formation of

pathological scars as a result of wound healing by secondary tension, which leads to the deterioration of the aesthetic appearance of patients and the formation of functional disorders [2, 7, 9, 13].

Currently, a large number of domestic and foreign scientists offers methods of prevention of the formation and treatment of pathological scars, such as the use of laser, PRP therapy, introduction of cryopreserved placenta, antioxidant drugs, etc [4, 6, 10].

The purpose of the study was to assess the risks of pathological scars of maxillofacial localization under the conditions of purulent and clean surgical interventions.

Materials and methods. To determine the features and terms of the formation of scars of maxillofacial localization a retrospective analysis of inpatient logs, patient histories, and reports on the work of the Department of maxillofacial surgery of the Poltava Regional Clinical Hospital for 2021 and 2022 years was conducted.

According to the data of the department of maxillofacial surgery of Poltava Regional Clinical Hospital 1230 and 1447 patients were treated in 2021 and 2022 years, respectively.

During the study, the following parameters were determined: the age and gender of the patients, the course of the pathological process, the localization of the incisions, the length of stay in hospital treatment, the application of sutures and the type of suture material, etc. Factors contributing to the formation of normotrophic scars of maxillofacial localization were also studied retrospectively, as well as risk factors for the formation of pathological scars. The course of healing of purulent and “clean” wounds was analyzed.

Statistical research methods were used in this study. Statistical processing of data was performed using the Statistica 6.0 software package (StatSoft Inc., USA), using the Student’s t-criteria.

An analysis of literary sources related to the formation of pathological scars of maxillofacial localization was also carried out. The PubMed database was used to conduct a literature search.

The results of a retrospective study of inpatient, consultative journals and disease histories of patients of the Department of Maxillofacial Surgery of the Poltava Regional Clinical Hospital for the period under study were compared with the data of the conducted literature search.

Results of the study and their discussion. It should be noted that surgical intervention was not carried out only in isolated cases, under the conditions of using conservative treatment.

Orthopedic treatment of mandibular (sometimes maxillary) fractures (namely, application of individual splints) was carried out in about 8 % of all interventions. It should also be noted that surgical interventions with intraoral access for maxillary sinusotomies with/without plasticity of the oroantral confluence, cystectomies and cystotomies, atypical removal of dystopian and retained teeth, interventions on soft tissues of the oral cavity, etc., were performed in 25–34 % of all surgical interventions. In isolated cases, endonasal access was used.

All other surgical interventions were performed by extraoral access. In our work, we did not consider the formation of the course of formation of scar tissue of the mucous membrane.

In connection with the difference in the results of the healing of the surgical wound by primary and secondary tension, which is confirmed by the literature data, and, accordingly, the risk of the formation of a pathological postoperative scar, the cases of clean and purulent surgical interventions were analyzed.

“Clean” surgical operations were carried out under the conditions of metallo-osteosynthesis for fractures of the jaws and bones of the facial skeleton (about 3 % of the performed operations), removal of neoplasms (benign tumors and tumor-like lesions) of maxillofacial localization (from 8 % to 17 % of cases), plastic surgery and primary surgical treatment of face and neck wounds (1 % of cases each).

During the study, only 3 patients applied to the maxillofacial department of the Poltava Regional Clinical Hospital with complaints about the presence of a keloid scar, which indirectly indicates the low prevalence of this disease. All patients received treatment - gentle removal of the keloid with further supervision by a doctor.

Purulent surgical interventions (about 30–34 % of all performed surgical interventions) were performed in the treatment of abscesses and phlegmons of maxillofacial localization, furuncles, carbuncles and acute purulent lymphadenitis of the face and neck, acute and chronic osteomyelitis of mandible, etc. It should also be noted that in 10–15 % of cases, patients who underwent opening of abscesses or phlegmons of the maxillofacial localization, after cleaning and the appearance of granulation tissue in the wound, underwent surgery to apply secondary sutures, in order to optimize the wound healing process, improve functional and aesthetic component in such patients.

Operative access in the submandibular area was the most common, both under clean and purulent surgeries. It was used in 74–83 % of cases of extraoral incisions. This incision corresponds to the lines of the skin relaxation, minimizes the risk of damage of blood vessels and the marginal mandibular branch of the facial nerve. Also, the versatility of this surgical incision is determined by the possibility of access to a significant number of tissue spaces surrounding the mandible, and also allows the surgeon to extend this incision if necessary when the purulent-inflammatory process spreads to the adjacent anatomical areas. Similar justifications for the use of this operative section were noted in the analysis of literary sources [9, 15].

Along with this operative approach, under the conditions of opening the phlegmon of the oral floor and neck, a collar-like (which was performed in both submandibular and submental areas) and an incision along the front edge of m. Sternocleidomastoideus, as well as short linear sections of different areas of the head and neck depending on the location of abscessing furuncles and carbuncles. Although some authors consider this operative approach very radical and prefer three linear incisions (one middle incision and two incisions in the submandibular areas) [10, 13].

When carrying out “clean” surgical treatment, we should mark the using of incisions along the front edge of m. Sternocleidomastoideus, upper neck fold, incision by Kovtunovich G.P. etc. It is also should be noted that in case of the primary surgical treatment of wounds, the integrity of the skin curves was directly determined by the injury itself.

The significant role in optimizing the reparative processes of wound healing after purulent-inflammatory processes of the maxillo-facial localization of the operation performed by applying the secondary sutures. With special attention to the importance of carrying out the refreshment of the edges of the wound and the mobilization of the skin curves, that should be carried out as atraumatically as possible, which is ahead of the overstretching of the skin, as a factor that may have a significant negative impact on the scar tissue. Also, the important role was played by the suture material [1].

When comparing the number of days of staying in the hospital in patients who underwent “clean” surgical interventions, this indicator was on average from 5 to 9 days, and in isolated cases even up to 18 days, depending on the diagnosis with which the patient was admitted to the department of maxillofacial surgery and volume of surgical intervention. In case of purulent-inflammatory processes, the term of treatment reached from 9 to 12 days, depending on the spread of the process and its severity. In isolated severe cases the term of treatment could take 28 days. We should mark that the term of inpatient treatment of patients who underwent the operation of applying secondary sutures was not significantly different from those patients who did not have this operation [10, 14].

Unfortunately, it was not possible to establish the complete correspondence of the formation of pathological scars depending on the type of surgical intervention performed due to the impossibility of monitoring all patients at the stage of the formation of scar tissue. But among patients who came for a secondary consultation of a maxillofacial surgeon, the formation of a normotrophic scar was more often observed among patients who underwent “clean” surgical interventions, which corresponds to the results of research by both domestic and foreign authors.

In further studies, it is planned to conduct a study of the condition of the skin in the area of the incision, depending on the type of pathology, the mechanism of wound healing, the type of suture material, and the age and gender of the patients.

Conclusions

1. During the treatment of patients, surgical interventions were more often carried out by the extraoral method, which provides the shortest way to the purulent center, but without taking into account the features of deformation and relaxation of the intact skin of this areas. The most widespread was the submandibular access, both under the conditions of "clean" and purulent surgical interventions.
2. The healing mechanism of a surgical wound formed against the background of bacterial insemination, determined by the type of surgical pathology, has a significant impact on the stage and quality of postoperative scar formation. Also the important factors of optimal scar formation are the peculiarities of the direction of incisions, its correspondence to the lines of the skin relaxation, the degree of skin tension taking into account its morphofunctional state in various topographic-anatomical areas of the head and neck, types of sutures, etc.

References

1. Lokes KP. Analiz prychyn nezadovolnykh rezultativ likuvannya khvorykh iz hniyno-zapalnymi protsesamy shchepelno-lytsevoyi dilyanky. Aktualni problemy suchasnoyi medytsyny: Visnyk ukrayinskoyi medychnoyi stomatolohichnoyi akademiyi. 2014;14,4(48):21–22. [in Ukrainian]
2. Ananieva MM, Faustova MO, Basarab IO, Loban' GA. Kocuria rosea, kocuria kristinae, leucoostoc mesenteroides as caries-causing representatives of oral microflora. Wiadomosci lekarskie (Warsaw, Poland) : 1960. 2017;70(2):296 – 298.
3. Huang TR, Chen SG, Chen JC, Liu SC. Validation of Fespixon in Postoperative Scar Cosmesis Using Quantitative Digital Photography Analysis. Aesthet Surg J. 2023;43(6):NP427-NP437. doi: 10.1093/asj/sjad005.
4. Chen SX, Cheng J, Watchmaker J, Dover JS, Chung HJ. Review of Lasers and Energy-Based Devices for Skin Rejuvenation and Scar Treatment with Histologic Correlations. Dermatol Surg. 2022;48(4):441–448. doi: 10.1097/DSS.0000000000003397.
5. Cheng M, Zhuang Y, Zhao H, Li M, Fan L, Yu H. Development of a maxillofacial virtual surgical system based on biomechanical parameters of facial soft tissue. Int J Comput Assist Radiol Surg. 2022;17(7):1201–1211. doi: 10.1007/s11548-022-02657-5.
6. Ebrahimi Z, Alimohamadi Y, Janani M, Hejazi P, Kamali M, Goodarzi A. Platelet-rich plasma in the treatment of scars, to suggest or not to suggest? A systematic review and meta-analysis. J Tissue Eng Regen Med. 2022;16(10):875–899. doi: 10.1002/term.3338.
7. Faustova MO, Ananieva MM, Basarab YO, Dobrobolska OV, Vovk IM, Loban' GA. Bacterial factors of cariogenicity (literature review). Wiadomosci lekarskie (Warsaw, Poland) : 1960. 2018;71(2):378–382.
8. Guo HQ, Yang X, Wang XT, Ji AP, Bai J. Risk Factors for Infection of Sutured Maxillofacial Soft Tissue Injuries. Surg Infect (Larchmt). 2022;23(3):298–303. doi: 10.1089/sur.2021.358

9. Keswani ES, Venkateshwar G. Odontogenic Maxillofacial Space Infections: A 5-Year Retrospective Review in Navi Mumbai. *J Maxillofac Oral Surg.* 2019;18(3):345–353. doi: 10.1007/s12663-018-1152-x.
10. Monavarian M, Kader S, Moeinzadeh S, Jabbari E. Regenerative Scar-Free Skin Wound Healing. *Tissue Eng Part B Rev.* 2019;25(4):294–311. doi: 10.1089/ten.TEB.2018.0350.
11. Scheepens KMJ, Marsidi N, Genders RE, Horeman-Franse T. The Compressiometer: Toward a New Skin Tensiometer for Research and Surgical Planning. *IEEE J Transl Eng Health Med.* 2021; 10:2500109. doi: 10.1109/JTEHM.2021.3133485.
12. Avetikov DS, Yeroshenko HA, Skrypnyk VM. Morfofunktsionalne obhruntuvannya profilaktyky pislyaoperatsiynykh kelozydnykh rubtsiv oblychchya ta shyyi. *Svit medytsyny ta biolohiyi.* 2013; 1:85–87. [in Ukrainian]
13. Taub D, Yampolsky A, Diecidue R, Gold L. Controversies in the Management of Oral and Maxillofacial Infections. *Oral Maxillofac Surg Clin North Am.* 2017;29(4):465–473. doi: 10.1016/j.coms.2017.06.004.
14. Knowles A, Glass DA 2nd. Keloids and Hypertrophic Scars. *Dermatol Clin.* 2023;41(3):509–517. doi: 10.1016/j.det.2023.02.010.
15. Wang PH, Huang BS, Horng HC, Yeh CC, Chen YJ. Wound healing. *J Chin Med Assoc.* 2018;81(2):94–101. doi: 10.1016/j.jcma.2017.11.002.

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CHOICE OF TREATMENT IN PATIENTS WITH COMBINED PROSTATE INTRAEPITHELIAL NEOPLASIA OF PERIPHERIC AND CENTRAL ZONES

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The article deals with the problem of prostate intraepithelial neoplasia treatment as a precancerous state. Data of treatment results of 130 patients with prostate intraepithelial neoplasia of peripheric and central zones are analysed. Patients were distributed to groups depending on treatment method: active surveillance, Dutasteride treatment, transurethral prostate resection, and a combination of Dutasteride and transurethral prostate resection. Results were assessed after 3 years of follow-up by detecting of prostate cancer incidence. It was determined that in the active surveillance group prostate cancer rate was 68.8 %. Treatment in patients with prostate intraepithelial neoplasia of peripheric and central zones with Dutasteride decreased prostate cancer rate by 53.8 %, transurethral prostate resection decreased prostate cancer rate by 55.5 % and a combination of Dutasteride and transurethral prostate resection decreased prostate cancer rate by 54.5 %. Obtained data demonstrate the effectiveness of prostate cancer chemoprevention by prostate intraepithelial neoplasia treatment.

Key words: prostate intraepithelial neoplasia, Dutasteride, transurethral prostate resection.

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ВИБІР МЕТОДУ ЛІКУВАННЯ У ПАЦІЄНТІВ З ПОЄДНАНОЮ ПРОСТАТИЧНОЮ ІНТРАЕПІТЕЛІАЛЬНОЮ НЕОПЛАЗІЄЮ ПЕРИФЕРИЧНОЇ ТА ЦЕНТРАЛЬНОЇ ЗОН

Стаття стосується проблеми лікування простатичної інтраепітеліальної неоплазії як передракового процесу. Аналізуються дані результатів лікування 130 пацієнтів з простатичною інтраепітеліальною неоплазією периферичної та центральної зон. Пацієнти розподілялися на групи в залежності від виду одержаного лікування: динамічне спостереження, прийом Дутастериду, трансуретральна резекція простати, поєднання Дутастериду та трансуретральної резекції простати. Результати оцінювалися впродовж 3-річного періоду спостереження по частоті виявлення раку передміхурової залози. Встановлено, що у випадках динамічного спостереження малігнізація відбувається у 68,8 % пацієнтів. Лікування у пацієнтів з простатичною інтраепітеліальною неоплазією периферичної та центральної зон простати у вигляді Дутастериду зменшує частоту виявлення раку передміхурової залози на 53,8 %, трансуретральна резекція простати зменшує частоту раку передміхурової залози на 55,5 %, комбіноване лікування із застосуванням Дутастериду та трансуретральної резекції простати зменшує частоту раку передміхурової залози на 54,5 %. Одержані дані свідчать про ефективність хіміопрофілактики раку передміхурової залози шляхом лікування простатичної інтраепітеліальної неоплазії.

Ключові слова: простатична інтраепітеліальна неоплазія, дутастерид, трансуретральна резекція простати.

The study is a fragment of the research project "Optimization of surgical treatment of patients under the program of quick recovery on the base of mini-invasive surgery improvement, in particular with the use of nanobiosensitive technologies", number of state registration No. 0122U000233.

Prostate intraepithelial neoplasia (PIN) is considered to be a precancerous state and an actual medical and social problem in the whole world. The study of prostate pathology is connected with the investigation of morphofunctional features of normal men's reproductive system, which gives an opportunity for better understanding of malformations and functional disorders of different organs of the reproductive system [1].