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Risk Factors for Pressure Ulcers in Patients with Traumatic Spinal Cord Injuries

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ABSTRACT

Background. In the occurrence and development of the pressure ulcer process, the following are important: stay in a hospital, a rare multiplicity of changes in body position (less often than every 4 hours), early after injury (up to 1 month), male sex, duration of existence of pressure ulcer wounds, degree of conduction disturbance in the spinal cord.

Results. The presence of a pressure ulcer process limits the restoration of statodynamic functions in patients with traumatic spinal cord disease. Plastic surgery with local tissues is an effective method of treating the pressure ulcer process; The proposed method of surgical treatment of bursitis-bedsores, which involves isolating the bursa cavity and excising it with "one conglomerate", contributes to more effective wound healing compared to traditional methods of surgical treatment of pressure sores.

Key words: Bedsores, traumatic spinal cord disease, diagnosis, treatment

INTRODUCTION

The pressure ulcer process is an extremely serious complication of many diseases, in particular, it is observed in 50-75% of patients with para- and tetraplegia of various etiologies, including diseases of the spinal cord and spine, often of traumatic origin [1, 4, 12, 28].

Stable trends in the increase in the number of spinal cord injuries are due to the growth of environmental aggressiveness: urbanization, development of production and transport [2, 3, 14].

In some publications, there is a tendency to reduce the incidence of spinal cord injury in several economically developed countries, which is probably associated with effective prevention of injuries in general [5, 7, 9, 13, 22, 31].

This injury belongs to the category of severe, over 90% of survivors of spinal injury become disabled, as a rule, the most severe of the first group, accounting for 0.7% of the total contingent of disabled people [6, 8, 10, 11, 15, 21, 27, 29].

Improving the survival rate of patients with spinal cord injury contributes to the accumulation of disabled people with traumatic spinal cord disease [16-20, 23-26].

Every year, the number of victims of spinal cord injury in the world is increasing [30, 31].

In the overall structure of injuries, they account for 0.7-6.6% of all fractures, of which 23.8%-34.5% are complicated [31].

Already in the early period after the injury, the main problems of the late period of traumatic spinal cord disease are formed: chronic inflammation of the organs of the urinary system, neurogenic contractures and deformities, and the development of the pressure ulcer process [30].

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Pressure ulcers not only affect the general condition of the patient, the frequency of complications and mortality, but also negatively affect the psychological state of the patient, significantly narrowing the rehabilitation potential and the possibility of reintegration of the disabled person into society, which significantly aggravates the course of traumatic spinal cord disease [7, 18].

However, many aspects of the prevention and treatment of pressure ulcers remain poorly understood. The unsatisfactory nature of the outcomes of conservative therapy, the lack of a unified concept of surgical treatment of the pressure ulcer process, the lack of consensus on terminology, assessment of the severity of the pressure ulcer process, as well as on the risk factors for pressure ulcer wounds are noted [12, 22].

To date, there is no common understanding of the role of certain risk factors in the occurrence and development of the pressure ulcer process, as well as the nature of the relationship between the severity of the pressure ulcer process and the degree of motor activity of patients.

There is practically no information about the relationship between the effectiveness of the treatment of pressure ulcers and the process of restoring the motor functions of patients. There is no consensus on the place of conservative and surgical methods of treatment of pressure ulcer wounds, as well as the optimal tactics for treating the pressure ulcer process, taking into account the restoration of statodynamic functions. Methodological issues of treatment of pressure wounds also require improvement.

MATERIAL AND METHODS

In the course of a retrospective study, an analysis of the results of examination and treatment of 1271 patients who were treated in the surgical infection department of the multidisciplinary clinic of the Tashkent Medical Academy in the period 2002-2022 was carried out; men - 971 (76.4%), women - 300 (23.6%), the duration of the disease is from 2 months to 31 years. In the intermediate period of traumatic spinal cord disease, there were 92 patients, and in the late period - 1179 patients. Pressure ulcers were present in 247 (out of 1271) patients: men - 201 (81.4%), women - 46 (18.6%). Over the next 5 years, the long-term results of surgical treatment of pressure ulcers were evaluated. Repeated hospitalizations of patients took place in 63 cases.

The survey was conducted in accordance with modern international standards. The data of the clinical examination were supplemented by methods of functional, laboratory, and X-ray diagnostics.

According to the motor activity of patients and the implementation of their locomotor functions, the following groups were distinguished:

1) The patient is not able to move - a position forced to lie in bed, movement in a wheelchair with assistance.

2) The patient can move in a wheelchair on his own.

3) The patient can stand upright, it is possible to move with a fixed stable support.

4) The patient can move with a movable unstable support or without additional support.

Taking into account that, according to the criterion of activity, patients of group 1 are not able to move independently, unlike patients of groups 2, 3 and 4, these groups were combined according to the criteria "not mobile" and "mobile".

The effectiveness of treatment of pressure ulcers was evaluated in 246 patients. Conservative treatment of pressure ulcers was carried out in 143 cases. In the group of patients who underwent conservative treatment, one patient died, in this regard, further analysis of the effectiveness of conservative treatment of wounds was carried out on a group of 142 people.

In 104 patients, 106 operations were performed. Plastic surgery with local tissues was performed in 105 cases in 104 patients, in one case - dermatom plasty. The case of plastic surgery with a split skin flap of a pressure ulcer with an area of more than 100 cm2 is included in the group with secondary wound healing. The indications for surgery were 78 bursitis bedsores, 28 bedsores. In the late period of traumatic spinal cord disease, 100 patients were operated on, in the intermediate - 4 people. For comparison, a retrospective analysis of the results of surgical treatment of pressure sores of the sacral region using a bridge flap of the back (8 cases), and 7 bursitis-pressure sores of the ischial region using a scrotum flap on the feeding leg was carried out.

The evaluation of the effectiveness of surgical treatment of pressure ulcer defects was carried out according to the criteria: "primary healing", "recurrence", and "healing with elements of secondary tension". The effectiveness of conservative treatment of pressure ulcer defects was evaluated according to the following criteria: "healing", "reduction of area", and "lack of dynamics".

RESULTS AND DISCUSSION

According to a survey of patients, information about the existence of pressure ulcers in the anamnesis was noted by 63 out of 100 respondents. It was found that the pressure ulcer process

occurred more often: during the first month after the injury than at a later date (81.0% and 19.0%, respectively; p<0.001).

Pressure ulcers were more common in a hospital setting than at home; The incidence of pressure ulcers in the hospital and outside the medical institution was 87.3% and 12.7%, respectively (p<0.001), and, in a non-specialized hospital, they occurred more often than in a specialized one (78.9% and 49.4%, respectively; p<0.05).

Pressure ulcer wounds were also more common with concomitant injuries than with isolated injuries (66.0% and 44.0%, respectively; p<0.05). It was found that when changing the position of the body up to 3 times a day, pressure ulcers occurred much more often than every 2 hours (85.7% and 41.9%, respectively; p<0.001). There was no clear relationship between the frequency of pressure ulcers and the age of patients, the level of education, place of residence (city, village), marital status, subjective preservation of sensitivity, the level of spinal damage, and the method of urine diversion (p>0.05).

For further analysis of the identified relationships, the logistic regression method was used, with the help of which the significance of the following risk factors for the development of a pressure ulcer process was confirmed: stay in a hospital, a rare multiplicity of changes in body position (less often than every 4 hours).

According to a retrospective study of cases of hospitalization of patients in the clinic, it was found that in the development of the pressure ulcer process, the following matters: the duration of its existence (p<0.05), the degree of conduction disturbance in the spinal cord (73.2% and 55.9%, respectively; p<0.05).

The gender factor also matters. In the late period of traumatic spinal cord disease in men, pressure wounds were observed statistically significantly more often than in women (19.6% and 14.9%, respectively; p<0.05); In addition, in men compared with women, the frequency of recurrence of pressure ulcers in the long-term period was higher (93.1% and 6.9%, respectively; p<0.05). There was no distinct effect of microcirculation disorders and the nature of microbial contamination of wounds. The latter, however, does not exclude the possible important role of microcirculation disorders and infection in the occurrence and development of pressure ulcer wounds, which, in particular, is shown in several works, but only emphasizes the multi-component nature of the etiopathogenesis of the pressure ulcer process [23].

Thus, the results of the studies show that social and hygienic aspects play a greater role in the occurrence and development of the pressure ulcer process than biological, that is, anatomical physiological and pathogenetic factors associated with the course of traumatic spinal cord disease. The latter should be taken into account when forming a program for supervising a patient with spinal cord injury in terms of preventing a pressure ulcer [18].

In the group of patients with pressure ulcer wounds, the number of "non-mobile" patients before the start of treatment and rehabilitation measures was 64 out of 246 (26.0%), and without pressure ulcers - 141 out of 1024 (13.8%; p<0.05).

These differences persisted in cervical spine injury (52.2% and 29.1%, respectively; p<0.05), but not in other localizations of the injury level. The frequency of observations of "non-mobile" patients with a pressure ulcer did not depend on the degree of conduction disturbance in the spinal cord. The relationship between the severity of mobility disorders and the area of pressure ulcers was noted. With wounds with an area of more than 100 sm^2, the frequency of observations of "non-mobile" patients was 2.2 times (p<0.05) higher than with wounds with an area of up to 10 sm^2 [11].

Complete wound healing (primary or secondary tension) in cases of plastic surgery with local tissues was 93.3%, and when using a bridge flap n scrotum flap - only 37.5% (p<0.05) and 42.9% (p<0.05), respectively.

At the same time, it should be noted that the group of 105 operations in which plastic surgery with local tissues was used includes both traditionally used methods of surgical intervention and the method of surgical treatment of pressure ulcers developed in the course of this study. However, even without taking into account these cases, the effectiveness of interventions using plastic surgery with local tissues was higher than with the use of plastic surgery with a bridge flap or scrotum flap. The number of cases of complete healing of the postoperative wound during plastic surgery with local tissues was 35 out of 42 (83.3%), and in the combined group of cases of plastic surgery with a bridge flap and a scrotum flap - 6 out of 15 (40.0%). The method of operation developed in the course of this study made it possible to further improve the results of treatment of the pressure ulcer process. Its essence is as follows.

The method includes tamponade of the cavity with turunda with methylene blue to stain the cavity, excision of the pressure sore, drainage, plastic surgery with a musculocutaneous flap with the imposition of removable "polyspast" sutures or sutures of the Donati type,

antibiotic therapy. For staining, a solution of methylene blue mixed with hydrogen peroxide 3% in a ratio of 9: 1 is used. Before excising the bedsore, its entrance gate is tightly sutured. An ellipsoidal incision is planned sufficient to excise the pressure ulcer capsule, the sutured entrance gate of the pressure ulcer remains intact inside the excised area of the skin, which also eliminates the risk of infection of the surgical field. Wound drainage is carried out by "blind" drainage for 3 days. The combination of these features of the proposed method makes it possible to obtain a new technical result: to verify all the leaks and pockets of the pressure ulcer wound and, at the same time to reduce the likelihood of wound contents leaving the pressure ulcer cavity when it interacts with hydrogen peroxide; allows you to transfer surgery from the category of "purulent" to "clean".

Of the 78 cases of surgical treatment of bursitis-pressure ulcers, using the developed method of excision of the wound, 63 operations were performed, and 62 (98.4%) of them healed primarily; In 15 cases, surgical treatment was performed according to the usual method, primary healing was achieved in 11 (73.3%) cases, in 2 cases the wound healed by secondary tension, in 2 more cases in the early postoperative period, the failure of the surgical wound and the recurrence of the pressure ulcer process were noted.

Thus, the application of the developed method makes it possible to achieve wound healing by primary tension statistically more often and avoid relapses ($p<0.05$).

CONCLUSION

Risk factors for the occurrence of a pressure ulcer are: stay in a hospital, a rare multiplicity of changes in body position (less often than every 4 hours), and in its development, the male sex, the duration of the existence of pressure ulcer wounds, the degree of conduction disturbance in the spinal cord. Do not have a significant effect: the age of patients, the level of education, place of residence (city, village), marital status, subjective preservation of sensitivity, the level of spinal damage, the period after the injury, the nature of the injuries, the method of urine diversion, impaired microcirculation and the nature of microbial contamination of wounds.

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REFERENCES:

1. A case of a clinical course of a purulent-inflammatory disease of soft tissues against the background of diabetes mellitus (2018) / AO Okhunov, UI Pulatov, DA Okhunova // European research: innovation in science, education and technology London, United Kingdom – Pages 19-22.
2. Mervis JS, Phillips TJ. Pressure ulcers: Pathophysiology, epidemiology, risk factors, and presentation. J Am Acad Dermatol. 2019 Oct;81(4):881-890. doi: 10.1016/j.jaad.2018.12.069. Epub 2019 Jan 18. PMID: 30664905.
3. Clinical and Morphological Substantiation of the Choice of Treatment Method for Diabetic Foot Syndrome (2023) / Alisher Okhunov, Sarvar Atakov, Inayat. Sattarov, Kuvandik. Matmuratov, U Kasimov, F Abdurakhmanov, Q Boboev, A Fakirov, A Bobobekov, X Xudayberganova // European Chemical Bulletin – Volume 12, Issue 7, Pages 4585-4597.
4. Clinical cases from the practice of members of the Surgical Infectious Society of North America (2023) / A.O. Okhunov // Journal of Education and Scientific Medicine – Volume 1, Issue 3, Pages 76-84.
5. Sumarno AS. Pressure ulcers: the core, care and cure approach. Br J Community Nurs. 2019 Dec 1;24(Sup12):S38-S42. doi: 10.12968/bjcn.2019.24.Sup12.S38. PMID: 31804885.
6. Diabetes mellitus and surgical infection (2023) / A.O. Okhunov, Sh.A. Khamdamov // British Medical Journal – Volume 3, Issue 3, Pages 107-119.

7. BEDFORD PD, COSIN LZ, McCARTHY TF. Bedsores. Lancet. 1961 Jul 8;2(7193):76-8. doi: 10.1016/s0140-6736(61)92371-6. PMID: 13688585.
8. Kottner J, Cuddigan J, Carville K, Balzer K, Berlowitz D, Law S, Litchford M, Mitchell P, Moore Z, Pittman J, Sigaudo-Roussel D, Yee CY, Haesler E. Pressure ulcer/injury classification today: An international perspective. J Tissue Viability. 2020 Aug;29(3):197-203. doi: 10.1016/j.jtv.2020.04.003. Epub 2020 May 1. PMID: 32414554.
9. Dangoisse C, Lambeau C, Van Esse R, Barroy JP, Deschamps P, Jaspar N, Praet JP. Physiopathologie des escarres [Physiopathology of bedsores]. Rev Med Brux. 1997 Sep;18(4):257-60. French. PMID: 9411657.
10. Endovascular methods for correcting angiopathy of the diabetic foot syndrome in patients after COVID-19 (2022) / A.O. Okhunov // 16th European Diabetes and Endocrinology Congress – Pages 12-15.
11. Fargals in the treatment of necrotic infections of soft tissues on the background of diabetes mellitus (2023) / UK Kasimov, AO Okhunov // Research Jet Journal of Analysis and Inventions – Volume 4, Issue 2, Pages 63-73.
12. McInnes E, Jammali-Blasi A, Bell-Syer SE, Dumville JC, Middleton V, Cullum N. Support surfaces for pressure ulcer prevention. Cochrane Database Syst Rev. 2015 Sep 3;2015(9): CD001735. doi: 10.1002/14651858.CD001735.pub5. PMID: 26333288; PMCID: PMC7075275.
13. American Academy of Family Physicians. Preventing bedsores. Am Fam Physician. 2008 Nov 15;78(10):1195-6. PMID: 19035068.
14. Influence of bariatric operations on the course of the ulcerous-necrotic process in patients with diabetes type 2 (2019) / A.O. Okhunov, D.A. Okhunova // WCITD-2019.
15. Prévention et traitement des escarres de l'adulte et du sujet âgé [Prevention and treatment of bedsores in adults and the elderly]. Ann Dermatol Venereol. 2002 May;129(5 Pt 1):757-65. French. PMID: 12124527.
16. Demarré L, Van Lancker A, Van Hecke A, Verhaeghe S, Grypdonck M, Lemey J, Annemans L, Beeckman D. The cost of prevention and treatment of pressure ulcers: A systematic review. Int J Nurs Stud. 2015 Nov;52(11):1754-74. doi: 10.1016/j.ijnurstu.2015.06.006. Epub 2015 Jun 25. PMID: 26231383.
17. Ibarra G, Rivera A, Fernandez-Ibarburu B, Lorca-García C, Garcia-Ruano A. Prone position pressure sores in the COVID-19 pandemic: The Madrid experience. J Plast Reconstr Aesthet Surg. 2021 Sep;74(9):2141-2148. doi: 10.1016/j.bjps.2020.12.057. Epub 2020 Dec 26. PMID: 33446462; PMCID: PMC7837206.
18. Morphological aspects of wounds in patients with purulent inflammation of soft tissues in diabetes mellitus and under the influence of granulocyte-colony-stimulating factor (2022) / U.I. Pulatov, R.I. Israilov, A.O. Okhunov, F.M. Abdurakhmanov, K.H. Boboev // Journal of education and scientific medicine – Volume 2, Issue 3, Pages 43-50.
19. Morphological characteristics of results of treatment of diabetic angiopathy (2019) / AO Okhunov // International journal of diabetes and metabolic disorders – Volume 4, Issue 4, Pages 1-3.
20. New approaches to improve autodermaplasty results (2023) / FM Abdurakhmanov, Sh.A. Khamdamov, DA Korikhonov, A.O. Okhunov // Journal of Education & Scientific Medicine – Volume 2, Issue 1. – Pages 22-27.
21. Prediction and prevention of sepsis in patients with necrotizing fasciitis on the background of diabetes mellitus (2023) / A.O. Okhunov // 42-Annual Meeting of the Surgical Infection Society, Westlake Village, CA April 11-14, 2023 – Pages 39.
22. Ayello EA. From Bedsores to Global Health Care: Insights from Nightingale's Notes on Nursing. Adv Skin Wound Care. 2020 May;33(5):237-238. doi: 10.1097/01.ASW.0000658604.86284.f2. PMID: 32304446.
23. Prolonged intraarterial catheter therapy for diabetic gangrene of the lower limb (2023) / A.O. Okhunov, F.A. Abduralhmanov // 42-Annual Meeting of the Surgical Infection Society, Westlake Village, CA April 11-14, 2023 – Pages 38.
24. Skin manifestations of Pseudomonas aeruginosa infections. / Spernovasilis N, Psichogiou M, Poulakou G. // Curr Opin Infect Dis. 2021 Apr 1;34(2):72-79. doi: 10.1097/QCO.0000000000000717.
25. Skin Wound Healing: Normal Macrophage Function and Macrophage Dysfunction in Diabetic Wounds. / Aitcheson SM, Frentiu FD, Hurn SE, Edwards K, Murray RZ. // Molecules. 2021 Aug 13;26(16):4917. doi: 10.3390/molecules26164917.
26. The choice of method of surgical correction of complicated forms of diabetes type 2 (2019) / AO

Okhunov // International Journal of diabetes and metabolic disorders – Volume 4, Issue 4, Pages 1-3.

27. The microbiological environment of wounds and skin in patients with purulent-inflammatory diseases of soft tissues (2023) / W.S. Jonson, A.O. Okhunov, S.S. Atakov, U.K. Kasimov, I.S. Sattarov, Sh.A. Bobokulova, Sh.A. Khamdamov, D.N. Korikhonov, F.M. Abdurakhmanov, K.Kh. Boboyev // Journal of Educational and Scientific Medicine – Volume 2, Issue 2, Pages 72-81.
28. The reasons for the generalization of infection in patients with purulent-inflammatory diseases of soft tissues against the background of diabetes mellitus (2016) / AO Okhunov, BD Babadzhanov, UI Pulatov // Bulletin of the Tashkent Medical Academy – Volume 4, Pages 89-93.
29. To Some Questions About the Treatment of Diabetic Foot Syndrome in Patients with Covid-19 (2023) / A.O. Okhunov, F.M. Abdurakhmanov // Eurasian Medical Research Periodical – Volume 20, Pages 216-221.
30. Ways to achieve positive results of dermaplasty in patients with diabetic foot syndrome (2023) / A.O. Okhunov, F.M. Abdurakhmanov // British Medical Journal – Volume 3, Issue 1, Pages 92-98.
31. Why does surgical infection often affect diabetics? : A literature review of recent data (2023) / B. Babadjanov, A.O. Okhunov, S. Atakov, U. Kasimov, I. Sattarov, K. Matmuratov, A. Bobobekov, N. Khudaybergenova, Sh. Khamdamov, Sh. Bobokulova, K. Boboyev, F. Abdurakhmanov, D. Korikhonov // Journal of education and scientific medicine – Volume 1, Issue 3, Pages 66-75.