GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 7-8 (364-365) Июль-Август 2025

ТБИЛИСИ - NEW YORK

ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

Monthly Georgia-US joint scientific journal published both in electronic and paper formats of the Agency of Medical Information of the Georgian Association of Business Press. Published since 1994. Distributed in NIS, EU and USA.

GMN: Georgian Medical News is peer-reviewed, published monthly journal committed to promoting the science and art of medicine and the betterment of public health, published by the GMN Editorial Board since 1994. GMN carries original scientific articles on medicine, biology and pharmacy, which are of experimental, theoretical and practical character; publishes original research, reviews, commentaries, editorials, essays, medical news, and correspondence in English and Russian.

GMN is indexed in MEDLINE, SCOPUS, PubMed and VINITI Russian Academy of Sciences. The full text content is available through EBSCO databases.

GMN: Медицинские новости Грузии - ежемесячный рецензируемый научный журнал, издаётся Редакционной коллегией с 1994 года на русском и английском языках в целях поддержки медицинской науки и улучшения здравоохранения. В журнале публикуются оригинальные научные статьи в области медицины, биологии и фармации, статьи обзорного характера, научные сообщения, новости медицины и здравоохранения. Журнал индексируется в MEDLINE, отражён в базе данных SCOPUS, PubMed и ВИНИТИ РАН. Полнотекстовые статьи журнала доступны через БД EBSCO.

GMN: Georgian Medical News – საქართველოს სამედიცინო სიახლენი – არის ყოველთვიური სამეცნიერო სამედიცინო რეცენზირებადი ჟურნალი, გამოიცემა 1994 წლიდან, წარმოადგენს სარედაქციო კოლეგიისა და აშშ-ის მეცნიერების, განათლების, ინდუსტრიის, ხელოვნებისა და ბუნებისმეტყველების საერთაშორისო აკადემიის ერთობლივ გამოცემას. GMN-ში რუსულ და ინგლისურ ენებზე ქვეყნდება ექსპერიმენტული, თეორიული და პრაქტიკული ხასიათის ორიგინალური სამეცნიერო სტატიები მედიცინის, ბიოლოგიისა და ფარმაციის სფეროში, მიმოხილვითი ხასიათის სტატიები.

ჟურნალი ინდექსირებულია MEDLINE-ის საერთაშორისო სისტემაში, ასახულია SCOPUS-ის, PubMed-ის და ВИНИТИ РАН-ის მონაცემთა ბაზებში. სტატიების სრული ტექსტი ხელმისაწვდომია EBSCO-ს მონაცემთა ბაზებიდან.

WEBSITE

www.geomednews.com

К СВЕДЕНИЮ АВТОРОВ!

При направлении статьи в редакцию необходимо соблюдать следующие правила:

1. Статья должна быть представлена в двух экземплярах, на русском или английском языках, напечатанная через **полтора интервала на одной стороне стандартного листа с шириной левого поля в три сантиметра**. Используемый компьютерный шрифт для текста на русском и английском языках - **Times New Roman** (**Кириллица**), для текста на грузинском языке следует использовать **AcadNusx.** Размер шрифта - **12**. К рукописи, напечатанной на компьютере, должен быть приложен CD со статьей.

2. Размер статьи должен быть не менее десяти и не более двадцати страниц машинописи, включая указатель литературы и резюме на английском, русском и грузинском языках.

3. В статье должны быть освещены актуальность данного материала, методы и результаты исследования и их обсуждение.

При представлении в печать научных экспериментальных работ авторы должны указывать вид и количество экспериментальных животных, применявшиеся методы обезболивания и усыпления (в ходе острых опытов).

4. К статье должны быть приложены краткое (на полстраницы) резюме на английском, русском и грузинском языках (включающее следующие разделы: цель исследования, материал и методы, результаты и заключение) и список ключевых слов (key words).

5. Таблицы необходимо представлять в печатной форме. Фотокопии не принимаются. **Все цифровые, итоговые и процентные данные в таблицах должны соответствовать таковым в тексте статьи**. Таблицы и графики должны быть озаглавлены.

6. Фотографии должны быть контрастными, фотокопии с рентгенограмм - в позитивном изображении. Рисунки, чертежи и диаграммы следует озаглавить, пронумеровать и вставить в соответствующее место текста **в tiff формате**.

В подписях к микрофотографиям следует указывать степень увеличения через окуляр или объектив и метод окраски или импрегнации срезов.

7. Фамилии отечественных авторов приводятся в оригинальной транскрипции.

8. При оформлении и направлении статей в журнал МНГ просим авторов соблюдать правила, изложенные в «Единых требованиях к рукописям, представляемым в биомедицинские журналы», принятых Международным комитетом редакторов медицинских журналов - http://www.spinesurgery.ru/files/publish.pdf и http://www.nlm.nih.gov/bsd/uniform_requirements.html
В конце каждой оригинальной статьи приводится библиографический список. В список литературы включаются все материалы, на которые имеются ссылки в тексте. Список составляется в алфавитном порядке и нумеруется. Литературный источник приводится на языке оригинала. В списке литературы сначала приводятся работы, написанные знаками грузинского алфавита, затем кириллицей и латиницей. Ссылки на цитируемые работы в тексте статьи даются в квадратных скобках в виде номера, соответствующего номеру данной работы в списке литературы. Большинство цитированных источников должны быть за последние 5-7 лет.

9. Для получения права на публикацию статья должна иметь от руководителя работы или учреждения визу и сопроводительное отношение, написанные или напечатанные на бланке и заверенные подписью и печатью.

10. В конце статьи должны быть подписи всех авторов, полностью приведены их фамилии, имена и отчества, указаны служебный и домашний номера телефонов и адреса или иные координаты. Количество авторов (соавторов) не должно превышать пяти человек.

11. Редакция оставляет за собой право сокращать и исправлять статьи. Корректура авторам не высылается, вся работа и сверка проводится по авторскому оригиналу.

12. Недопустимо направление в редакцию работ, представленных к печати в иных издательствах или опубликованных в других изданиях.

При нарушении указанных правил статьи не рассматриваются.

REQUIREMENTS

Please note, materials submitted to the Editorial Office Staff are supposed to meet the following requirements:

1. Articles must be provided with a double copy, in English or Russian languages and typed or compu-ter-printed on a single side of standard typing paper, with the left margin of **3** centimeters width, and **1.5** spacing between the lines, typeface - **Times New Roman** (**Cyrillic**), print size - **12** (referring to Georgian and Russian materials). With computer-printed texts please enclose a CD carrying the same file titled with Latin symbols.

2. Size of the article, including index and resume in English, Russian and Georgian languages must be at least 10 pages and not exceed the limit of 20 pages of typed or computer-printed text.

3. Submitted material must include a coverage of a topical subject, research methods, results, and review.

Authors of the scientific-research works must indicate the number of experimental biological species drawn in, list the employed methods of anesthetization and soporific means used during acute tests.

4. Articles must have a short (half page) abstract in English, Russian and Georgian (including the following sections: aim of study, material and methods, results and conclusions) and a list of key words.

5. Tables must be presented in an original typed or computer-printed form, instead of a photocopied version. **Numbers, totals, percentile data on the tables must coincide with those in the texts of the articles.** Tables and graphs must be headed.

6. Photographs are required to be contrasted and must be submitted with doubles. Please number each photograph with a pencil on its back, indicate author's name, title of the article (short version), and mark out its top and bottom parts. Drawings must be accurate, drafts and diagrams drawn in Indian ink (or black ink). Photocopies of the X-ray photographs must be presented in a positive image in **tiff format**.

Accurately numbered subtitles for each illustration must be listed on a separate sheet of paper. In the subtitles for the microphotographs please indicate the ocular and objective lens magnification power, method of coloring or impregnation of the microscopic sections (preparations).

7. Please indicate last names, first and middle initials of the native authors, present names and initials of the foreign authors in the transcription of the original language, enclose in parenthesis corresponding number under which the author is listed in the reference materials.

8. Please follow guidance offered to authors by The International Committee of Medical Journal Editors guidance in its Uniform Requirements for Manuscripts Submitted to Biomedical Journals publication available online at: http://www.nlm.nih.gov/bsd/uniform_requirements.html
http://www.icmje.org/urm_full.pdf
In GMN style for each work cited in the text, a bibliographic reference is given, and this is located at the end of the article under the title "References". All references cited in the text must be listed. The list of references should be arranged alphabetically and then numbered. References are numbered in the text [numbers in square brackets] and in the reference list and numbers are repeated throughout the text as needed. The bibliographic description is given in the language of publication (citations in Georgian script are followed by Cyrillic and Latin).

9. To obtain the rights of publication articles must be accompanied by a visa from the project instructor or the establishment, where the work has been performed, and a reference letter, both written or typed on a special signed form, certified by a stamp or a seal.

10. Articles must be signed by all of the authors at the end, and they must be provided with a list of full names, office and home phone numbers and addresses or other non-office locations where the authors could be reached. The number of the authors (co-authors) must not exceed the limit of 5 people.

11. Editorial Staff reserves the rights to cut down in size and correct the articles. Proof-sheets are not sent out to the authors. The entire editorial and collation work is performed according to the author's original text.

12. Sending in the works that have already been assigned to the press by other Editorial Staffs or have been printed by other publishers is not permissible.

Articles that Fail to Meet the Aforementioned Requirements are not Assigned to be Reviewed.

ავტორთა საყურადღებოდ!

რედაქციაში სტატიის წარმოდგენისას საჭიროა დავიცვათ შემდეგი წესები:

1. სტატია უნდა წარმოადგინოთ 2 ცალად, რუსულ ან ინგლისურ ენებზე,დაბეჭდილი სტანდარტული ფურცლის 1 გვერდზე, 3 სმ სიგანის მარცხენა ველისა და სტრიქონებს შორის 1,5 ინტერვალის დაცვით. გამოყენებული კომპიუტერული შრიფტი რუსულ და ინგლისურენოვან ტექსტებში - **Times New Roman (Кириллица)**, ხოლო ქართულენოვან ტექსტში საჭიროა გამოვიყენოთ **AcadNusx.** შრიფტის ზომა – 12. სტატიას თან უნდა ახლდეს CD სტატიით.

2. სტატიის მოცულობა არ უნდა შეადგენდეს 10 გვერდზე ნაკლებს და 20 გვერდზე მეტს ლიტერატურის სიის და რეზიუმეების (ინგლისურ, რუსულ და ქართულ ენებზე) ჩათვლით.

3. სტატიაში საჭიროა გაშუქდეს: საკითხის აქტუალობა; კვლევის მიზანი; საკვლევი მასალა და გამოყენებული მეთოდები; მიღებული შედეგები და მათი განსჯა. ექსპერიმენტული ხასიათის სტატიების წარმოდგენისას ავტორებმა უნდა მიუთითონ საექსპერიმენტო ცხოველების სახეობა და რაოდენობა; გაუტკივარებისა და დაძინების მეთოდები (მწვავე ცდების პირობებში).

4. სტატიას თან უნდა ახლდეს რეზიუმე ინგლისურ, რუსულ და ქართულ ენებზე არანაკლებ ნახევარი გვერდის მოცულობისა (სათაურის, ავტორების, დაწესებულების მითითებით და უნდა შეიცავდეს შემდეგ განყოფილებებს: მიზანი, მასალა და მეთოდები, შედეგები და დასკვნები; ტექსტუალური ნაწილი არ უნდა იყოს 15 სტრიქონზე ნაკლები) და საკვანძო სიტყვების ჩამონათვალი (key words).

5. ცხრილები საჭიროა წარმოადგინოთ ნაბეჭდი სახით. ყველა ციფრული, შემაჯამებელი და პროცენტული მონაცემები უნდა შეესაბამებოდეს ტექსტში მოყვანილს.

6. ფოტოსურათები უნდა იყოს კონტრასტული; სურათები, ნახაზები, დიაგრამები - დასათაურებული, დანომრილი და სათანადო ადგილას ჩასმული. რენტგენოგრამების ფოტოასლები წარმოადგინეთ პოზიტიური გამოსახულებით **tiff** ფორმატში. მიკროფოტოსურათების წარწერებში საჭიროა მიუთითოთ ოკულარის ან ობიექტივის საშუალებით გადიდების ხარისხი, ანათალების შეღებვის ან იმპრეგნაციის მეთოდი და აღნიშნოთ სურათის ზედა და ქვედა ნაწილები.

7. სამამულო ავტორების გვარები სტატიაში აღინიშნება ინიციალების თანდართვით, უცხოურისა – უცხოური ტრანსკრიპციით.

8. სტატიას თან უნდა ახლდეს ავტორის მიერ გამოყენებული სამამულო და უცხოური შრომების ბიბლიოგრაფიული სია (ბოლო 5-8 წლის სიღრმით). ანბანური წყობით წარმოდგენილ ბიბლიოგრაფიულ სიაში მიუთითეთ ჯერ სამამულო, შემდეგ უცხოელი ავტორები (გვარი, ინიციალები, სტატიის სათაური, ჟურნალის დასახელება, გამოცემის ადგილი, წელი, ჟურნალის №, პირველი და ბოლო გვერდები). მონოგრაფიის შემთხვევაში მიუთითეთ გამოცემის წელი, ადგილი და გვერდების საერთო რაოდენობა. ტექსტში კვადრატულ ფჩხილებში უნდა მიუთითოთ ავტორის შესაბამისი N ლიტერატურის სიის მიხედვით. მიზანშეწონილია, რომ ციტირებული წყაროების უმეტესი ნაწილი იყოს 5-6 წლის სიღრმის.

9. სტატიას თან უნდა ახლდეს: ა) დაწესებულების ან სამეცნიერო ხელმძღვანელის წარდგინება, დამოწმებული ხელმოწერითა და ბეჭდით; ბ) დარგის სპეციალისტის დამოწმებული რეცენზია, რომელშიც მითითებული იქნება საკითხის აქტუალობა, მასალის საკმაობა, მეთოდის სანდოობა, შედეგების სამეცნიერო-პრაქტიკული მნიშვნელობა.

10. სტატიის ბოლოს საჭიროა ყველა ავტორის ხელმოწერა, რომელთა რაოდენობა არ უნდა აღემატებოდეს 5-ს.

11. რედაქცია იტოვებს უფლებას შეასწოროს სტატია. ტექსტზე მუშაობა და შეჯერება ხდება საავტორო ორიგინალის მიხედვით.

12. დაუშვებელია რედაქციაში ისეთი სტატიის წარდგენა, რომელიც დასაბეჭდად წარდგენილი იყო სხვა რედაქციაში ან გამოქვეყნებული იყო სხვა გამოცემებში.

აღნიშნული წესების დარღვევის შემთხვევაში სტატიები არ განიხილება.

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Содержание:

GEORGIAN MEDICAL NEWS
No 7-8 (364-365) 2025

OSSIFICATION OF THE POSTERIOR LONGITUDINAL LIGAMENT: A CASE REPORT AND LITERATURE REVIEW

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Abstract.

Ossification of the posterior longitudinal ligament is a relatively rare potentially dangerous pathology with insufficiently covered issues of clinical presentation, diagnostics, treatment tactics and surgical correction options.

Objective: To present a rare clinical case of a fracture of the ossified posterior longitudinal ligament in a patient with a cervical vertebral injury, as well as a review of the literature on the etiology, pathogenesis, clinical presentation, diagnostics, and tactics of conservative and surgical treatment for this pathological condition.

Materials and methods: Clinical case of fracture of ossified posterior longitudinal ligament in a patient with cervical spine injury, scientific literature and periodicals.

Results: The material provided will help doctors in various fields in treating their patients.

Conclusion: Due to the rarity of such clinical situations, further accumulation of information and its analysis is required.

Key words. Fracture of the ossified posterior longitudinal ligament, laminoplasty, spinal canal tenosis, clinical case.

Introduction.

Ossification of the posterior longitudinal ligament (OLL) is a rare, progressive pathological condition characterized by heterotropic ossification and a progressive process that can lead to spinal cord compression and myelopathy [1-3].

The main task of the doctor is to make a correct diagnosis as early as possible to differentiate it from other neurological diseases, as well as to perform timely surgical and drug treatment aimed at compensating for this condition and restoring functions.

This pathology does not have a clear etiological factor; there are different theories of its development. Ossification can be provoked and stimulated by trauma, infections, autoimmune processes, and the impact of environmental factors [4]. At the genetic and biochemical level, polymorphism of changes in the alpha chain of collagen types 6,11,17 plays a role. It is they that, to some extent, over time lead to membranous ossification of the ligament [5,6].

The posterior longitudinal ligament is firmly fused with the intervertebral discs and loosely with the vertebral bodies. The ligament limits excessive flexion of the spinal column, being the functional antagonist of the anterior longitudinal ligament.

The loose connection of the posterior longitudinal ligament with the vertebral bodies and more intense blood circulation during the occurrence of an adaptive reaction, in some cases, initiates the activity of the osteogenic function of the periosteum, the synthetic function of osteoblasts, which in some cases contributes to the ossification of the posterior longitudinal ligament.

Studies of the synthetic function of the main cells of connective tissue – fibroblasts in vitro in the process of modeling the etiological factors of the formation of somatic dysfunctions (hypercapnia, hypoxia, compression) and the dynamics of changes in the composition of the intercellular matrix in the form of changes in the concentration of collagen, elastin and glycosaminoglycans confirm this statement [4].

Currently, there is a single generally accepted classification in the literature, developed by the Research Committee of the Ministry of Health and Welfare of Japan. According to this classification, ossification of the ossification of the lateral radiograph is divided into four types: local, segmental, continuous and mixed. Mixed and continuous types are most often associated with progressive myelopathy. They are characterized by an increase in morphogenetic protein-2.

The surgical approach is based on the size, location and degree of spinal cord compression. The anterior approach usually includes anterior corpectomy with fusion and discectomy with fusion, while the posterior approach includes laminectomy and laminoplasty. The choice of surgical treatment for ossified longitudinal ligament remains controversial. The choice of anterior approach in surgical treatment is more favorable than posterior one, but may have its own critical complications in the form of para- or tetraplegia/paresis [7].

Objective: To present a rare clinical case of a fracture of the ossified posterior longitudinal ligament in a patient with a cervical spine injury, as well as a review of the literature on the etiology and pathogenesis, clinical presentation, diagnostics and tactics of conservative and surgical treatment.

Materials and Methods.

A clinical case of a fracture of the ossified posterior longitudinal ligament in a patient with a cervical spine injury.

Clinical example.

Patient T., 62 years old, was admitted to the Tyumen Regional Clinical Hospital No. 2 in 2019, delivered by an ambulance team.

According to relatives, he stumbled on the porch of his own house, fell, and hit his cervical spine on the steps. Immediately after the injury, weakness occurred in all limbs, there was a short-term loss of consciousness. Immediately after admission, he was examined by a neurosurgeon, the neurological status revealed: depression of consciousness according to the Glasgow Coma Scale up to 14 points, tetraparesis, in the arms up to 3 points, in the legs up to 4 points.

According to the CT results - calcification of the posterior longitudinal ligament at the level of C2-C5, fragmented in the upper section, with the formation of an incomplete bone block C4-C5. The spinal canal at this level is narrowed by 2/3.

According to MRI data, at the level of C2-C7, there is hyperdense thickening, calcification of the posterior longitudinal ligament, with the formation of a massive exostosis, up to 7-8 mm thick, at the level of C2-C3, the exostosis is fragmented, narrows the spinal canal to 5 mm, compresses the spinal cord by 1/2, the latter has a pathological MR signal due to edema.

On the day of admission, a decompression and stabilization operation was performed using the anterior approach. Removal of a herniated intervertebral disc C2-3, C3-4. A porous NiTi implant was formed in the interbody space during distraction of the cervical spine. A 50 mm Atlantis bone plate was fixed to the bodies of the C2 and C4 vertebrae during distraction of the cervical spine. The upper edge of the plate is fixed with two screws to the body of the C2 vertebra with the screws passing into the right sections through the central bodies of the vertebrae, and the lower edge is fixed to the C4 vertebra with the screws passing into the middle sections of the vertebral bodies. A control X-ray showed that the condition of the implants is satisfactory.

On the 4th day, due to the appearance of hemodynamically significant episodes of asystole, the patient underwent implantation of a temporary pacemaker.

In the postoperative period, the patient developed tetraplegia, intestinal and respiratory muscle paresis. A tracheostomy was performed, and the patient was transferred to artificial ventilation. The temperature reaction was hectic.

On the 17th day, a CT scan of the chest was performed - an abscess in the left lung, bilateral hypostatic pneumonia were detected. Partial atelectasis of the lower lobe on the left. Hydrothorax on the left. Antibacterial and detoxification therapy was performed. With the increase of multiple organ failure, a fatal outcome was recorded.

Discussion.

When analyzing literary data, it is noted that this pathology is more frequently mentioned in Asian countries.

The greatest amount of information on OZPS has been accumulated in Japan, where serious scientific research on this pathology is conducted at the scientific center of the Japanese Orthopedic Association (JOA). According to the latest data, the incidence rate in this country is the highest and amounts to 2.0-4.0%, in connection with which this pathology is called the "disease of the Japanese" [8].

The annual incidence of new cases of OPPS in Korea and China is within 1.0-3.0%, in North America and Europe – 0.1-1.7% [9]. Such differences in this indicator are probably explained by differences in genetic determination.

Ossification of the posterior longitudinal ligament may occur concomitantly with other hyperostotic changes such as diffuse idiopathic skeletal hyperostosis (50.0%), ankylosing spondylitis (2.0%), and ossification of the ligamentum flavum (6.8%).

Women more often have a petrified, diffuse focus in the thoracic spine, and this pathology is more severe in them. For men, the location of foci in the cervicothoracic and thoracolumbar junctions is more typical.

The onset of ligament destruction occurs after 40 years of age, more often in men [5].

Given the apparent paucity of data on the pathogenesis of PL, it has been suggested that the ligaments have several osteoblastic phenotypes that are not similar to normal cells. A large number of studies suggest that genetic loci are associated with susceptibility to calcification of the posterior longitudinal ligament [5].

The gold standard for assessing changes in the spinal canal and spinal cord is MRI and CT.

Non-surgical treatment most often consists of physiotherapy and the use of oral analgesics or anti-inflammatory drugs [7].

Today, surgical treatment by decompression of the spinal cord is the standard treatment method.

The anterior approach was the most convenient in this case, as it provides the best route to the ligament and visualization of the spinal structures, in addition, this approach has a lower risk of damaging the spinal cord than the posterior approach. Posterior decompression is technically more difficult, since the posterior longitudinal ligament is located in front of the spinal cord. The consequences of using the posterior approach can be kyphosis and expansion of ossification. Clinicians note that if the patient has ossification less than 3-4 vertebrae below the C3 level, with a ligament thickness of less than 5-6 mm and spinal canal stenosis of less than 50%, then the operation should be performed using the anterior approach. According to the indicative points of the Japanese Orthopedic Association (JOA), the anterior approach is also the best [7,10].

In this case, the use of an anterior approach was completely justified and met the necessary criteria.

The cause of fatal complications in this case was critical damage to the spinal cord at the cervical level by fragments of the ossified posterior longitudinal ligament, which leads to ischemia and edema, which are factors of secondary damage to brain tissue. The consequence of this is respiratory failure with the addition of purulent-septic complications, and the subsequent development of multiple organ failure, which was the immediate cause of death.

It should be emphasized that respiratory failure plays a key role in the pathogenetic chain of development of a cascade of further unfavorable pathological conditions in the victim's body. Clinical practice shows that when the neurotrophic effect on organs and tissues is disrupted due to damage to the spinal cord structures, severe organ complications develop much faster and are more severe than without such damage and often lead to the death of the patient, even with carefully carried out care measures and compliance with all rules and criteria for artificial ventilation.

There are no clear clinical differences in spinal cord damage due to a fracture of the posterior longitudinal ligament and its trauma described in the literature. In both cases, the neurological symptoms may be the same.

According to Hosono et al., after laminoplasty, pain in the cervical spine is more common, in 60% of those operated it lasted more than 3 months with the need to use strong analgesics. In the case of anterior spondylodesis, 19% of those operated on did not have any significant pain at all [11].

During observation of patients, Japanese surgeons and orthopedists came to the conclusion that after laminoplasty there is a decrease in the range of motion in this section of the spine by 62%. The development of paresis is most often associated with damage to the spinal cord at the level of the C5 vertebra [11-17].

Conclusion.

Thus, ossification of the posterior longitudinal ligament is a polyetiological pathology leading to hyperostosis and ectopic calcification of the posterior longitudinal ligament.

The presented clinical case ended with an unfavorable outcome due to the addition of a secondary infection and multiple organ failure. This case shows that despite successful decompression of the spinal cord, even with satisfactory postoperative respiratory and infectious control, critical complications may develop.

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