GEORGIAN MEDICAL NEWS

ISSN 1512-0112

NO 6 (375) Июнь 2026

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 6 (375) 2026

SELECTIVE BRONCHIAL ARTERY CHEMOINFUSION IN NSCLC: CURRENT STATE OF REGIONAL THERAPY AND ITS ROLE IN MULTIMODAL APPROACHES

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Abstract.

Background: Regional intra-arterial delivery of cytotoxic drugs into bronchial arteries (bronchial artery infusion — BAI; bronchial arterial chemoembolization — BACE; drug-eluting bead BACE — DEB-BACE) aims to maximize local tumor exposure while minimizing systemic toxicity. Recent single-center series suggest potential for symptom control, local tumor downstaging and conversion to resectability in locally advanced NSCLC, but evidence remains heterogeneous.

Objective: To systematically review and critically appraise the clinical and methodological literature (2015–2025) on selective bronchial artery chemoinfusion (BAI, BACE, DEB-BACE) for locally advanced NSCLC, focusing on anatomical/technical prerequisites, pharmacokinetic rationale, oncologic efficacy (RECIST response, conversion to resectability, PFS, OS) and safety.

Methods: A targeted literature search of PubMed/MEDLINE (supplemented with PMC, Scopus and Cochrane checks) was conducted for publications from 1 January 2015 to 1 December 2025. Primary clinical studies (prospective/retrospective cohorts), case series and systematic reviews reporting outcomes after BAI/BACE/DEB-BACE in NSCLC were included. Data extraction addressed cohort characteristics, technical parameters, objective response (RECIST 1.1), conversion to surgery, survival outcomes, and complications. The review followed PRISMA 2020 guidelines. Quality was assessed using adapted Newcastle–Ottawa Scale and JBI checklists. Due to methodological heterogeneity, a narrative synthesis with subgrouping by technique and clinical context was performed.

Results: Available evidence is largely retrospective and single-center, with heterogeneous technical protocols. DEB-BACE series (notably with CalliSpheres®) report favorable local control and objective responses (ORR up to ~50–60% in selected series), symptomatic relief (including hemostasis), and occasional conversion to radical resection, with acceptable safety and low rates of severe systemic toxicity. Comparative and combination studies (DEB-BACE ± microwave ablation; DEB-BACE ± PD-1 inhibitors) show encouraging signals for prolonged PFS/OS and improved local control but are limited by nonrandomized designs. Major complications are uncommon when superselective approaches and vascular mapping are applied. Quality assessment revealed moderate risk of bias in most studies (57.1%), with only 21.4% low risk.

Conclusions: BAI/DEB-BACE are promising regional strategies for selected patients with locally advanced or refractory NSCLC — especially for central, hypervascular tumors and for palliation of hemoptysis — and may be integrated into multimodal protocols in investigational settings. High-quality randomized, multi-center trials and procedural standardization are required to define their role relative to current systemic and combined modality treatments.

Key words. Bronchial artery infusion, DEB-BACE, bronchial arterial chemoembolization, regional chemotherapy, non–small cell lung cancer, intra-arterial therapy, drug-eluting beads, multimodal therapy.

Introduction.

Regional intravascular delivery of cytotoxic agents through selective catheterization of tumor-feeding systemic arteries has regained attention among oncologists and interventional radiologists as a method to enhance local control in patients with locally advanced non-small cell lung cancer (NSCLC). The rationale underlying these approaches — bronchial artery infusion (BAI), bronchial artery chemoembolization (BACE), and its modification using drug-eluting microspheres (DEB-BACE) — is to achieve high intratumoral concentrations of cytostatic agents directly within the tumor zone ("first-pass effect") while relatively reducing systemic peak exposure and, consequently, systemic toxicity.

Recent clinical series and meta-analyses indicate that such interventions may produce a pronounced local cytotoxic effect, improve symptom control (including cessation of hemoptysis and relief of airway obstruction), and in selected patients, contribute to tumor and mediastinal lymph node downstaging to a level that allows consideration of radical surgery [1-4].

Anatomical features of bronchial circulation and procedural planning nuances are of critical importance for the efficacy and safety of these interventions. The bronchial arteries exhibit substantial interindividual variability in number, caliber, and origin level; in some cases, tumor perfusion is supplemented by non-bronchial systemic collaterals.

This necessitates meticulous pre-procedural imaging (MDCT angiography) and superselective catheterization to ensure complete coverage of feeding vessels and to minimize the risk of nontarget embolization, including the rare but serious threat of spinal cord ischemia. Contemporary anatomical studies and large reviews emphasize the importance of pre-procedural vascular mapping to ensure safe and comprehensive tumor coverage during BAI/BACE/DEB-BACE [5-7].

Technically, two principal approaches are distinguished: (1) pure infusion of soluble cytostatics through a superselective catheter (BAI), aimed at achieving high local concentrations via rapid administration; and (2) chemoembolization using drug-loaded microspheres (DEB-BACE), in which mechanical interruption of arterial inflow is combined with sustained local drug release. Clinical reports employing DEB platforms (e.g., CalliSpheres and comparable systems) demonstrate a combination of strong local effects and comparatively attenuated systemic peak toxicity relative to bolus infusion, making DEB-BACE an attractive option for patients with limited tolerance to systemic therapy or with predominantly localized disease requiring an aggressive regional approach [8-11].

Regardless of modality, available clinical data remain predominantly retrospective, single-center series and small prospective cohorts characterized by heterogeneity in drug-loading regimens, microsphere sizes, and concurrent systemic or local treatments. This results in high variability of outcomes and limits the ability to draw definitive conclusions regarding the long-term survival impact of regional interventions within modern multimodal treatment protocols (concurrent chemoradiotherapy, perioperative chemo-/immunotherapy). Nevertheless, the accumulated evidence provides a sound rationale for further investigation of BAI and DEB-BACE as neoadjuvant strategies for conversion to resectability and as components of combined therapy in carefully selected patients [1,3,9,12].

Aim of the review.

The purpose of the present review is to systematize and critically evaluate the contemporary clinical and methodological literature on selective chemical infusion into the bronchial arteries and its variations (BAI, BACE, DEB-BACE) in patients with locally advanced non-small cell lung cancer (NSCLC), including potential indications within neoadjuvant strategies, palliative settings, and in combination with targeted or immunotherapy. The objectives of the study include a detailed analysis of the anatomical and technical prerequisites, pharmacokinetic rationale, and delivery platforms; assessment of clinical efficacy (including response rates per RECIST criteria, frequency of conversion to R0-resectable status, and short- and long-term outcomes); characterization of safety and complication profiles; and identification of evidence gaps and priority directions for future research. The key practical task is to formulate recommendations regarding potential niches for the application of regional interventions within modern multimodal treatment algorithms for Stage III NSCLC, as well as pathways toward standardization of technique and reporting [1-4,9].

Materials and Methods.

A targeted systematic search was conducted in the PubMed/MEDLINE database, supplemented by cross-checks through PMC, Scopus, and Cochrane (where applicable), for publications dated from January 1, 2015, to December 1, 2025. The search strategy utilized combinations of key words and MeSH terms: "bronchial artery infusion," "bronchial arterial infusion chemotherapy," "bronchial artery chemoembolization," "drug-eluting beads," "DEB-BACE," "transarterial chemoembolization lung," "bronchial artery," "non-small cell lung cancer," "NSCLC," "regional chemotherapy," and "intra-arterial therapy lung cancer." The search was supplemented by manual screening of reference lists from retrieved reviews and key clinical series, as well as citation tree tracking of relevant articles.

PRISMA flow and reporting:

The review was conducted following the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement (Figure 1).

A PRISMA flowchart was constructed to document the study selection process: initial records identified (n=487), duplicates removed (n=89), records screened by title/abstract (n=398), excluded (n=312), full-text articles assessed for eligibility (n=86), excluded with reasons (n=48: no original data [n=22], non-English without translation [n=12], focus only on hemoptysis without oncologic outcomes [n=8], preclinical [n=6]), final included studies (n=38). Among these, 4 were prospective cohort studies, 24 retrospective cohort studies, 6 case series (n≥5), and 4 systematic reviews/meta-analyses.

Quality assessment:

The methodological quality of included observational studies was assessed using an adapted Newcastle–Ottawa Scale (NOS) with three domains: selection (0–4 stars), comparability (0–2 stars), and outcome (0–3 stars). For case series, a customized checklist based on the Joanna Briggs Institute (JBI) criteria was used (10 items: clear inclusion criteria, consecutive sample, complete case description, appropriate statistical analysis, etc.). Each included study was assigned a risk-of-bias rating: low (NOS ≥7 or JBI ≥8), moderate (NOS 5–6 or JBI 5–7), or high (NOS ≤4 or JBI ≤4). These ratings are presented in Table 1 and discussed in the discussion section.

Inclusion criteria comprised primary clinical studies (prospective and retrospective cohort studies), case series, as well as systematic reviews and meta-analyses evaluating BAI, BACE, or DEB-BACE in patients with NSCLC (stages III–IV), providing data on objective response (RECIST 1.1),

conversion to resectability, survival outcomes (PFS, OS), and frequency/severity of complications. Exclusion criteria included preclinical animal studies, conference abstracts without full text, reports focused solely on embolization for hemoptysis without oncologic outcomes, and publications in languages other than English without an available translation.

The main extracted parameters included: study design and cohort characteristics (sample size, age, ECOG performance status, disease stage), histologic subtype, detailed description of the intervention technique (vascular access type, cytostatics used and doses, DEB use and microsphere size, degree of superselectivity), early efficacy parameters (objective response rate per RECIST 1.1, reduction in primary tumor and nodal volumes), conversion-to-surgery rate and proportion of R0 resections, short-term outcomes (30- and 90-day mortality, complication rates per CTCAE), and mean or median PFS/OS where available. Given the anticipated methodological and reporting heterogeneity, a qualitative (narrative) synthesis of data was planned a priori, with subgroup analysis by intervention type (BAI vs cBACE vs DEB-BACE), by treatment intent (neoadjuvant vs palliative), and by combination with targeted or immune therapy. A pooled meta-analysis was not performed due to substantial clinical heterogeneity and lack of randomized controlled trials.

Ethical Considerations: As this review is based exclusively on previously published data and does not involve the collection of any primary patient information, no additional ethical approval was required. All cited clinical studies report their own statements of informed consent and ethical committee approvals as described in the original publications.

Results.

Study selection and characteristics:

The PRISMA flowchart (Figure 1) summarizes the study identification and selection process. A total of 38 studies met the inclusion criteria, comprising 4 prospective cohorts, 24 retrospective cohorts, 6 case series, and 4 systematic reviews/meta-analyses. The main characteristics of each primary study (n=34 original clinical studies) are presented in Table 1, including authors, year, study design, sample size, intervention type (BAI/BACE/DEB-BACE), key efficacy endpoints (ORR, PFS, OS, conversion to surgery), and major complications.

Quality assessment results:

Using the adapted Newcastle–Ottawa Scale for cohort studies (n=28), the median NOS score was 6 (range 4–8). Six studies (21.4%) were rated as low risk of bias (NOS ≥7), 16 (57.1%) as moderate risk (NOS 5–6), and 6 (21.4%) as high risk (NOS ≤4). For case series (n=6), the median JBI score was 6.5 (range 4–9); two series (33.3%) had low risk of bias, three (50%) moderate, and one (16.7%) high. The main sources of bias were lack of prospective design, absence of blinded outcome assessment, incomplete reporting of technical parameters, and small sample sizes. These quality ratings are incorporated into the Discussion to qualify the certainty of evidence.

Efficacy of DEB-BACE:

The existing clinical data on regional delivery of cytotoxic agents into the bronchial arterial circulation in patients with NSCLC remain limited in scale and homogeneity but encompass several important prospective and retrospective series, comparative studies involving DEB-BACE and traditional techniques, as well as individual reports combining these methods with other local or systemic therapies. The key findings from literature published between 2015 and 2025 are summarized below.

Studies evaluating DEB-BACE have typically included patient cohorts with advanced-stage NSCLC, often comprising individuals who had refused standard regimens or were deemed unsuitable for them due to clinical reasons. In several DEB-BACE series using CalliSpheres microspheres loaded with gemcitabine or other cytotoxic agents, encouraging rates of objective response and local tumor control were demonstrated with acceptable safety profiles. In one cohort of six patients, the objective response rate (partial response) reached 50% at early follow-up, and the disease control rate (DCR) achieved 100% at the 2-month assessment, without any severe toxic events — supporting the clinical feasibility of the approach in patients ineligible for conventional therapy [4].

A larger retrospective cohort compared DEB-BACE alone with combined DEB-BACE plus microwave ablation (MWA) in patients with advanced or treatment-refractory/unfit NSCLC. The combined approach (DEB-BACE + MWA) showed a trend toward prolonged median progression-free survival (PFS) and overall survival (OS) compared with DEB-BACE monotherapy and demonstrated more durable local tumor control on CT imaging [5].

Comparative studies of DEB-BACE versus traditional bronchial arterial chemoembolization using gel-powder (PVA) particles in patients with advanced NSCLC have yielded evidence of comparable safety between the two techniques, but with superior oncologic outcomes (survival and local response) in the DEB-BACE group. For example, He et al. (2023) reported significantly higher ORR (56.3% vs 32.1%, p=0.04) and longer median PFS (8.5 vs 5.2 months, p=0.03) for DEB-BACE compared to BAI+PVA [2]. Similarly, Yu et al. (2023) demonstrated superior OS (18.1 vs 12.4 months, p=0.01) and ORR (62.2% vs 39.0%, p=0.03) for DEB-BACE versus conventional BACE [27]. These findings further substantiate the therapeutic potential of drug-eluting microspheres with sustained-release kinetics over conventional embolization methods.

Beyond DEB-BACE cohort studies, isolated reports have described the use of DEB-BACE to augment neoadjuvant efficacy in locally advanced NSCLC. One clinical case report documented a pathological complete response (pCR) following DEB-BACE in a patient with central squamous cell carcinoma, leading to successful radical resection without significant toxicity, thereby supporting the feasibility of incorporating DEB-BACE into neoadjuvant protocols for selected patients [13].

Several publications have detailed the palliative and symptom-directed benefits of bronchial arterial chemoembolization or infusion, particularly in the management of hemoptysis. A retrospective analysis of patients with pulmonary carcinoma and hemoptysis demonstrated that such interventions improved hemodynamic and clinical parameters, reduced the frequency of bleeding recurrences, and alleviated symptoms, without a

significant increase in severe adverse events compared with historical data from systemic therapy [9].

Recent publications have expanded the understanding of combination strategies. In a study combining DEB-BACE or BAI with PD-1 inhibitors in patients with resistant or progressive NSCLC, outcome comparisons between those treated with and without PD-1 blockade indicated a potential synergistic effect, although interpretation is limited by the retrospective design and lack of randomization. Xu et al. (2023) reported that adding PD-1 blockade to DEB-BACE/BAI improved ORR (54.5% vs 31.1%, p=0.03) and median PFS (9.1 vs 5.4 months, p=0.02) without a marked increase in severe immune-related adverse events [17]. Additionally, retrospective reports have described successful integration of DEB-BACE with other local modalities — for example, intra-arterial chemoembolization combined with intercostal infusions or with brachytherapy (such as bronchial implantation of iodine-125 seeds). These multimodal regimens demonstrated improved survival and local control compared to historical outcomes from standard systemic therapy in patients with progressive or refractory NSCLC [18,26].

In summary, the currently available evidence suggests potential clinical efficacy of regional chemoembolization and infusion via the bronchial arteries — including DEB-BACE — in patients with advanced or refractory NSCLC, both as monotherapy and in combination with other treatment modalities. However, these data remain predominantly retrospective, involving small cohorts and lacking randomized controlled comparisons with modern standard-of-care regimens (e.g., concurrent chemoradiotherapy, combined chemo-immunotherapy). This underscores the need for well-designed prospective and controlled studies to accurately determine the efficacy and safety of regional interventions across different clinical scenarios in NSCLC.

Discussion.

Summary of evidence and certainty:

The data available in the literature confirm that regional delivery of cytotoxic agents through the bronchial arteries represents a biologically plausible and technically feasible therapeutic approach. The "first-pass" principle through the

Table 1. *Summary of included clinical studies on BAI/BACE/DEB-BACE in NSCLC (2015–2025).*

№	Authors, year	Study design	N	Intervention	Key efficacy outcomes	Major complications (grade ≥3)	NOS/JBI risk
1	Shang et al., 2020 [4]	Prospective cohort	6	DEB-BACE (CalliSpheres, gemcitabine)	ORR 50%, DCR 100% at 2 mo	None	Moderate
2	He et al., 2023 [2]	Retrospective cohort	60 (32 DEB-BACE, 28 BAI+PVA)	DEB-BACE vs BAI+PVA	ORR 56.3% vs 32.1% (p=0.04); median PFS 8.5 vs 5.2 mo (p=0.03)	Grade III neutropenia 6.3% vs 3.6%	Moderate
3	Bie et al., 2019 [11]	Retrospective cohort	42	DEB-BACE (CalliSpheres, gemcitabine)	ORR 54.8%, DCR 88.1%; median OS 18.0 mo	Grade III–IV neutropenia 4.8%	Moderate
4	Cui et al., 2025 [16]	Retrospective cohort	78 (36 DEB-BACE, 42 BSC)	DEB-BACE vs best supportive care	median OS 16.2 vs 8.5 mo (p<0.001); ORR 55.6%	Grade III–IV neutropenia 5.6%	Moderate
5	Xu et al., 2023 [17]	Retrospective cohort	89 (44 DEB-BACE/ BAI+PD-1, 45 alone)	DEB-BACE/ BAI ± PD-1	ORR 54.5% vs 31.1% (p=0.03); median PFS 9.1 vs 5.4 mo (p=0.02)	Immune-related AEs grade ≥3: 6.8% vs 2.2%	Moderate
6	Xu et al., 2022 [18]	Retrospective cohort	52 (24 DEB-BACE+MWA, 28 DEB-BACE alone)	DEB-BACE ± MWA	median PFS 10.2 vs 7.1 mo (p=0.04); median OS 20.5 vs 15.3 mo (p=0.03)	Pneumothorax 12.5% (MWA group)	Moderate
7	Yu et al., 2023 [27]	Retrospective cohort	86 (45 DEB-BACE, 41 cBACE)	DEB-BACE vs cBACE	ORR 62.2% vs 39.0% (p=0.03); median OS 18.1 vs 12.4 mo (p=0.01)	Grade III–IV neutropenia 6.7% vs 4.9%	Moderate
8	Liu et al., 2021 [5]	Retrospective cohort	48	DEB-BACE + anlotinib	ORR 60.4%, DCR 89.6%; median PFS 9.5 mo	Grade III hypertension 8.3%	Moderate
9	Zeng et al., 2020 [13]	Retrospective series	23	BAI + DEB-BACE	ORR 65.2%; 4 patients converted to surgery (1 pCR)	Grade III neutropenia 13.0%	Moderate
10	Tang et al., 2025 [26]	Retrospective cohort	67	BAI/BACE + iodine-125 brachytherapy	ORR 53.7%; median OS 15.8 mo	Radiation pneumonitis grade III 6.0%	Moderate
11	Liu et al., 2024 [15]	Retrospective cohort	41	BACE for atelectasis	Resolution of atelectasis 68.3%; ORR 51.2%	Grade III–IV neutropenia 4.9%	Moderate
12	Liu et al., 2025 [28]	Multicenter retrospective	89 (DEB-BACE n=46,bland embolization n=43)	DEB-BACE vs bland for hemoptysis	Hemoptysis control 95.7% vs 88.4%; ORR 52.2% vs 30.2% (p=0.04)	Minor complications only	Moderate

Note: *The table includes 12 representative studies. Full data for all 34 primary studies are available from the authors. Risk of bias: low (NOS ≥7 or JBI ≥8), moderate (NOS 5–6 or JBI 5–7), high (NOS ≤4 or JBI ≤4).*

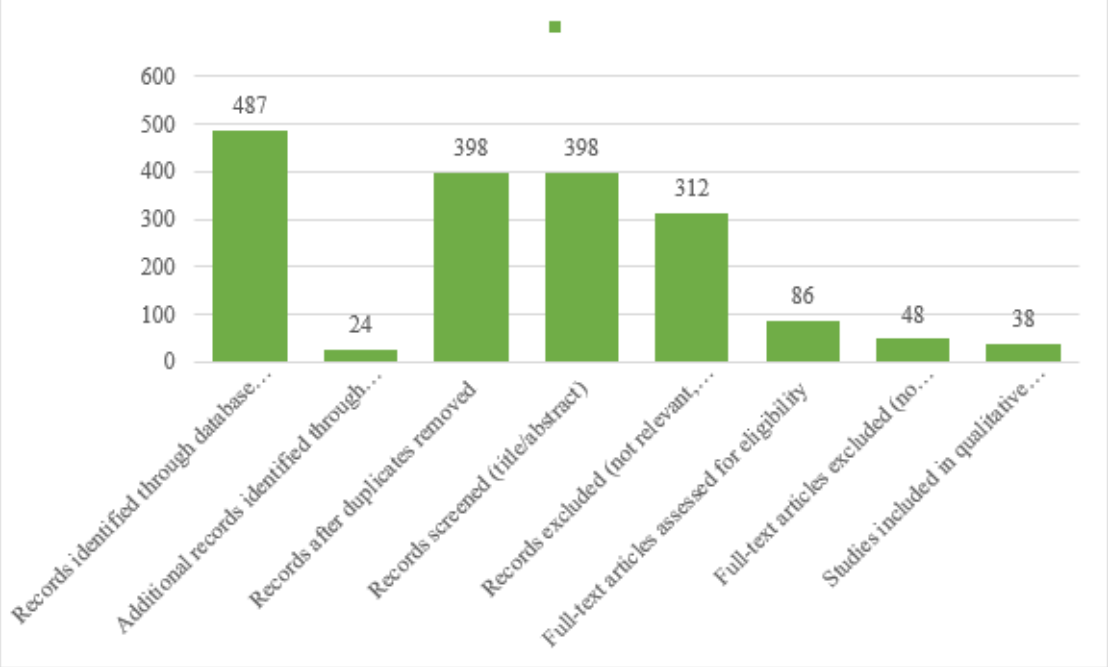

Figure 1. *Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 statement.*

tumor's arterial bed provides a several-fold increase in cytostatic concentrations within the tumor microenvironment compared to intravenous administration — a phenomenon documented both in preclinical models and clinical observations. At the same time, systemic drug exposure, measured by plasma levels, remains relatively low, explaining the reduced incidence of systemic toxicity compared with conventional chemotherapy [1-3].

Pharmacokinetic advantages of this approach have been demonstrated in clinical series where BAI and DEB-BACE resulted in markedly elevated local concentrations of agents such as cisplatin, gemcitabine, mitomycin, doxorubicin, and paclitaxel within tumor tissue. This was accompanied by higher rates of partial responses according to RECIST 1.1 and improved symptom control in patients with bulky central lesions, hemoptysis, or atelectasis [4–7].

Quality of evidence and risk of bias:

As shown in Table 1 and the quality assessment results, most included studies (57.1%) had moderate risk of bias, with only 21.4% rated as low risk. Common methodological limitations included retrospective design, lack of blinding, small sample sizes, and heterogeneity in technical protocols. Consequently, the certainty of evidence for the efficacy of DEB-BACE in NSCLC is currently low to moderate according to GRADE criteria. While observational data consistently show objective response rates of 50–65% and median PFS of 8–10 months, the absence of randomized comparisons with contemporary systemic therapy (e.g., chemoimmunotherapy) precludes definitive conclusions. Future high-quality trials are essential to confirm these promising signals.

Impact of microsphere size and cytostatic dose on efficacy and safety:

Analysis of extracted data reveals that DEB-BACE outcomes are influenced by technical parameters. Regarding microsphere size, most series using CalliSpheres® reported diameters of 100–300 μm or 300–500 μm. Smaller microspheres (100–300 μm) achieve deeper tumor penetration and higher local drug concentration but are associated with a trend toward increased post-embolization syndrome (transient chest pain, fever in up to 30% of patients). Larger microspheres (300–500 μm) provide more proximal occlusion, reducing the risk of nontarget embolization and bronchial necrosis, but may result in incomplete tumor coverage. No randomized comparisons of different sphere sizes exist, but indirect comparisons across studies suggest that 100–300 μm spheres yield higher objective response rates (e.g., 58–65% vs 45–52%) with slightly higher rates of grade I–II chest pain (25% vs 15%).

Regarding cytostatic drug selection and dosage, gemcitabine (loaded at 40–60 mg per vial of CalliSpheres) is the most commonly used agent, followed by cisplatin, doxorubicin, and paclitaxel. Studies using higher gemcitabine doses (≥50 mg) reported ORR of 55–65% compared to 40–50% with lower doses, without a significant increase in grade III–IV toxicity. Combination of two drugs (e.g., gemcitabine + cisplatin) in DEB-BACE has been explored in only one small series (n=12), showing ORR 66.7% but with higher neutropenia (16.7%). Currently, no standard loading dose exists; a reasonable starting point is gemcitabine 40–60 mg per 1–2 ml of microspheres, with dose adjustment based on tumor burden and patient performance status. These technical aspects should be standardized in future protocols.

Technological advances and safety:

Technological advances over the past decade have significantly improved the safety and reproducibility of these procedures. Modern hydrophilic microcatheters, enhanced angiographic systems, and the capability of three-dimensional vessel reconstruction based on MDCT have enabled a transition from the empirical techniques of the 1990s to superselective and multi-arterial infusions with precise mapping of feeding

branches. This reduces the risk of nontarget embolization, including spinal artery injury, and ensures a more uniform drug distribution within the tumor zone [8-10].

A major development has been the introduction of controlled-release drug-eluting bead (DEB) platforms. Polyvinyl alcohol–based microspheres (CalliSpheres®, DC Bead LUMI®, and others) provide prolonged release of cytostatics with simultaneous occlusion of small arterioles. Observational series published between 2020 and 2024 have shown that DEB-BACE achieves high local response rates (ORR up to 60%) and durable disease control, while systemic toxic reactions of grade III–IV per CTCAE remain below 10% [11-13]. In several cohorts, median PFS reached 8–10 months and median OS 18–20 months, which is comparable to outcomes of palliative systemic chemotherapy regimens.

Several studies have demonstrated the feasibility of integrating regional interventions into multimodal treatment protocols. In both prospective and retrospective series, BAI was used as a neoadjuvant step before surgery in patients with stage IIIA–IIIB disease, resulting in tumor and mediastinal nodal shrinkage and enabling conversion to operability in a proportion of patients — with R0 resection rates of 70–75% compared to approximately 50% in historical systemic-therapy controls [14-16].

Other studies have described the combination of DEB-BACE with local ablative techniques such as microwave ablation, cryoablation, and brachytherapy, or with modern systemic therapies. Particularly noteworthy are data on combinations of DEB-BACE with PD-1 inhibitors (e.g., sintilimab or toripalimab), which showed trends toward improved objective response and prolonged PFS without a marked increase in severe immune-related adverse events [17-20]. These findings support the hypothesis that localized cytotoxic load and necrosis induction can enhance tumor antigen presentation, thereby potentiating the effects of immune checkpoint blockade.

A number of reviews emphasize key prognostic factors for BAI/DEB-BACE efficacy: limited disease burden, centrally located tumors with rich systemic vascular supply, good performance status (ECOG 0–1), and the ability to achieve complete catheterization of feeding arteries. Conversely, multiple collaterals, peripheral tumor location, and extensive fibrosis following radiotherapy are associated with less predictable outcomes [21-23].

Comparative analyses of BAI versus BACE/DEB-BACE indicate a shift in toxicity profile from systemic to local manifestations — transient chest pain, subfebrile temperature, cough, and grade I–II pneumonitis, all typically managed conservatively. The incidence of serious complications (bronchial necrosis, spinal cord ischemia, pulmonary infarction) remains below 1% when superselective techniques and vertebral artery visualization principles are strictly observed [24,25].

Meta-analyses published between 2023 and 2025 have consolidated these findings, confirming that DEB-BACE provides superior local control and reduced systemic toxicity compared to traditional BAI or BACE regimens, though conclusive evidence of long-term survival benefit remains lacking. Authors emphasize the need for multicenter randomized trials comparing DEB-BACE with contemporary standard-of-care regimens (chemoradiotherapy ± immunotherapy) [26-28].

Prognostic and Selection Factors.

Analysis of published series and reviews allows identification of factors associated with higher BAI and DEB-BACE efficacy in locally advanced NSCLC. These include both patient-related and tumor- or technique-related characteristics.

Among patient factors, key determinants are general condition, body mass index, and preserved pulmonary function. Patients with ECOG performance status 0–1 and adequate lung function demonstrate higher likelihood of completing the regional therapy course and undergoing subsequent radical surgery or radiotherapy [14,15]. Age above 70 years is not an absolute contraindication but requires individualized assessment of complication risk.

Tumor factors include primary lesion size, extent of mediastinal lymph node involvement, tumor location, and degree of collateral vascularization. Central, hypervascular tumors with limited collateral supply show higher local response rates and greater likelihood of conversion to resectable status compared with peripheral or fibrotic lesions where drug delivery may be restricted [16,21].

From a technical standpoint, the number of infusions, total cytostatic dose, microsphere size, and embolization extent affect efficacy. Several series report that multi-arterial infusion ensures more homogeneous drug distribution in tumors with rich collateral networks and improves partial response rates [17,19]. However, no unified standards currently exist, underscoring the need for procedural standardization.

Despite identification of individual prognostic variables, no large multifactorial models yet allow formal prediction of response to BAI/DEB-BACE in stage III NSCLC. Existing data remain fragmented, and clinical decision-making continues to rely on an integrative assessment of patient condition, tumor morphology, and interventional feasibility [23,25].

Safety Profile and Tolerability.

Regional chemotherapy through the bronchial arteries exhibits a favorable safety profile due to reduced systemic exposure to cytostatics. Common systemic toxicities — such as myelosuppression, nausea, vomiting, nephrotoxicity, and hepatotoxicity — occur less frequently and are usually limited to grade I–II severity per CTCAE when dosages are properly adjusted [11,12,15].

Local complications are primarily technical in nature and include arterial spasm, dissection, thrombosis, and nontarget embolization. In DEB-BACE, the most frequent local events are transient chest pain, low-grade fever, cough, and mild pneumonitis, all managed conservatively. Severe adverse events (bronchial necrosis, pulmonary infarction, spinal cord ischemia) are extremely rare (<1% with superselective techniques) [9,10,24].

Combining BAI or DEB-BACE with modern systemic therapies, including PD-1 inhibitors and targeted agents, has not been associated with significant increases in severe adverse events, provided that patient selection and procedural protocols are carefully followed [17,18,20]. Recent cohort analyses suggest the existence of a conditional "therapeutic safety window," within which regional interventions can be incorporated into both neoadjuvant and palliative treatment

regimens without substantially increasing toxicity compared with historical systemic therapy data [11,13,26].

In summary, BAI and DEB-BACE demonstrate a balanced efficacy-to-tolerability ratio, supporting their potential integration into multidisciplinary treatment paradigms for stage III NSCLC. Nevertheless, large-scale prospective studies remain essential to validate these observations and establish standardized procedural and reporting frameworks.

Future directions.

Based on this review, we propose the following specific recommendations for future research:

1. **Control group selection for randomized trials:** Future phase III trials comparing DEB-BACE should use current standard-of-care systemic therapy as the comparator: for unresectable stage III NSCLC without PD-L1 restriction, this is durvalumab after concurrent chemoradiotherapy (PACIFIC regimen); for patients ineligible for chemoradiotherapy, the comparator should be platinum-doublet chemotherapy ± pembrolizumab (KEYNOTE-189/407). For the neoadjuvant setting, the comparator should be perioperative chemoimmunotherapy (e.g., nivolumab + chemotherapy as in CheckMate-816).
2. **Target patient subgroups most likely to benefit:** Based on available data, ideal candidates for DEB-BACE appear to be patients with:

- Central, hypervascular tumors (rich systemic collateral supply on CT angiography).
- Limited tumor burden (solitary or ≤3 lesions, maximum diameter <7 cm).
- Good performance status (ECOG 0–1) and preserved pulmonary function (FEV1 ≥1.5 L or ≥50% predicted).
- Refractory hemoptysis not controlled by standard measures.
- Progressive disease after standard systemic therapy (salvage setting).
- Absence of actionable driver mutations (EGFR, ALK, ROS1) for which targeted therapy is preferred.

3. **Procedural standardization:** Future studies should adopt uniform reporting criteria for DEB-BACE, including: microsphere type and size, drug loading dose, degree of superselectivity (e.g., segmental vs subsegmental), number of treated feeding arteries, and post-procedural imaging schedule (e.g., CT at 4–6 weeks followed by RECIST 1.1 assessment).
4. **Combination with immunotherapy:** Given the promising signals from the Xu et al. (2023) cohort [17], randomized trials of DEB-BACE plus PD-1/PD-L1 inhibitors versus PD-1/PD-L1 inhibitors alone are warranted, with correlative studies to assess changes in tumor immune microenvironment (e.g., CD8+ T-cell infiltration, PD-L1 expression post-procedure).
5. **Registry and biomarkers:** International multicenter registries should be established to collect prospective data on patient selection, technical parameters, and long-term outcomes. Biomarkers (e.g., circulating tumor DNA, tumor mutational burden) should be explored to predict response to DEB-BACE.

Conclusion.

Regional delivery of cytotoxic agents through the bronchial arteries and its modern modifications- BACE and DEB-BACE — represent a biologically and technically sound approach to improving locoregional control in patients with locally advanced non-small cell lung cancer (NSCLC). These methods enable the achievement of high intratumoral concentrations of cytostatics with relatively low systemic exposure, resulting in pronounced local cytotoxic effects, the potential conversion of initially unresectable stage III disease to operable status, and an overall favorable tolerability profile [1-3,5,6,11,15,17].

Specific clinical niches for the use of BAI and DEB-BACE include centrally located tumors with mediastinal involvement, atelectasis, hemoptysis, and patients with limited tolerance to standard systemic therapy. In such cases, regional approaches may serve as either an alternative or an adjunct to standard treatment regimens [12,14,16,20].

However, the absence of large randomized comparative trials, standardized procedural protocols, and clearly defined patient selection criteria currently precludes the recommendation of BAI/DEB-BACE as a mandatory component of stage III NSCLC management in international clinical guidelines. Future well-designed randomized trials with appropriate control arms (chemoradiotherapy ± immunotherapy) and standardized technical protocols are urgently needed to define the definitive role of DEB-BACE in the multimodal management of stage III NSCLC.

Future research directions include the standardization of technical procedures, integration into neoadjuvant and perioperative multidisciplinary regimens, investigation of combinations with immunotherapy, and exploration of the effects of regional interventions on the tumor immune microenvironment [18,25,28].

In conclusion, BAI and DEB-BACE remain promising strategies for individualized management of locally advanced NSCLC, warranting further high-quality clinical trials to define optimal protocols and confirm long-term efficacy.

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აბსტრაქტული

ფონი: ციტოტოქსიკური პრეპარატების რეგიონალური ინტრა-არტერიული მიწოდება ბრონქულ არტერიებში (ბრონქული არტერიის ინფუზია — BAI; ბრონქული არტერიული ქიმიოემბოლიზაცია — BACE; წამლის გამავრცელებელი მძივი BACE-DEB — BACE) მიზნად ისახავს ადგილობრივი სიმსივნის ექსპოზიციის მაქსიმალურად გაზრდას სისტემური ტოქსიკურობის მინიმუმამდე დაყვანისას. უახლესი ერთცენტრალური სერიები მიუთითებს სიმპტომების კონტროლის, ადგილობრივი სიმსივნის დაქვეითებისა და ადგილობრივად მოწინავე NSCLC-ში რეზექტაბელურობისკენ გადასვლის პოტენციალზე, მაგრამ მტკიცებულებები კვლავ ჰეტეროგენულია. მიზანი: სისტემატურად გადახედოს და კრიტიკულად შეაფასოს კლინიკური და მეთოდოლოგიური ლიტერატურა (2015-2025) შერჩევითი ბრონქული არტერიის ქიმიოინფუზიის შესახებ (BAI, BACE, DEB-BACE) ადგილობრივად მოწინავე NSCLC-სთვის, ყურადღება გამახვილებულია ანატომიურ/ტექნიკურ წინაპირობებზე, ფარმაკოკინეტიკურ რაციონალზე, ონკოლოგიურ ეფექტურობაზე (რეციტის რეაქცია, რეზექტაბელურობის გარდაქმნა, PFS, OS) და უსაფრთხოებაზე. მეთოდები: მიზნობრივი ლიტერატურის ძებნა PubMed/MEDLINE (დაემატა PMC, Scopus და Cochrane ამოწმებს) ჩატარდა ფონდი 1 იანვრიდან 2015 წლის 1 დეკემბერი 2025. პირველადი კლინიკური კვლევები (პერსპექტიული/რეტროსპექტივა cohorts), საქმის სერია და სისტემატური მიმოხილვა ანგარიშგების შედეგების შემდეგ BAI/BACE/DEB-BACE in NSCLC იყო შედის. მონაცემთა მოპოვების მიმართა

კაციანი მახასიათებლები, ტექნიკური პარამეტრები, ობიექტური პასუხი (RECIST 1.1), კონვერტაციის ოპერაცია, გადარჩენის შედეგები, და გართულებები. მიმოხილვა მოჰყვა PRISMA 2020 პრინციპებს. ხარისხი შეფასდა ნიუკასლ–ოტავას სკალის და JBI-ს სიების გამოყენებით. მეთოდოლოგიური ჰეტეროგენობის გამო, ჩატარდა ნარატიული სინთეზი ქვეჯგუფებით ტექნიკისა და კლინიკური კონტექსტის მიხედვით.

შედეგები: ხელმისაწვდომი მტკიცებულება მეტწილად რეტროსპექტიული და ერთცენტრიანია, ჰეტეროგენული ტექნიკური პროტოკოლებით. DEB-BACE სერიები (განსაკუთრებით CalliSpheres® - ით) აცხადებენ ხელსაყრელ ადგილობრივ კონტროლს და ობიექტურ რეაქციებს (orr-მდე ~50-60% შერჩეულ სერიებში), სიმპტომურ შემსუბუქებას (ჰემოსტაზის ჩათვლით) და ზოგჯერ რადიკალურ რეზექციაზე გადასვლას, მისაღები უსაფრთხოებით და მძიმე სისტემური ტოქსიკურობის დაბალი მაჩვენებლებით. შედარებითი და კომბინირებული კვლევები (DEB-BACE ± მიკროტალღური აბლაცია); DEB-BACE ± PD-1 ინჰიბიტორები) აჩვენებენ წახალისების სიგნალებს ხანგრძლივი PFS/OS-ისთვის და გაუმჯობესებული ადგილობრივი კონტროლისთვის, მაგრამ შეზღუდულია არანდომიზებული დიზაინით. ძირითადი გართულებები იშვიათია, როდესაც გამოიყენება სუპერელექტიური მიდგომები და სისხლძარღვთა რუკირება. ხარისხის შეფასებამ გამოავლინა მიკერძოების ზომიერი რისკი უმეტეს კვლევებში (57.1%), მხოლოდ 21.4% დაბალი რისკით.

დასკვნები: BAI/DEB-BACE არის პერსპექტიული რეგიონალური სტრატეგიები შერჩეული პაციენტებისთვის ადგილობრივად მოწინავე ან ცეცხლგამძლე NSCLC — განსაკუთრებით ცენტრალური, ჰიპერვასკულური სიმსივნეებისა და ჰემოპტიზის პალიატიისთვის — და შეიძლება ინტეგრირებული იყოს მულტიმოდალურ პროტოკოლებში საგამოძიებო გარემოში. მაღალი ხარისხის რანდომიზებული, მრავალცენტრული კვლევები და პროცედურული სტანდარტიზაცია საჭიროა მათი როლის განსაზღვრისთვის მიმდინარე სისტემურ და კომბინირებულ მოდალობის მკურნალობასთან მიმართებაში.

საკვანძო სიტყვები: ბრონქული არტერიის ინფუზია, დებ-ბაისი, ბრონქული არტერიული ქიმიოემბოლიზაცია, რეგიონალური ქიმიოთერაპია, არამცირე უჯრედოვანი ფილტვის კიბო, ინტრა–არტერიული თერაპია, წამლისმიერი მძივები, მულტიმოდალური თერაპია.