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ЕЖЕМЕСЯЧНЫЙ НАУЧНЫЙ ЖУРНАЛ

Медицинские новости Грузии

საქართველოს სამედიცინო სიახლენი

GEORGIAN MEDICAL NEWS

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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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TRAUMATIC PULMONARY HERNIATION: A RARE CHEST TRAUMA MANIFESTATION

Matthias Feyrer[1]*, Alexander Schuh[2], Holger Rupprecht[3], Harald Hennig[4], Stefan Sesselmann[5], Philipp Koehl[6].

[1]*Department of Industrial Engineering and Health, Institute of Medical Engineering, Technical University of Applied Sciences Amberg-Weiden, 92637 Weiden, Germany.*

[2]*Hospital of trauma surgery, Department of musculoskeletal research, Marktredwitz Hospital, 95615 Marktredwitz, Germany.*

[3]*Department of Thoracic Surgery, Neumarkt Hospital, 92318 Neumarkt, Germany.*

[4]*Emergency Department, Neumarkt Hospital, 92318 Neumarkt, Germany.*

[5]*Technical University of Applied Sciences Würzburg-Schweinfurt, 97070 Würzburg*

[6]*Hospital of trauma surgery, Marktredwitz Hospital, 95615 Marktredwitz, Germany.*

Abstract.

Traumatic pulmonary hernia is an uncommon occurrence resulting from chest trauma, typically covered by the skin. Chest trauma may arise from penetrating or blunt mechanisms, with blunt trauma being more frequently observed. When lung herniation transpires, various symptoms such as chest pain, dyspnea, subcutaneous emphysema, bone crepitation, and hemoptysis (in cases of lung parenchymal damage) may manifest. We present the case of a 66-year-old woman suffering from chest pain and dyspnea after blunt chest trauma due to a fall induced by delirium following alcohol abuse.

Key words. Trauma, lung, pulmonary herniation, chest wall defect, fracture.

Introduction.

Roland was the first person to describe pulmonary hernias in 1499; however, the formal definition of pulmonary hernias did not come into use until 1946. Clinically, herniation of the lung is an uncommon occurrence, defined as the protrusion of the lung through one of its bounding structures. Lung hernias are categorized based on their location and causative factors, with anatomical subdivisions comprising cervical, intercostal (thoracic), diaphragmatic, or mediastinal hernias. These hernias may be either congenital or acquired, with acquired hernias further classified as traumatic, spontaneous, or pathologic, arising from neoplastic or inflammatory processes. Traumatic pulmonary hernia is an exceedingly rare consequence of chest trauma, typically remaining covered by the skin [1-20]. Chest trauma may be caused by penetrating or blunt mechanisms, with blunt trauma being more frequently observed. In cases of lung herniation, manifestations such as chest pain, dyspnea, subcutaneous emphysema, bone crepitation, and hemoptysis (in the event of lung parenchymal damage) may be present [2,11].

We report the case of a 66-year-old woman who experienced chest pain and dyspnea following blunt chest trauma, resulting from a fall during a delirious episode induced by alcohol abuse.

Case report.

A 66-year-old woman sought urgent medical attention at the emergency department, reporting chest pain and dyspnea following a recent fall, further complicated by a history of alcohol abuse. She localized the pain above the left lower rib cage, exacerbated during deep inhalation and coughing (VAS 8/10), and persistent even at rest. Physical examination of the thoracic region revealed diminished breath sounds in the lower part of the left chest, along with pain and crepitus over the 9th and 10th left ribs, collectively resulting in a left thoracic instability. Reviewing her medical history, the patient had been prescribed amoxicillin and clavulanic acid by her general practitioner for suspected pulmonary infection starting the previous day. She did not exhibit typical angina pectoris symptoms, and there were no reported fever, chills, head pain, or abdominal discomfort.

In response to the unstable thoracic situation, an immediate chest CT scan was conducted directly from the emergency department. The results unveiled pre-existing, partially incompletely consolidated rib fractures on both sides, alongside fresh fractures of the 9th and 10th left ribs (Figure 1). Notably, a left-sided herniation of lung tissue was evident (Figure 2), coupled with a displacement of the costochondral junctions of the left 9th and 10th ribs (Figure 3). A mild accompanying pleural effusion was observed on the left side; however, no pneumothorax or mediastinal shift was detected. Furthermore, at the transition to the abdomen, a slight curvilinear herniation of soft tissue was discernible.

Upon initial laboratory tests, a significant hyponatremia was identified, prompting the decision to admit the patient directly to the intensive care unit for sodium deficit correction. This decision was particularly crucial given the patient's history of alcohol abuse and very poor general condition. While in the intensive care unit, the patient manifested paranoid tendencies and alcohol withdrawal delirium. Pharmacological intervention led to an improvement in the clinical condition. However, these complications resulted in the reconsideration of the initially planned surgical thoracic stabilization, originally scheduled for the first day after admission. It was deemed clinically justifiable to postpone the surgical intervention, and it was ultimately performed on the 8th day of hospitalization.

During the intraoperative assessment, confirmation of extensive dehiscence of the 8th and 9th left ribs, lung herniation, and a thoracic wall defect (Figure 4a) measuring approximately 20x15 cm was obtained. Direct closure was not feasible due to high rib tension in that area. Consequently, a Gore-Tex patch was sutured using a sublay technique with individual button stitches to address the defect (Figure 4b). In contrast to the initial CT findings, a significant diaphragmatic defect on the left side measuring approximately 12x10 cm was additionally identified. Portions of this defect were repaired through direct suturing. A remaining defect of approximately 10x10 cm was resolved using a Gore-Tex Dualmesh patch in a sublay technique. Prior to closure, any concomitant hemorrhagic effusions in the thoracic and abdominal regions were suctioned. The antibiotic therapy initiated perioperatively with Cefuroxime was continued.

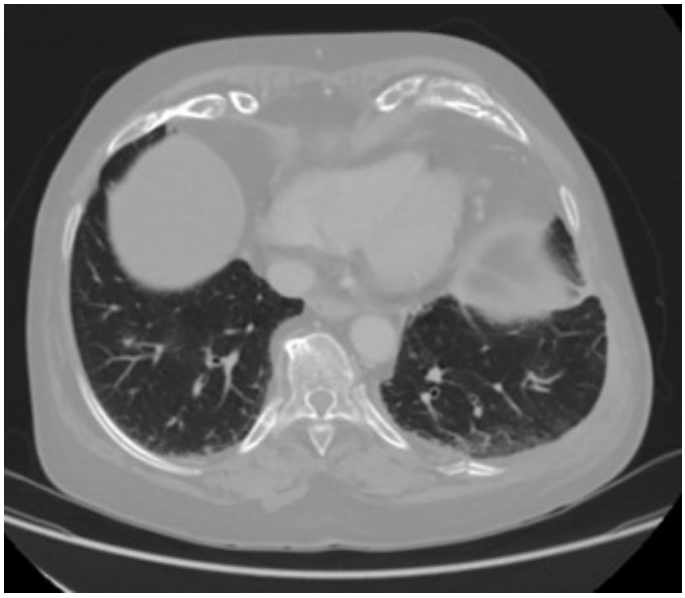
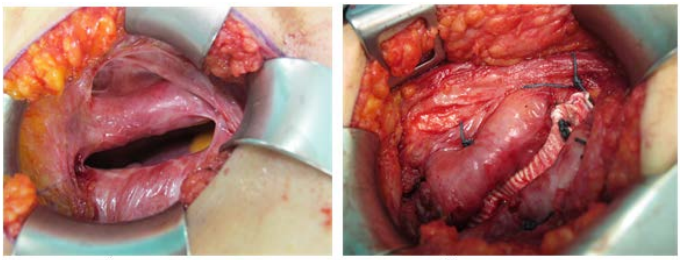


Figure 1. *Thoracic CT reveals a fracture of the left 9th rib and a left-sided pulmonary hernia.*

Figure 2. *The thoracic CT scout view displays the left subcutaneous pulmonary hernia.*

Figure 3. *3D reconstruction of the thoracic CT scan visualizes dislocation of the costochondral junctions of the 9th and 10th ribs on the left side.*



A B

Figure 4. *Thoracic wall defect after repositioning the pulmonary hernia (a) and during closure (b).*

The postoperative course initially progressed without complications, including the uneventful removal of drains and successful primary wound healing. Sutures in the thoracotomy wound area were removed during the hospital stay. However, persistent postoperative respiratory insufficiency was noted, with oxygen saturation dropping to 85% on room air, a condition that the patient largely tolerated. Subsequently, a home oxygen therapy plan was initiated. Eventually, the patient was discharged to her home environment for further outpatient care on the 24th day of hospitalization.

Discussion.

In 1847, Morel-Lavallée [14] provided a classification for lung herniation, categorizing it into cervical, thoracic, diaphragmatic, or mediastinal types. Etiologically, lung herniation can be either congenital or acquired. Acquired hernias are further divided into traumatic, consecutive, spontaneous, or pathological types [2]. Approximately 85% of lung herniations result from trauma, with the majority (65%) occurring in the thoracic region, followed by 35% in the cervical area, and less than 1% in the diaphragmatic region [16]. Traumatic hernias are attributed to chest wall weakness, stemming from penetrating chest wounds, surgical interventions, fractured ribs, etc. [6]. Posttraumatic intercostal hernias may manifest either immediately after trauma or exhibit a delayed onset, occurring months or even years later [2]. Notably, there has been a recent surge in traumatic pulmonary herniation cases, often associated with high-speed trauma. These hernias frequently emerge as a consequence of multiple rib fractures, as well as costochondral or sternoclavicular joint dislocations [11].

The antero-lateral chest wall is notably more vulnerable to traumatic lung herniation, attributed to its minimal soft tissue support, primarily provided by the intercostal muscles, as opposed to the posterior wall, which benefits from the support of the trapezius, latissimus dorsi, and rhomboid muscles [18]. While a pulmonary hernia itself does not typically pose a serious threat, the risk escalates when there is incarceration and strangulation, potentially leading to hemoptysis and localized pain [2]. Symptoms of a pulmonary hernia can be atypical and easily overshadowed by those of other conditions, underscoring the importance of radiological examinations for accurate diagnosis. Although many cases of pulmonary herniation are asymptomatic, others may present with a soft, subcutaneous mass that is reducible upon coughing [11]. Severe symptoms such as shortness of breath, dyspnea, and respiratory failure may also manifest [11]. Complications like incarceration, strangulation, and hemoptysis are rare. Uncomplicated hernias

may present as a soft, crepitant bulge that enlarges with deep inspiration or coughing. CT imaging is crucial not only for detecting the hernia but also for assessing the precise location and size of the defect. In cases of intercostal hernias, routine chest radiography may fail to reveal the abnormality unless the hernia aligns tangentially with the X-ray beam. Emphasizing the rarity, diaphragmatic lung hernias are infrequently reported [2].

The presented case unveils an uncommon scenario, featuring a distinctive combination of intercostal lung herniation attributed to the fracture of the 9th rib and dislocation of the costochondral junctions of the 9th and 10th ribs. Intriguingly, this case also involved diaphragmatic rupture, although diaphragmatic lung herniation did not occur. This unique combination underscores the complexity and variability in the clinical manifestation of thoracic injuries, requiring a comprehensive approach to diagnosis and treatment.

Presently, managing asymptomatic patients with pulmonary hernias poses a challenge, given the lack of consensus on a standardized approach. Patients often present with nonspecific signs and symptoms, further complicating decision-making. Historically, conservative treatment has been favoured for asymptomatic pulmonary hernias. However, an escalating number of cases suggests that surgery may yield more favourable outcomes for select patients with asymptomatic pulmonary hernias. A critical aspect of the management strategy is the timing of intervention. Current recommendations advocate for surgical intervention within 48 hours of diagnosis, which was clinically not possible in our case as described. Operative treatment becomes imperative when conservative measures prove ineffective or when the local protrusion significantly impacts the patient's quality of life and appearance [11]. The evolving understanding of this condition necessitates ongoing research to establish comprehensive guidelines for the management of asymptomatic pulmonary hernias.

There are two central principles in the surgical treatment of pulmonary hernia: achieving sufficient repair and restoring chest wall stability. The main steps of pulmonary hernia surgery involve preserving viable lung tissue, resecting the hernia sac and infarcted lung tissue, and repairing the chest wall defect [4]. If the intercostal defect is less than 2 cm, the hernia can be closed by suturing adjacent soft tissues. For defects greater than 2 cm, a mesh can be employed to repair and reconstruct the chest wall, if necessary [3,4,7,9,11,15], as was the case in our situation. In cases of partial pulmonary hernias and unilateral multiple rib fractures, simply fixing the ribs can lead to long-term satisfactory results [17]. In our case, closure of the defect using a mesh proved to be an effective treatment despite the delayed surgery.

Conclusion.

Traumatic pulmonary hernia represents a highly uncommon manifestation of chest trauma, usually covered by the skin. The symptoms associated with pulmonary hernia are atypical and can be easily overshadowed by those of other conditions, underscoring the importance of employing radiological examinations for accurate diagnosis.

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