·指南·共识·解读·

# 中国慢性癌症相关性疼痛诊疗指南（2024版）

中国慢性癌症相关性疼痛诊疗指南制订专家组，中国老年保健协会疼痛病学分会
程志祥[1] 马柯[2] 王建秀[3] 王德全[4] 师存伟[5] 刘金锋[6] 刘海鹏[7] 宋涛[8] 张宝娟[9] 林学武[10] 周华成[11] 宛春甫[12] 曹汉忠[13] 舒雅[14] 樊肖冲[15] 刘延青[16]
[1]南京医科大学第二附属医院疼痛科，南京市 210011；[2]上海交通大学医学院附属新华医院疼痛科，上海市 200092；[3]淄博市中心医院疼痛科，山东省淄博市 255020；[4]新疆维吾尔自治区人民医院疼痛科，乌鲁木齐市 830011；[5]青海大学附属医院疼痛科，西宁市 810012；[6]哈尔滨医科大学附属第二医院疼痛科，哈尔滨市 150086；[7]甘肃省人民医院疼痛科，兰州市 730099；[8]中国医科大学附属第一医院疼痛科，沈阳市 110002；[9]济宁市第一人民医院疼痛科，山东省济宁市 272002；[10]蚌埠医科大学第一附属医院疼痛科，安徽省蚌埠市 233099；[11]哈尔滨医科大学附属第四医院疼痛科，哈尔滨市 150001；[12]河北医科大学第四医院疼痛科，石家庄市 050011；[13]南通大学附属肿瘤医院（南通市肿瘤医院）疼痛科，江苏省南通市 226006；[14]西安医学院第一附属医院疼痛科，西安市 710077；[15]郑州大学第一附属医院疼痛科，郑州市 450052；[16]首都医科大学附属北京天坛医院疼痛科，北京 100050
所有作者对本文有同等贡献（除了执笔者和通信作者外，其他作者按照姓氏笔画排序）
执笔者：程志祥，Email: zhixiangcheng@njmu.edu.cn
通信作者：刘延青，Email: lyqttyy@126.com

**【摘要】** 慢性癌症相关性疼痛是严重危害癌症患者身心健康的一类疾病。消除癌痛是癌症患者的基本权益，控制和消除癌痛是医护人员的职责。本指南专家组依据国内外近10年来发表的慢性癌症相关性疼痛诊疗高质量循证医学研究证据，经严格论证和专家投票，对常见的慢性癌症相关性疼痛治疗方法形成推荐意见，旨在为慢性癌症相关性疼痛规范诊疗提供参考。

**【关键词】** 慢性癌症相关性疼痛；癌痛；指南
DOI: 10.3760/cma.j.cn101658-20240815-00115

**A Chinese guideline for the diagnosis and treatment of chronic cancer-related pain (2024 edition)**

*Expert Group for the Development of Chinese Chronic Cancer-related Pain Diagnosis and Treatment Guidelines, Society of Painology, Chinese Aging Well Association*
*Cheng Zhixiang[1], Ma Ke[2], Wang Jianxiu[3], Wang Dequan[4], Shi Cunwei[5], Liu Jinfeng[6], Liu Haipeng[7], Song Tao[8], Zhang Baojuan[9], Lin Xuewu[10], Zhou Huacheng[11], Wan Chunfu[12], Cao Hanzhong[13], Shu Ya[14], Fan Xiaochong[15], Liu Yanqing[16]*
*[1]Department of Painology, The Second Affiliated Hospital of Nanjing Medical University, Nanjing City, Jiangsu Province 210011, China; [2]Department of Painology, Xinhua Hospital affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai City 200092, China; [3]Department of Painology, Zibo Central Hospital, Zibo City, Shandong Province 255020, China; [4]Department of Painology, People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi City, Xinjiang Uygur Autonomous Region 830011, China; [5]Department of Painology, Qinghai University Affiliated Hospital, Xining City, Qinghai Province 810012, China; [6]Department of Painology, The Second Affiliated Hospital of Harbin Medical University, Harbin City, Heilongjiang Province 150086, China; [7]Department of Painology, Gansu Provincial Hospital, Lanzhou City, Gansu Province 730099,*

*China; [8]Department of Painology, The First Hospital of China Medical University, Shenyang City, Liaoning Province 110002, China; [9]Department of Painology, The First People's Hospital of Jining City, Jining City, Shandong Province 272002, China; [10]Department of Painology, The First Affiliated Hospital of Bengbu Medical University, Bengbu City, Anhui Province 233099, China; [11]Department of Painology, The Fourth Affiliated Hospital of Harbin Medical University, Harbin City, Heilongjiang Province 150001, China; [12]Department of Painology, The Fourth Hospital of Hebei Medical University, Shijiazhuang City, Hebei Province 050011, China; [13]Department of Painology, Nantong Tumor Hospital, Nantong University, Nantong City, Jiangsu Province 226006, China; [14]Department of Painology, The First Affiliated Hospital of Xi'an Medical University, Xi'an City, Shaanxi Province 710077, China; [15]Department of Painology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou City, Henan Province 450052, China; [16]Department of Painology, Beijing Tiantan Hospital, Capital Medical University, Beijing City 100050, China*

*All authors contributed equally to the article (Except for the author and corresponding author, other authors are sorted by stroke of their surname)*

*Writer: Cheng Zhixiang, Email: zhixiangcheng@njmu.edu.cn*

*Corresponding author: Liu Yanqing, Email: lyqttyy@126.com*

**【Abstract】** Chronic cancer-related pain can seriously damage physical and mental health of cancer patients. Eliminating cancer pain is basic right of cancer patients, controlling and eliminating cancer pain is the responsibility of medical staff. Based on high quality evidence of medical researches on the diagnosis and treatment of chronic cancer-related pain published domestically and internationally in the past 10 years, the expert group has formed recommendations for common treatment methods through rigorous argumentation and expert voting, to provide references for standardized diagnosis and treatment of chronic cancer-related pain.

**【Key words】** Chronic cancer-related pain; Cancer pain; Guideline

DOI: 10.3760/cma.j.cn101658-20240815-00115

慢性癌症相关性疼痛(chronic cancer-related pain, CCRP)严重危害患者身心健康,加速疾病进展,恶化生理功能,甚至被迫中断抗肿瘤治疗,导致生存期缩短[1]。相比死亡,癌症患者更恐惧癌痛。消除癌痛是癌症患者的合理诉求和基本权益,控制和消除癌痛是医护人员的职责。虽然国内外学术组织、机构或专家团队已经发布了很多针对CCRP管理的原则、规范、专家共识及临床指南,但完全基于国际疾病分类-11(International Classification of Diseases-11, ICD-11)的CCRP临床诊疗指南未见公布。为进一步提升CCRP诊疗服务能力,满足临床诊疗需求,我们组织国内疼痛学科领域的相关专家制订了《中国慢性癌症相关性疼痛诊疗指南》。需要注意的是,由于篇幅所限,本指南无法涵盖CCRP诊疗每一个方面的所有细节。

## 指南的制订方法

文献检索时限为2014年1月至2024年5月。中文检索词包括癌痛、癌症相关性疼痛、内脏癌性疼痛、骨性癌性疼痛、神经病理性癌性疼痛、癌症药物治疗后疼痛、放射治疗后疼痛、癌症术后疼痛、癌性爆发痛等,英文检索词包括cancer pain, chronic cancer-related pain, chronic post-cancer treatment pain, visceral cancer pain, bone cancer pain, neuropathic cancer pain, post-cancer medicine pain, post-radiotherapy pain, post-cancer surgery pain, breakthrough cancer pain等,系统检索了万方、知网、PubMed、Cochrane Library等国内外知名数据库,主要选择系统评价(systematic review)、Meta分析(Meta analysis)、随机对照试验(randomized controlled trial, RCT)、专家共识(consensus)、临床指南(guideline)等高质量循证医学证据文献,采用推荐分级的评估、制订与评价(Grading of Recommendations Assessment, Development and Evaluation, GRADE)分级系统证据质量分级及推荐强度(表1)和共识会议法,经过多次反复讨论,并进行在线投票,最终制订本指南[2-4]。

## 慢性癌症相关性疼痛概述

### 一、CCRP的定义

CCRP是由癌症本身或转移所致的疼痛以及癌

症治疗引起的慢性疼痛[5-6]。

二、CCRP的流行病学

CCRP在癌症的各个阶段均可出现，约25.0%新诊断恶性肿瘤患者，75.0%转移性癌症患者和59.0%目前正在接受抗癌治疗的患者报告疼痛，且1/3的患者即使在完成根治治疗后仍感到疼痛[7]。在患有晚期癌症、濒临死亡的患者中，有66.0%的患者经历过疼痛，55.0%的患者为中至重度疼痛[5-6]。

三、分类[5-6]

根据疼痛的原因，CCRP分为慢性癌性疼痛（chronic cancer pain, CCP）和慢性癌症治疗后疼痛（chronic post-cancer treatment pain, CPCTP）（图1）。

1. CCP 主要包括慢性内脏癌痛（chronic visceral cancer pain, CVCP）、慢性骨性癌痛（chronic bone cancer pain, CBCP）、慢性神经病理性癌痛（chronic neuropathic cancer pain, CNCP）等。

(1) CVCP 指原发肿瘤和肿瘤转移损伤了头颈部或胸腹盆腔内的内脏器官所引起的慢性疼痛。例如肝转移灶、胰腺肿瘤侵犯腹腔神经丛所致的疼痛，食管或肺肿瘤局部进展所致的胸骨后疼痛。

(2) CBCP 指由原发肿瘤和肿瘤转移破坏或损伤骨骼引起的慢性疼痛，是最常见的CCP类型。由于原发性骨肿瘤比较罕见，所以其他部位肿瘤转移到骨骼所致的疼痛是最常见的CBCP类型。

(3) CNCP 指由原发肿瘤或肿瘤转移破坏或损伤外周或中枢神经系统引起的慢性疼痛。慢性外周性神经病理性癌性疼痛包括胸部原发或转移性肿瘤破坏臂丛神经，或腹盆腔肿瘤损伤腰骶神经丛等。脊髓压迫（癌症骨转移导致的椎体塌陷）可导致慢性中枢性神经病理性癌性疼痛。

2. CPCTP 主要包括癌症药物治疗后的慢性疼痛（chronic post-cancer medicine pain, CPCMP）、慢性放射治疗后疼痛（chronic post-radiotherapy pain, CPRP）、慢性癌症术后疼痛（chronic post-cancer surgery pain, CPCSP）等。

(1) CPCMP 指由任何抗癌药物引起的慢性疼痛，包括全身化疗、激素治疗和生物治疗等使用的药物。慢性痛性化疗后多发神经病变（chronic painful

**表1** GRADE系统证据质量分级及推荐强度说明

| 级别 | 说明 |
|---|---|
| 证据质量 | |
| 高质量(A) | 非常有把握估计值接近真实值 |
| 中等质量(B) | 对估计值有中等把握：估计值有可能接近真实值，但也有可能差别很大 |
| 低质量(C) | 对估计值的把握有限：估计值可能与真实值有很大差别 |
| 极低质量(D) | 对估计值几乎没有把握：估计值与真实值极大可能有很大差别 |
| 推荐强度 | |
| 强推荐(1) | 大部分患者在此种情况下会选择使用推荐方案，只有少数患者不会；大多数医生应该接受干预措施；70%以上专家组成员赞成 |
| 弱推荐(2) | 大部分患者在此种情况下会选择使用推荐方案，还有很多患者不会；医生亲自仔细查找证据或证据摘要，准备与患者就证据以及他们的价值观和意愿进行讨论；50%～70%专家组成员赞成 |
| 没有明确推荐意见(3) | 利弊相当；未确定目标人群；制订推荐意见的证据不足；50%以下专家组成员同意 |

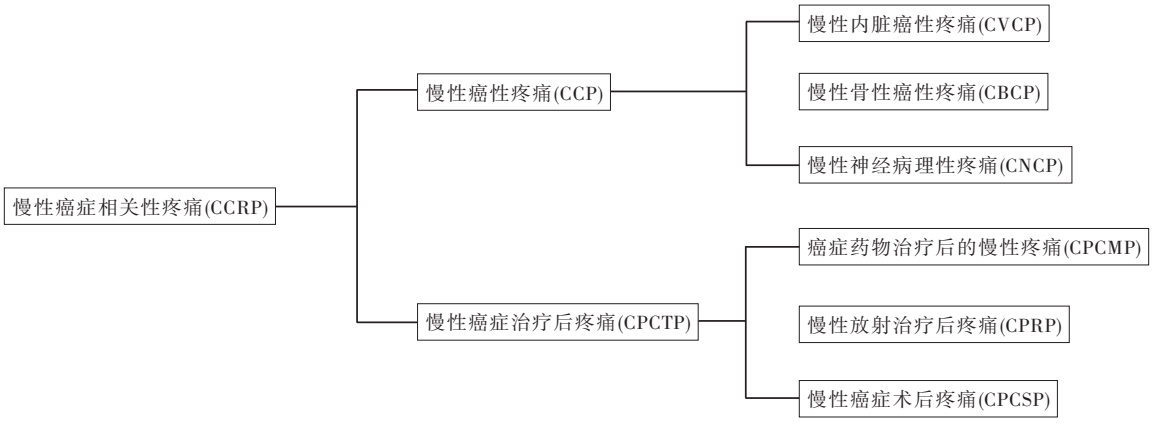


**图1** 慢性癌症相关性疼痛的分类

chemotherapy-induced polyneuropathy, CIPN）是ICD-11的一个诊断类别。在接受激素治疗的女性乳腺癌患者中，45%伴有慢性关节痛，表现为对称性的关节疼痛，最常见的部位是手腕、双手和膝盖。慢性痛性化疗后神经病变（chronic painful chemotherapy-induced neuropathy, CPCIN）是指由于治疗原发肿瘤或肿瘤转移采用了口服或静脉化疗而引起的慢性周围性神经病理性疼痛。

(2) CPRP　指对原发肿瘤或转移性肿瘤进行放射治疗时，照射野内神经、骨骼或软组织的延迟性损害所致的慢性疼痛。这类疼痛的发生可始于放疗结束后几个月内或数年后，发生的危险因素包括总治疗剂量过大、每次放疗剂量过大以及联合使用手术或化疗治疗。

(3) CPCSP　指癌症手术或有创操作（组织活检或胸引流管插入）引起的疼痛。乳腺癌术后（乳房切除术后疼痛）或肺癌术后（开胸后疼痛）尤为常见。

## 慢性癌症相关性疼痛的发生机制

CCRP发生机制复杂且独特，涉及肿瘤组织、正常组织、肿瘤微环境、神经系统及免疫系统之间的相互作用[8-9]。

一、癌症相关伤害性疼痛机制

癌症发生、发展过程中的肿瘤组织浸润、压迫和转移会产生前列腺素E2、缓激肽、P物质、肿瘤坏死因子等炎症因子，通过直接与受体或离子通道相互作用，支配癌症组织的外周感觉神经引起疼痛[9]。癌症骨转移相关的疼痛可由溶骨性病变或溶骨性侵袭诱发，骨破坏过程中分泌大量的炎症因子，从而刺激敏感的神经纤维，导致严重疼痛[10]。

二、癌症相关神经病理性疼痛机制

癌症影响到躯体感觉神经系统改变是主要机制，肿瘤细胞直接侵袭神经周围或通过免疫细胞侵袭，瘤体直接压迫神经，甚至放疗和化疗的影响以及癌症的手术治疗等因素均可引起神经损伤，可能导致轴突运输中断，离子通道和受体活性变化，神经元损伤和炎症，氧化应激和线粒体损伤等改变，进一步导致外周和中枢神经系统敏化，诱发神经病理性疼痛[9, 11]。

三、其它机制

如癌症相关内脏疼痛，患者心理状态改变，压力增加等也是导致CCRP的重要机制[12]。

## 慢性癌症相关性疼痛的临床特点

一、持续慢性疼痛，伴随整个病程，夜间痛和静息痛为其特点。

二、常伴有严重的难以忍受的爆发痛。

三、常呈现全方位疼痛（total pain），包括躯体的、心理的、精神的、社会的等多种表现。

## 慢性癌症相关性疼痛的辅助检查

一、实验室检查

血常规、肝肾功能、电解质、凝血功能、肿瘤标志物等。

二、影像学检查

1. X线检查　空间分辨率很高，但密度分辨率不足，适用于骨和含气组织的显像，主要用于识别骨折等。

2. 计算机化X线体层照相（CT）　可清晰显示人体多数组织和器官，包括骨骼等。注射造影剂进行强化，可进一步提高组织密度和分辨率。

3. 磁共振成像（MRI）　更适合软组织（组织对比度更佳）和神经组织检查，常用于椎管受侵的识别。

4. 正电子发射计算机断层扫描（PET）　高效、安全、无创，保证诊断准确性，在疑似多发性转移病例中具有优势。

5. 单光子发射计算机断层显像（ECT）　不仅显示脏器或病变组织的形态结构，还提供脏器或病变的功能和代谢信息，对转移性骨肿瘤有很高的灵敏度。

6. 超声　不仅可观察内脏的细微结构和功能状态，而且可实时观察肌肉、肌腱的运动情况，在腹部、盆腔及四肢软组织疾病的诊断中发挥重要作用。

7. 医用红外热成像　借助于敏感的体表温度变化，进行双侧对比观察，可早期发现能够引起体表温度变化的病变，如血管运动不良、炎症、肿瘤等。

## 慢性癌症相关性疼痛的诊断标准与疼痛评估

一、诊断标准

1. 有明确癌症病史。

2. 如无明确的病理学诊断，需有癌症临床表现，并有影像学、实验室检查等证据。

3. 患者的疼痛是源于肿瘤的发生发展或治疗所

引发。

二、疼痛评估

癌痛评估是CCRP获得合理、有效治疗的前提。

1. 评估原则[13]

(1) 首诊评估 首次接诊癌症患者时医护人员须筛查和评估疼痛。

(2) 常规评估 每日进行1次评估。

(3) 量化评估 采用疼痛强度评估量表,量化并记录患者描述的疼痛强度。

(4) 全面评估 评估疼痛类型、发作情况、诱发因素、治疗效果等。

(5) 动态评估 接诊后对癌痛患者持续疼痛评估,包括门诊就诊、住院期间、出院后,以及癌痛治疗实施前后疼痛变化。

2. 评估工具

根据患者个人情况不同,采用合适的疼痛强度评估量表,记录患者疼痛强度,必要时可进行心理状态评估。常用疼痛评估工具包括[13]:

(1) 数字分级评分法(numerical rating scale, NRS)。

(2) 视觉模拟评分法(visual analogue scale, VAS)。

(3) 面部表情评分量表(faces pain scale, FPS)。

(4) 简明疼痛评估量表(brief pain inventory, BPI)。

(5) 心理痛苦温度计(distress thermometer, DT)。

(6) 健康问卷抑郁量表(patient health questionnaire-9, PHQ-9)。

(7) 广泛性焦虑自评量表(generalized anxiety disorder-7, GAD-7)。

## 慢性癌症相关性疼痛的治疗

一、治疗原则与目标

1. 治疗原则

CCRP发病机制复杂,需要根据疼痛的病因、特点和患者身体情况进行个体化治疗[14-15]。世界卫生组织(World Health Organization, WHO)提出的癌痛三阶梯药物治疗原则仍是目前控制癌痛的主要方式[16]。实施标准化的疼痛评估、规范化治疗[17]、安宁疗护(姑息治疗)[18-19]可有效缓解疼痛,提高生活质量。

2. 治疗目标

癌痛控制的"5A"目标[14-15]:

(1) 镇痛(analgesia) 优化镇痛(缓解疼痛)。

(2) 活动(activities) 优化日常生活活动(心理社会功能)。

(3) 不良反应(adverse effects) 尽量减少不良事件。

(4) 异常用药(aberrant behavior) 监控异常的药物使用行为。

(5) 情绪(affect) 疼痛与情绪之间的关系。

二、治疗方法

CCRP治疗首先是病因治疗,尤其是抗肿瘤治疗,再采取针对性的个体化镇痛治疗,如一般治疗、药物治疗、物理治疗、中医治疗、心理治疗、数字医疗、微创介入治疗等[20]。

1. 一般治疗

一般治疗主要包括健康教育、自我管理等(表2)。

(1) 健康教育 对患者及其家属进行健康教育的内容主要包括治疗目标、治疗方法、可能出现的不良反应等。健康教育可培养患者良好的自我控制能力,提高患者的治疗依从性,显著减少疼痛发作的强度和频率,提高患者的生活质量[21]。

(2) 自我管理 癌痛自我管理是指患者管理自己的疼痛,将疼痛缓解策略融入日常生活的过程[21]。有效的癌痛管理不仅需要医护人员的专业指导,还需要患者自身的积极参与和自我管理。

**表2** 一般治疗的循证医学证据质量分级及推荐强度

| 治疗方式 | 证据级别 | 推荐强度 |
|---|---|---|
| 健康教育[22-24] | A | 1 |
| 自我管理[25-27] | A | 1 |

2. 药物治疗

(1) 概述

药物治疗是CCRP治疗最为重要和常用的方法,规范、有效的药物治疗能够缓解80%~90% CCRP。强效阿片类药物是CCRP治疗的基石,吗啡是强效阿片类药物的金标准[28]。

(2) 癌痛治疗的药物种类

用于CCRP治疗的药物主要有镇痛药物和辅助镇痛药物。

① 镇痛药物(表3[28-29, 41-71])

A. 非甾体类抗炎药(non-steroidal anti-inflammatory drugs, NSAIDs) 如塞来昔布、布洛芬、吲哚美辛、双氯芬酸、右酮洛芬氨丁三醇[29]等。

B. 阿片类药物 吗啡、羟考酮、芬太尼等。吗啡或羟考酮是中重度CCRP治疗的一线口服阿片类

药物[28, 30]。与口服阿片类药物相比，使用透皮芬太尼治疗中重度CCRP具有更多优势[31-32]，因而经皮给药是阿片稳定需求患者的最佳治疗选择[33]。芬太尼透皮贴剂优选人群主要有：不能或不愿经口服给药、中重度肝肾功能不全、恶性肠梗阻、慢性便秘及顽固性便秘、口服阿片类药物出现不可耐受的严重恶心及呕吐、对口服药依从性差的人群等[34]。

C. 生物毒素　眼镜蛇神经毒素、河豚毒素[35-36]、肉毒杆菌毒素[37-38]等。中华眼镜蛇神经毒素被制备成镇痛药物，用于CCRP的治疗[39-40]。

② 辅助镇痛药物（表4[43, 63, 74-85]）

A. 钙离子通道药物　加巴喷丁、普瑞巴林等。

B. 三环类抗抑郁药物　阿米替林、多塞平等。

C. 5-羟色胺和去甲肾上腺素再摄取抑制剂（serotonin-norepinephrine reuptake inhibitors, SNRIs）　度洛西汀、文拉法辛等。

D. 其他药物　利多卡因、辣椒素、氯胺酮、糖皮质激素、汉防己甲素、脾多肽注射液等[72-73, 82-84]。

(3) 阿片类药物剂量转换、滴定、常见不良反应及处理方法、使用原则

① 阿片类药物剂量转换（表5）

阿片类药物轮换是指用一种阿片类药物替代另一种阿片类药物，或者是同一阿片类药物不同剂型之间的转换，以寻求疼痛控制和不良反应之间的平衡。阿片类药物轮换能够提高患者镇痛效果及患者满意度[86]。

② 阿片类药物剂量滴定原则

A. 目的是尽快有效镇痛，按需给药治疗爆发痛。

B. 滴定应简单、灵活，提倡采用短效药物滴定与控缓释剂型相结合的原则，实现对基础性疼痛和

**表3**　镇痛药物循证医学证据质量分级及推荐强度

| 药物种类 | 药物名称 | CVCP | CNCP | CPCMP | CPRP |
|---|---|---|---|---|---|
| NSAIDs | 吲哚美辛[29, 41] | | | B2 | B2 |
| | 双氯芬酸[29, 42-43] | B2 | | | B2 |
| 类阿片类 | 曲马多[44-45] | A2 | | | |
| 弱阿片类 | 可待因[46] | A2 | | | |
| 强阿片类 | 吗啡[30, 47-49] | A1 | | | |
| | 羟考酮[28, 47, 49-52] | A1 | | | |
| | 芬太尼[32, 47-48, 53] | A1 | | | |
| | 氢吗啡酮[54-57] | A1 | | | |
| | 丁丙诺啡[47, 58] | A2 | | | |
| | 美沙酮[59-64] | B2 | B2 | | B2 |
| | 地佐辛[45, 65-66] | B2 | | | |
| 复合止痛 | 羟考酮纳洛酮缓释片[67-70] | A1 | | | |
| | 氨酚羟考酮片[71] | B2 | | | |

注：CVCP为慢性内脏癌性疼痛，CNCP为慢性神经病理性癌痛，CPCMP为癌症药物治疗后的慢性疼痛，CPRP为慢性放射治疗后疼痛，NSAIDs为非甾体抗炎药物

**表4**　辅助镇痛药物循证医学证据质量分级及推荐强度

| 药物种类 | 药物名称 | CVCP | CNCP | CPCMP | CPRP | CPCSP |
|---|---|---|---|---|---|---|
| 钙离子通道药物 | 加巴喷丁[63, 74] | A2 | | | B2 | |
| | 普瑞巴林[63, 74-78] | A1 | A1 | A1 | A1 | |
| 三环类抗抑郁药物 | 阿米替林[43, 74] | B2 | | | B2 | |
| | 多塞平[43, 77] | | | B2 | B2 | |
| SNRIs | 度洛西汀[75-76, 79-81] | | A1 | A1 | | |
| | 文拉法辛[74, 79] | A2 | | B2 | | |
| 其他 | 利多卡因[82] | B2 | | | | |
| | 辣椒素[83-84] | B2 | | | | B2 |
| | 氯胺酮[63, 85] | B2 | | | B2 | |

注：CVCP为慢性内脏癌性疼痛，CNCP为慢性神经病理性癌痛，CPCMP为癌症药物治疗后的慢性疼痛，CPRP为慢性放射治疗后疼痛，CPCSP为慢性癌症术后疼痛，SNRIs为去甲肾上腺素再摄取抑制剂

爆发痛的控制。

C. 当需要快速剂量滴定时，推荐使用快速起效的短效药物，优先推荐使用经皮下或静脉途径给药。

D. 阿片类药物滴定是实现中度至重度癌症疼痛缓解和可耐受不良反应平衡的最佳方法，快速剂量滴定有助于实现早期镇痛[87]。

③ 阿片类药物常见不良反应及处理方法（表6[88]）。

④ 阿片类药物使用原则

A. 癌痛药物治疗的5项基本原则：无创给药（口服、皮肤或粘膜）、按时给药、按阶梯给药、个体化用药及细节化用药。

B. 其他原则：尽早应用、改变给药途径、阿片类药物转换、联合用药等。

(4) 癌痛三阶梯药物治疗原则

① 第一阶梯　针对轻度疼痛，使用非阿片类药物，如NSAIDs等。这些药物存在最大有效剂量的问题，即所谓的“天花板效应”。

② 第二阶梯　对于中度疼痛，使用弱阿片类药物，如可待因、曲马多等，并可与NSAIDs联合使用。弱阿片类药物也存在“天花板效应”。

③ 第三阶梯　重度疼痛的治疗则使用强阿片类药物，如吗啡等，且没有“天花板效应”。这类药物可以持续增加剂量。

3. 物理治疗

物理治疗主要包括光生物调节疗法（photobiomodulation therapy, PBMT）、低能量激光治疗（low-level laser therapy, LLLT）、经皮神经电刺激（transcutaneous electrical nerve stimulation, TENS）、加扰器疗法（scrambler therapy, ST）、经颅直流电刺激（transcranial direct current stimulation, tDCS）、手法治疗（manual therapy, MT）、运动疗法、立体定向放疗（stereotactic body radiotherapy, SBRT）、MRI引导聚焦超声（magnetic resonance-guided focused ultrasound, MRgFUS）、放射性核素等，在CCRP治疗中应用广泛（表7[89-109]）。

4. 中医治疗

基于辩证论治的理论，CCRP中医治疗主要有中医内治和外治法。

(1) 中医内治法　主要包括中药汤剂和中成药两种形式，可以止痛并改善阿片类药物不良反应，作为癌痛辅助治疗方法。见表8[110-114]。

(2) 中医外治法　主要包括针刺、针灸、电针、按摩、耳穴疗法、穴位注射、芳香疗法等。见表9[115-133]。

5. 心理治疗

心理治疗（psychotherapy）是指应用心理学原理

**表5**　常用阿片类药物不同给药途径的剂量转换

| 吗啡(mg/d) | 芬太尼(μg/h) | | | 羟考酮(mg/d) | | 可待因(mg/d) | |
|---|---|---|---|---|---|---|---|
| 静脉/皮下/硬膜外/鞘内 | 口服 | 肠外 | 贴剂 | 静脉/皮下 | 口服 | 静脉/皮下 | 口服 |
| 20 | 60 | 25 | 25 | 15 | 30 | 130 | 200 |
| 40 | 120 | 50 | 50 | 30 | 60 | 260 | 400 |
| 60 | 180 | 75 | 75 | 45 | 90 | 390 | 600 |
| 80 | 240 | 100 | 100 | 60 | 120 | 520 | 800 |

**表6**　阿片类药物常见不良反应及处理方法

| 副作用 | 特点 | 处理方法 |
|---|---|---|
| 恶心呕吐 | 呈剂量依赖和自限性，一般在用药后3～7 d可耐受 | 甲氧氯普胺、异丙嗪、氟哌啶醇及氯丙嗪。静脉注射格拉司琼及昂丹司琼 |
| 便秘 | | 治疗药物有甲基纳曲酮[88]等，通便药物有润滑性药物多库酯钠、番泻叶、比沙可啶、容积性药物植物纤维素、渗透性药物乳果糖、大便软化剂等。非药物方法也有效，如增加液体摄入和活动、规律排便等 |
| 呼吸抑制 | 剂量依赖性，静脉注射易发生。开始应用药物后5～7 d可耐受呼吸抑制 | 唤醒患者，给予疼痛刺激，可诱发呼吸。应用纳洛酮拮抗 |
| 尿潴留 | | 应用非药物，例如听流水声、会阴部热敷、膀胱部位轻度按摩、针灸等<br>如果没有效果，可插管导尿 |
| 瘙痒 | | 抗组胺药物仍是治疗瘙痒的一线药物，常用药物包括苯海拉明、异丙嗪、赛庚啶等。基础治疗包括加强皮肤护理，穿着纯棉松软内衣等 |
| 镇静、嗜睡 | 多在1周内消失。 | 需减量或更换其他阿片类药物，也可使用小剂量中枢兴奋药物治疗 |

**表7** CCRP物理治疗循证医学证据质量分级及推荐强度

| 治疗方法 | CVCP | CNCP | CPCMP | CPRP | CPCSP |
|---|---|---|---|---|---|
| PBMT[89-90] | | | | A2 | |
| LLLT[91-93] | | | B2 | | A2 |
| TENS[94-96] | A2 | | B2 | | |
| ST[97] | | | B2 | | |
| tDCS[98] | B2 | | | | |
| MT[99-100] | B2 | | B2 | A2 | A2 |
| 运动疗法[101-102] | | | B2 | | |
| SBRT[103-106] | B2 | A1 | | | |
| 放射性核素[107-108] | | A2 | | | |
| MRgFUS[109] | | B2 | | | |

注：PBMT为光生物调节疗法，LLLT为低能量激光治疗，TENS为经皮神经电刺激，ST为加扰器疗法，tDCS为经颅直流电刺激，MT为手法治疗，SBRT为立体定向放疗，MRgFUS为引导聚焦超声治疗，CVCP为慢性内脏癌性疼痛，CNCP为慢性神经病理性癌痛，CPCMP为癌症药物治疗后的慢性疼痛，CPRP为慢性放射治疗后疼痛，CPCSP慢性癌症术后疼痛

**表8** 中成药治疗CCRP循证医学证据质量分级及推荐强度

| 中成药 | CVCP | CBCP |
|---|---|---|
| 复方苦参注射液[111-112] | B2 | B2 |
| 华蟾素[113] | B2 | |
| 双柏散[114] | B2 | |

注：CVCP为慢性内脏癌性疼痛，CBCP为慢性骨性癌性疼痛

**表9** 常见中医外治法循证医学证据质量分级及推荐强度

| 中医外治法 | CVCP | CBCP | CPCMP | CPRP | CPCSP |
|---|---|---|---|---|---|
| 针刺[116-117] | B3 | | B3 | | |
| 针灸[118-125] | A2 | A2 | A2 | | A2 |
| 电针[126] | B2 | | | | |
| 体针[127] | B2 | B2 | | B2 | |
| 穴位注射[128] | B3 | | | | |
| 耳穴疗法[129] | B3 | | | | |
| 耳穴贴压[130] | B3 | | | | |
| 按摩[131-132] | B3 | | B3 | | |
| 芳香疗法[133] | B2 | | | | |

注：CVCP为慢性内脏癌性疼痛，CBCP为慢性骨性癌性疼痛，CPCMP为癌症药物治疗后的慢性疼痛，CPRP为慢性放射治疗后疼痛，CPCSP为慢性癌症术后疼痛

和方法，与患者建立良好治疗关系与互动，应用专业的理论和技术，对患者进行治疗的过程。癌痛患者常表现出焦虑、恐惧、抑郁等情绪障碍，甚至产生自杀倾向，对癌痛患者开展心理治疗非常必要。癌痛治疗常用的心理治疗方法主要有认知行为疗法（cognitive-behavioural therapy, CBT）、基于正念的认知疗法（mindfulness-based cognitive therapy, MBCT）、基于正念的减压疗法（mindfulness-based stress reduction, MBSR）、催眠、音乐疗法、引导想象疗法、肌肉放松训练、身心疗法、神经反馈疗法（neurofeedback, NFB）等。见表10[134-153]。

**表10** 常见心理治疗方法循证医学证据质量分级及推荐强度

| 治疗方法 | 证据分级 | 推荐强度 |
|---|---|---|
| CBT[134] | A | 2 |
| 身心疗法[135] | A | 2 |
| MBCT[136-140] | A | 1 |
| MBSR[139-141] | A | 2 |
| 催眠[142-144] | B | 2 |
| 肌肉放松训练[137, 145] | B | 2 |
| 引导想象疗法[137, 145] | B | 3 |
| 音乐疗法[146-150] | B | 2 |
| NFB[151-153] | B | 2 |

注：CBT为认知行为疗法，MBCT为基于正念的认知疗法，MBSR为基于正念的减压疗法，NFB为神经反馈疗法

6. 数字医疗

数字医疗是把现代数字信息技术应用于整个医疗过程的一种新型医疗方式，已经由电子医疗、远程医疗和移动医疗发展到数字疗法（digital therapeutics, DTx）。见表11[26, 154-164]。

**表11** 常见数字医疗循证医学证据质量分级及推荐强度

| 治疗方法 | 证据级别 | 推荐强度 |
|---|---|---|
| 电子医疗[154] | B | 2 |
| 远程医疗[155-156] | B | 2 |
| 移动医疗[26, 157-161] | B | 2 |
| 数字疗法[157, 162-164] | B | 2 |

7. 微创介入治疗

微创介入治疗方法主要有自控镇痛（patient controlled analgesia, PCA）、神经毁损术、经皮椎体成形术、放射性粒子植入术、鞘内药物输注系统（intrathecal drug delivery system, IDDS）等。

(1) PCA技术

① 定义

PCA是一种由医护人员根据患者疼痛程度和身体情况，预先设置镇痛药物的剂量，再交由患者“自我管理”的一种疼痛管理技术[165]。PCA具有起效迅速、血药浓度波动小、镇痛效果好、按需给药、个体化程度高等优点。

② 分类

PCA主要包括患者静脉自控镇痛（patient

controlled intravenous analgesia, PCIA）、患者皮下自控镇痛（patient-controlled subcutaneous analgesia, PCSA）、硬膜外腔PCA（patient controlled epidural analgesia, PCEA）、鞘内PCA和区域阻滞PCA。

③ 适应证

A. 口服用药困难、胃肠道功能障碍或消化道肿瘤导致的肠梗阻患者。

B. 口服大量镇痛药但效果不佳或长期使用镇痛药出现耐受的患者。

C. 口服药物出现严重不良反应的患者。

D. 阿片类药物的滴定。

E. 癌性爆发痛频繁发作（每日≥5次）的患者。

④ PCA数智化管理

癌痛的管理过程是长期的、动态的，同时涉及麻精药品的应用和管理，因此需要信息化、智能化的平台管理。癌痛管理平台利用物联网，联结三级-二级-社区-居家等各级医疗机构、各级医护人员于同一癌痛管控医联体，在癌痛管理平台对各级医疗机构包括居家的癌痛患者进行同质化远程实时管理，实现医护人员之间、医患之间零距离交流，协助医疗单位高效管理癌痛及慢性疼痛患者，提升医疗服务质量与效率。数智化PCA（artificial intelligence PCA, Ai-PCA）利用物联网和人工智能技术，由终端、无线传输、中心控制3部分组成，赋予镇痛泵系统智能分析评估、智能报警、远程监控等功能，实现PCA的全程化、智能化及个体化管理[166-169]。

(2) 神经毁损术

神经毁损技术是以介入手术方式将化学药物或物理因素作用于疼痛区域的责任神经，使神经组织变性、结构损伤，破坏部分或全部感觉传导功能，从而获得较长镇痛时间的方法。根据毁损的方法不同，神经毁损分为化学性毁损和物理性毁损。

① 化学性毁损

将化学药物通过介入方式精准作用于硬膜外腔、蛛网膜下腔、神经根、神经干、神经丛，甚至瘤体内神经末梢，以控制严重的癌性疼痛，而不会产生明显的不良反应。神经毁损药物包括无水乙醇、苯酚、阿霉素、亚甲蓝等，其中无水乙醇是最常用的药物。化学性毁损的镇痛作用一般维持2～4个月。

② 物理性毁损

利用物理方法对感觉神经产生物理性毁损，使神经组织的传导功能受到不同程度的中断或阻滞，从而获得镇痛效果，主要包括内脏神经毁损术（splanchnic nerve neurolysis, SNN）、超声内镜下腹腔神经丛松解术（EUS-guided celiac plexus neurolysis, EUS-CPN）、射频消融术（Radiofrequency ablation, RFA）、EUS引导射频消融术（EUS-guided radiofrequency ablation, EUS-RFA）、经皮热消融术（percutaneous thermal ablation, PTA）、微波消融术（microwave ablation）、冷冻消融术（cryoablation）、高强度聚焦超声（high intensity focused ultrasound）等。

(3) 经皮椎体成形术

经皮椎体成形术，全称为经皮穿刺椎体成形术（percutaneous vertebro plasty, PVP），是向病变椎体内注入骨水泥（聚丙烯酸甲酯）或人工骨，以强化椎体的技术。球囊扩张椎体后凸成形术（percutanous kyphoplasty, PKP）在PVP基础上改进而来，经过球囊扩张后再分次注入骨水泥，可减少骨水泥的渗漏。PKP更有助于椎体的稳定和椎间高度的维持。PVP可减轻椎体原发性肿瘤或转移瘤疼痛、强化椎体稳定性，同时对椎体肿瘤有一定杀伤作用，抑制肿瘤的进展。

(4) 放射性粒子植入术

放射性粒子植入术是在CT、DSA等引导下将微型粒子源（$^{125}$I）利用植入针准确植入肿瘤内，持续性释放γ射线及X射线，通过直接电离破坏DNA及间接电离产生氧自由基来杀灭肿瘤细胞，治疗中发现$^{125}$I粒子植入对癌性疼痛有一定作用。具有瘤内剂量高、瘤外剂量低，高度适形，并发症少，患者耐受性好等优点。

(5) IDDS

IDDS可将药物以精确控制的速度输送到蛛网膜下腔。由于鞘内给药可以绕过血脑屏障，直接作用于中枢神经系统，因此较小剂量即可产生显著的镇痛效果，从而减少全身不良反应。对于无法忍受药物不良反应和/或全身性阿片类药物治疗无法有效控制疼痛的患者，应考虑鞘内途径给药[170]。鞘内镇痛可作为癌症患者在疾病过程中任何时间的可选治疗方案，尤其是对于预期寿命有限的患者，优先考虑，及时减轻患者痛苦。根据《鞘内药物输注技术用于癌痛管理的中国专家共识（2022版）》，鞘内用药应以阿片类药物为主导，依据镇痛方案进行阶梯用药[171]。阿片类药物或者阿片类药物与局麻药联合使用为癌痛鞘内治疗的一线用药。IDDS最常见的

并发症为低颅压性疼痛，常见不良反应包括尿潴留、恶心、呕吐等。

常用微创介入治疗循证医学证据质量级别及推荐强度。见表12[55, 57, 165, 169-170, 172-204]。

**表12** 常用微创介入治疗循证医学证据质量级别及推荐强度

| 类型 | 方法 | 证据级别 | 推荐强度 |
|---|---|---|---|
| PCA | PCIA[57, 165, 172-174] | A | 1 |
| | PCSA[55, 165, 174-176] | A | 1 |
| | PCEA[177-178] | A | 1 |
| 化学性毁损术 | [179-180] | B | 1 |
| 物理性毁损术 | SNN[181] | A | 1 |
| | EUS-CPN[182-185] | A | 1 |
| | EUS-RFA[186] | A | 2 |
| | PTA[187] | A | 1 |
| | RFA[188-195] | A | 1 |
| | 微波消融[191-192] | A | 1 |
| | 冷冻消融[191-192, 196-197] | A | 1 |
| | 高强度聚焦超声[191-192] | A | 2 |
| 经皮椎体成形术 | PVP[198-200] | A | 1 |
| | PKP[198-200] | A | 1 |
| 放射性粒子置入术[201-202] | | A | 1 |
| 鞘内药物输注系统[169-170, 203-204] | | A | 1 |

注：PCA为患者自控镇痛，PCIA为患者静脉自控镇痛，PCSA为患者皮下自控镇痛，PCEA为患者硬膜外自控镇痛，SNN为内脏神经毁损术，EUS-CPN为超声内镜下腹腔神经丛松解术，EUS-RFA为超声内镜引导射频消融术，PTA为经皮热消融术，RFA为射频消融术，PVP为经皮穿刺椎体成形术，PKP为球囊扩张椎体后凸成形术

8. 康复治疗

癌痛患者的康复治疗是一个综合性的、个体化的过程，应该根据患者的具体情况和需求进行定制。高级别证据支持长期随访护理、疲劳和心理社会/心理健康筛查的康复建议[205]，旨在帮助患者减轻疼痛、恢复身心健康，提高生活质量。

9. 安宁疗护

在诊断为癌症晚期后，患者的主要关注点包括躯体症状和不良反应、功能丧失，疾病进展的可能性以及生存期等。找到合适的安宁疗护方法，控制疼痛、营养支持、心理支持，尽可能提高生活质量[18-19]。

## 癌性爆发痛

一、概念

癌性爆发痛（breakthrough cancer pain, BTcP）是指在背景痛控制相对稳定、镇痛药物充分应用的前提下自发或在某些因素的诱发下，突然出现的短暂疼痛加重，其发生率可达33%～95%。BTcP可分为事件性（诱发性）BTcP和自发性（特发性）BTcP，前者一般由可预测的因素引起易于防治，而后者是由无法预测的活动或诱因引发疼痛，难以防治。BTcP为一种难治性癌痛，起病迅速、中度至重度强度、持续时间短、疼痛多不可预测，病理机制复杂，任何解救性药物均有滞后性。

二、诊断标准[206]

1. 在过去的1周患者是否存在持续性疼痛（背景痛）。

2. 在过去的1周患者的背景痛是否充分控制（NRS≤3分）。

3. 患者是否存在短暂疼痛加重的现象（NRS≥4分）。

若上述问题的答案均为“是”，则可确诊患者存在BTcP。

三、治疗方法

病因治疗至关重要。BTcP治疗主要是基于阿片类药物为主导的解救治疗（多推荐芬太尼制剂）和微创介入治疗。

1. 药物治疗

国内目前多采用的方法：(1) 快速起效的解救药物；(2) PCA，一般采用静脉或皮下途径给药。

常用的阿片类药物包括吗啡、氢吗啡酮注射剂等[56]，有趋势使用特色的芬太尼剂型，包括芬太尼透粘膜口含锭剂、芬太尼舌下含片、芬太尼鼻腔喷雾剂等[207-211]。

2. 微创介入治疗

合理选择微创介入治疗可以提高癌痛的治疗效果，并降低BTcP的发作频率和程度。可根据病情选择的方法有：(1) 针对瘤体进行治疗（粒子植入术、瘤体物理或化学毁损等）；(2) 阻断癌痛相关的神经传导通路（内脏神经节、神经干毁损，脊神经根、神经干毁损等）；(3) 改善和提升组织结构的稳定性（经皮椎体/骨成形术）；(4) 改变给药途径或方式，提高药物疗效、加快起效时间（IDDS、PCA等）。

## 慢性癌症相关性疼痛诊疗路径

CCRP的诊疗路径见图2。

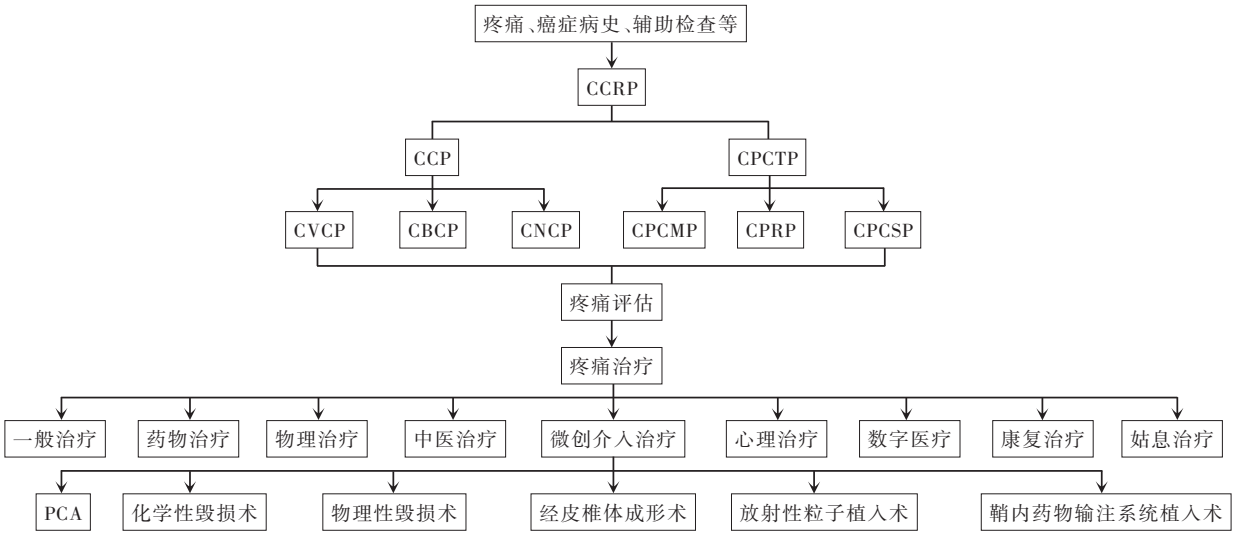


**图2** CCRP诊疗路径

注：CCRP为慢性癌症相关性痛，CCP为慢性癌性疼痛，CVCP为慢性内脏癌性疼痛，CBCP为慢性骨性癌性疼痛，CNCP为慢性神经病理性癌痛，CPCTP为慢性癌症治疗后疼痛，CPCMP为癌症药物治疗后的慢性疼痛，CPRP为慢性放射治疗后疼痛，CPCSP为慢性癌症术后疼痛，PCA为患者自控镇痛

**利益冲突** 所有作者均声明无利益冲突

## 参 考 文 献


[1] Zylla D, Steele G, Gupta P. A systematic review of the impact of pain on overall survival in patients with cancer[J]. Support Care Cancer, 2017, 25(5): 1687-1698. DOI: 10.1007/s00520-017-3614-y.

[2] Guyatt G, Oxman AD, Akl EA, et al. GRADE guidelines: 1. introduction GRADE evidence profiles and summary of findings tables[J]. J Clin Epidemiol, 2011, 64(4): 383394. DOI: 10.1016/j.jclinepi.2010.04.026.

[3] Balshem H, Helfand M, Schünemann HJ, et al. GRADE guidelines: 3. rating the quality of evidence[J]. J Clin Epidemiol, 2011, 64(4): 401406. DOI: 10.1016/j.jclinepi.2010.07.015.

[4] Jaeschke R, Guyatt GH, Dellinger P, et al. Use of GRADE grid to reach decisions on clinical practice guidelines when consensus is elusive[J]. BMJ, 2008, 337: a744. DOI: 10.1136/bmj.a744.

[5] 李小梅, 袁文茜, 曹伯旭, 等. 慢性癌症相关性疼痛[J]. 中国疼痛医学杂志, 2021, 27(3): 161-165. DOI: 10.3969/j.issn.1006-9852.2021.03.001.

[6] Bennett MI, Kaasa S, Barke A, et al. IASP taskforce for the classification of chronic pain. The IASP classification of chronic pain for ICD-11: chronic cancer-related pain[J]. Pain, 2019, 160(1): 38-44. DOI: 10.1097/j.pain.0000000000001363.

[7] Scarborough BM, Smith CB. Optimal pain management for patients with cancer in the modern era[J]. CA Cancer J Clin, 2018, 68(3): 182-196. DOI: 10.3322/caac.21453.

[8] Brozović G, Lesar N, Janev D, et al. Cancer pain and therapy[J]. Acta Clin Croat, 2022, 61(Suppl 2): 103-108. DOI: 10.20471/acc.2022.61.s2.13.

[9] Mardelle U, Bretaud N, Daher C, et al. From pain to tumor immunity: influence of peripheral sensory neurons in cancer[J]. Front Immunol, 2024, 15: 1335387. DOI: 10.3389/fimmu.2024.1335387.

[10] Zheng XQ, Wu YH, Huang JF, et al. Neurophysiological mechanisms of cancer-induced bone pain[J]. J Adv Res, 2021, 35: 117-127. DOI: 10.1016/j.jare.2021.06.006.

[11] Yoon SY, Oh J. Neuropathic cancer pain: prevalence, pathophysiology, and management[J]. Korean J Intern Med, 2018, 33(6): 1058-1069. DOI: 10.3904/kjim.2018.162.

[12] Atherton MA, Park S, Horan NL, et al. Sympathetic modulation of tumor necrosis factor alpha-induced nociception in the presence of oral squamous cell carcinoma[J]. Pain, 2023, 164(1): 27-42. DOI: 10.1097/j.pain.0000000000002655.

[13] 中国医师协会疼痛科医师分会,中华医学会疼痛学分会,国家疼痛专业医疗质量控制中心,等. 癌症相关性疼痛评估中国专家共识(2023版)[J]. 中国疼痛医学杂志, 2023, 29(12): 881-886. DOI: 10.3969/j.issn.1006-9852.2023.12.001.

[14] Kumar SK, Callander NS, Adekola K, et al. Multiple myeloma, version 2.2024, NCCN clinical practice guidelines in oncology[J]. J Natl Compr Canc Netw, 2023, 21(12): 1281-1301. DOI: 10.6004/jnccn.2023.0061.

[15] https://www.nccn.org/guidelines/guidelines-detail?category=3&id=1413.

[16] Jadad AR, Browman GP. The WHO analgesic ladder for cancer pain management. Stepping up the quality of its evaluation[J]. JAMA, 1995, 274(23): 1870-1873. PMID:7500538.

[17] Su WC, Chuang CH, Chen FM, et al. Effects of good pain management (GPM) ward program on patterns of care and pain control in patients with cancer pain in Taiwan[J]. Support Care Cancer, 2021, 29(4): 1903-1911. DOI: 10.1007/s00520-020-05656-x.

[18] Henson LA, Maddocks M, Evans C, et al. Palliative care and the management of common distressing symptoms in advanced cancer: pain, breathlessness, nausea and vomiting, and gatigue[J]. J Clinc Oncolo, 2020, 38(9): 905-914. DOI: 10.1200/JCO.19.00470.

[19] 冯丹, 陈萍, 刘行, 等. 安宁疗护疼痛管理指南的系统评价[J]. 护理研究, 2021, 35(1): 48-54. DOI: 10.12102/j.issn.1009-6493.2021.01.009.

[20] Jara C, Del Barco S, Grávalos C, et al. SEOM clinical guideline for treatment of cancer pain (2017)[J]. Clin Transl Oncol, 2018, 20(1): 97-107. DOI: 10.1007/s12094-017-1791-2.

[21] Yamanaka M. A concept analysis of self-management of cancer pain[J]. Asia Pac J Oncol Nurs, 2018, 5(3): 254-261. DOI: 10.4103/apjon.apjon_17_18.

[22] González-Martín AM, Aguilera-García I, Castellote-Caballero Y, et al. Effectiveness of therapeutic education in patients with cancer pain: systematic review and meta-analysis[J]. Cancers (Basel), 2023, 15(16): 4123. DOI: 10.3390/cancers15164123.

[23] Edwards Z, Ziegler L, Craigs C, et al. Pharmacist educational interventions for cancer pain management: a systematic review and meta-analysis[J]. Int J Pharm Pract, 2019, 27(4): 336-345. DOI: 10.1111/ijpp.12516.

[24] Makhlouf SM, Pini S, Ahmed S, et al. Managing pain in people with cancer-a systematic review of the attitudes and knowledge of professionals, patients, caregivers and public[J]. J Cancer Educ, 2020, 35(2): 214-240. DOI: 10.1007/s13187-019-01548-9.

[25] Zhang J, Chan DNS, Liu X, et al. Effects of self-management interventions for cancer patients with pain: a systematic review of randomized controlled trials[J]. J Clin Nurs, 2023, 32(17-18): 5652-5667. DOI: 10.1111/jocn.16669.

[26] Hernandez Silva E, Lawler S, Langbecker D. The effectiveness of mHealth for self-management in improving pain, psychological distress, fatigue, and sleep in cancer survivors: a systematic review[J]. J Cancer Surviv, 2019, 13(1): 97-107. DOI: 10.1007/s11764-018-0730-8.

[27] You E. Nontraditional and Home-Based Self-management interventions in cancer patients with pain: a mixed-method systematic review[J]. Holist Nurs Pract, 2020, 34(3): 138-149. DOI: 10.1097/HNP.0000000000000380.

[28] Schmidt-Hansen M, Bennett MI, Arnold S, et al. Oxycodone for cancer-related pain[J]. Cochrane Database Syst Rev, 2022, 6(6): CD003870. DOI: 10.1002/14651858.CD003870.pub7.

[29] Rodríguez MJ, Contreras D, Gálvez R, et al. Double-blind evaluation of short-term analgesic efficacy of orally administered dexketoprofen trometamol and ketorolac in bone cancer pain[J]. Pain, 2003, 104(1-2): 103-110. DOI: 10.1016/s0304-3959(02)00470-0.

[30] Wiffen PJ, Wee B, Moore RA. Oral morphine for cancer pain[J]. Cochrane Database Syst Rev, 2016, 4(4): CD003868. DOI: 10.1002/14651858.CD003868.pub4.

[31] Wang DD, Ma TT, Zhu HD, et al. Transdermal fentanyl for cancer pain: trial sequential analysis of 3406 patients from 35 randomized controlled trials[J]. J Cancer Res Ther, 2018, 14(Supplement): S14-S21. DOI: 10.4103/0973-1482.171368.

[32] Reis PS, Kraychete DC, Pedreira EM, et al. Transdermal opioids and the quality of life of the cancer patient: a systematic literature review[J]. Ann Pharmacother, 2024, 10600280241247363. DOI: 10.1177/10600280241247363.

[33] Caraceni A, Hanks G, Kaasa S, et al. Use of opioid analgesics in the treatment of cancer pain: evidence-based recommendations from the EAPC[J]. Lancet Oncol, 2012, 13(2): E58-E68. DOI: 10.1016/S1470-2045(12)70040-2.

[34] 湖北省抗癌协会癌症康复与姑息治疗专业委员会. 芬太尼透皮贴剂临床合理用药指南[J]. 医药导报, 2021, 40(11): 1463-1474. DOI: 10.3870/j.issn.1004-0781.2021.11.001.

[35] Huerta MÁ, de la Nava J, Artacho-Cordón A, et al. Efficacy and security of tetrodotoxin in the treatment of cancer-related pain: systematic review and meta-analysis[J]. Mar Drugs, 2023, 21(5): 316. DOI: 10.3390/md21050316.

[36] Hagen NA, Cantin L, Constant J, et al. Tetrodotoxin for moderate to severe cancer-related pain: a multicentre, randomized, double-blind, placebo-controlled, parallel-design trial[J]. Pain Res Manag, 2017, 2017: 7212713. DOI: 10.1155/2017/7212713.

[37] Lippi L, de Sire A, Turco A, et al. Botulinum toxin for pain relief in cancer patients: a systematic review of randomized controlled trials[J]. Toxins (Basel), 2024, 16(3): 153. DOI: 10.3390/toxins16030153.

[38] Li S, Peng S, Chen F, et al. The application and therapeutic effect of botulinum toxin type a (BTX-A) in the treatment of patients with pain after cancer treatment: a systematic review and meta-analysis[J]. Int J Surg, 2024, 110(2): 1215-1223. DOI: 10.1097/JS9.0000000000000916.

[39] Xu JM, Song ST, Feng FY, et al. Cobrotoxin-containing analgesic compound to treat chronic moderate to severe cancer pain: results from a randomized, double-blind, cross-over study and from an open-label study[J]. Oncol Rep, 2006, 16(5): 1077-1084. DOI: 10.3892/or.16.5.1077.

[40] 杨惠萍, 淮宗让, 朱天新. 科博肽肠溶胶囊治疗晚期中、重度癌症疼痛疗效观察[J]. 蛇志, 2001, 13(2): 4-5. DOI: 10.3969/j.issn.1001-5639.2001.02.002.

[41] Nagaoka H, Momo K, Hamano J, et al. Effects of an indomethacin oral spray on pain due to oral mucositis in cancer patients treated with radiotherapy and chemotherapy: a double-blind, randomized, placebo-controlled trial (JORTC-PAL04)[J]. J Pain Symptom Manage, 2021, 62(3): 537-544. DOI: 10.1016/j.jpainsymman.2021.01.123.

[42] Huang R, Jiang L, Cao Y, et al. Comparative efficacy of therapeutics for chronic cancer pain: a bayesian network meta-analysis[J]. J Clin Oncol, 2019, 37(20): 1742-1752. DOI: 10.1200/JCO.18.01567.

[43] Christoforou J, Karasneh J, Manfredi M, et al. World Workshop on Oral Medicine VII: Non-opioid pain management of head and neck chemo/radiation-induced mucositis: a systematic review[J]. Oral

Dis, 2019, 25 Suppl 1: 182-192. DOI: 10.1111/odi.13074.

[44] Wiffen PJ, Derry S, Moore RA. Tramadol with or without paracetamol (acetaminophen) for cancer pain [J]. Cochrane Database Syst Rev, 2017, 5(5): CD012508. DOI: 10.1002/14651858.CD012508.pub2.

[45] Shinkai M, Katsumata N, Kawai S, et al. Phase III study of bilayer sustained-release tramadol tablets in patients with cancer pain: a double-blind parallel-group, non-inferiority study with immediate-release tramadol capsules as an active comparator [J]. Support Care Cancer, 2023, 32(1): 69. DOI: 10.1007/s00520-023-08242-z.

[46] Straube C, Derry S, Jackson KC, et al. Codeine, alone and with paracetamol (acetaminophen), for cancer pain [J]. Cochrane Database Syst Rev, 2014, 2014(9): CD006601. DOI: 10.1002/14651858.CD006601.pub4.

[47] Leppert W, Nosek K. Comparison of the quality of life of cancer patients with pain treated with oral controlled-release morphine and oxycodone and transdermal buprenorphine and fentanyl [J]. Curr Pharm Des, 2019, 25(30): 3216-3224. DOI: 10.2174/1381612825666-190717091230.

[48] 陈路佳, 唐榕, 向帆, 等. 芬太尼透皮贴剂或吗啡缓释片治疗中重度癌痛的系统评价[J]. 中国药业, 2015(18): 51-54, 55.

[49] 李琴, 徐继前, 陈斌. 羟考酮和吗啡对中晚期癌痛患者镇痛效果比较的Meta分析[J]. 实用药物与临床, 2016, 19(3): 318-321. DOI: 10.14053/j.cnki.ppcr.201603016.

[50] Hou XB, Chen DD, Cheng TF, et al. Meta-analysis of efficacy and safety of sustained release oxycodone hydrochloride rectal administration for moderate to severe pain[J]. PLoS One, 2022, 17(6): e0266754. DOI: 10.1371/journal.pone.0266754.

[51] Schmidt-Hansen M, Bennett MI, Arnold S, et al. Efficacy, tolerability and acceptability of oxycodone for cancer-related pain in adults: an updated cochrane systematic review[J]. BMJ Support Palliat Care, 2018, 8(2): 117-128. DOI: 10.1136/bmjspcare-2017-001457.

[52] 张新宇, 李丕宝, 杨静, 等. 盐酸羟考酮缓控释片治疗中重度癌痛的安全性和有效性系统评价[J]. 中国医院药学杂志, 2024, 44(8): 916-924. DOI: 10.13286/j.1001-5213.2024.08.09.

[53] 奚烨. 芬太尼透皮贴剂对比吗啡治疗中重度癌痛的系统评价[J]. 医药前沿, 2017, 7(24): 147-148.

[54] Li Y, Ma J, Lu G, et al. Hydromorphone for cancer pain [J]. Cochrane Database Syst Rev, 2021, 8(8): CD011108. DOI: 10.1002/14651858.CD011108.pub3.

[55] Zeng X, Zhu J, Li J, et al. Patient controlled subcutaneous analgesia of hydromorphone versus morphine to treat moderate and severe cancer pain: a randomized double-blind controlled trial [J]. J Pain Symptom Manage, 2024, 67(1): 50-58. DOI: 10.1016/j.jpainsymman.2023.09.018.

[56] Ma K, Jin Y, Wang L, et al. Intrathecal delivery of hydromorphone vs morphine for refractory cancer pain: a multicenter, randomized, single-blind, controlled noninferiority trial [J]. Pain, 2020, 161(11): 2502-2510. DOI: 10.1097/j.pain.0000000000001957.

[57] 曾雅迪, 习诗良, 汤和青. 氢吗啡酮患者自控镇痛治疗癌痛的疗效及安全性Meta分析[J]. 中华疼痛学杂志, 2022, 18(5): 670-677. DOI: 10.3760/cma.j.cn101658-20221018-00158.

[58] Schmidt-Hansen M, Bromham N, Taubert M, et al. Buprenorphine for treating cancer pain [J]. Cochrane Database Syst Rev, 2015, 2015(3): CD009596. DOI: 10.1002/14651858.

[59] Nicholson AB, Watson GR, Derry S, et al. Methadone for cancer pain [J]. Cochrane Database Syst Rev, 2017, 2(2): CD003971. DOI: 10.1002/14651858.

[60] Imkamp MSV, Theunissen M, Viechtbauer W, et al. Shifting views on cancer pain management: a systematic review and network meta-analysis[J]. J Pain Symptom Manage, 2024, 68(3): 223-236. DOI: 10.1016/j.jpainsymman.2024.05.022.

[61] Mercadante S, Bruera E. Methadone as a First-line opioid in cancer pain management: a systematic review[J]. J Pain Symptom Manage, 2018, 55(3): 998-1003. DOI: 10.1016/j.jpainsymman.2017.10.017.

[62] Haumann J, Geurts JW, van Kuijk SM, et al. Methadone is superior to fentanyl in treating neuropathic pain in patients with head-and-neck cancer[J]. Eur J Cancer, 2016, 65: 121-129. DOI: 10.1016/j.ejca.2016.06.025.

[63] Kouri M, Rekatsina M, Vadalouca A, et al. Pharmacological management of neuropathic pain after radiotherapy in head and neck cancer patients: a systematic review[J]. J Clin Med, 2022, 11(16): 4877. DOI: 10.3390/jcm11164877.

[64] Haumann J, van Kuijk SMJ, Geurts JW, et al. Methadone versus fentanyl in patients with radiation-induced nociceptive pain with head and neck cancer: a randomized controlled noninferiority trial [J]. Pain Pract, 2018, 18(3): 331-340. DOI: 10.1111/papr.12609.

[65] 赵得堡. 地佐辛注射液治疗肿瘤患者持续疼痛的系统评价[J]. 北方药学, 2017, 14(12): 187. DOI: 10.3969/j.issn.1672-8351.2017.12.153.

[66] 董维森, 李洁, 陈赫军, 等. 地佐辛注射液治疗肿瘤患者持续疼痛的系统评价[J]. 中国疼痛医学杂志, 2016, 22(2): 123-127. DOI: 10.3969/j.issn.1006-9852.2016.02.009.

[67] Dupoiron D, Stachowiak A, Loewenstein O, et al. Long-term efficacy and safety of oxycodone-naloxone prolonged-release formulation (up to 180/90 mg daily) - results of the open-label extension phase of a phase III multicenter, multiple-dose, randomized, controlled study [J]. Eur J Pain, 2017, 21(9): 1485-1494. DOI: 10.1002/ejp.1050.

[68] Ahmedzai SH, Leppert W, Janecki M, et al. Long-term safety and efficacy of oxycodone/naloxone prolonged-release tablets in patients with moderate-to-severe chronic cancer pain [J]. Support Care Cancer, 2015, 23(3): 823-830. DOI: 10.1007/s00520-014-2435-5.

[69] Lee KH, Kim TW, Kang JH, et al. Efficacy and safety of controlled-release oxycodone/naloxone versus controlled-release oxycodone in Korean patients with cancer-related pain: a randomized controlled trial [J]. Chin J Cancer, 2017, 36(1): 74. DOI: 10.1186/s40880-017-0241-4.

[70] Koopmans G, Simpson K, De Andrés J, et al. Fixed ratio (2: 1) prolonged-release oxycodone/naloxone combination improves

bowel function in patients with moderate-to-severe pain and opioid-induced constipation refractory to at least two classes of laxatives [J]. Curr Med Res Opin, 2014, 30(11): 2389-2396. DOI: 10.1185/03007995.2014.971355.

[71] 李璐, 刘一, 钱文璟. 羟考酮控释片与氨酚羟考酮在中重度疼痛治疗的临床疗效及安全性的meta分析[J]. 深圳中西医结合杂志, 2015, 25(24): 9-11,封4. DOI: 10.16458/j.cnki.1007-0893.2015.24.005.

[72] Zhang ZL, Wu ZY, Liu FY, et al. Tetrandrine alleviates oxaliplatin-induced mechanical allodynia via modulation of inflammation-related genes [J]. Front Mol Neurosci, 2024, 17: 1333842. DOI: 10.3389/fnmol.2024.1333842.

[73] 范亚峰, 虞中平, 崔晓燕. 脾多肽注射液配合吗啡缓释片治疗中重度癌性疼痛的疗效[J]. 中国实用医刊, 2015(19): 80-81. DOI: 10.3760/cma.j.issn.1674-4756.2015.19.042.

[74] Van den Beuken-van Everdingen MH, de Graeff A, Jongen JL, et al. Pharmacological treatment of pain in cancer patients: the role of adjuvant analgesics, a systematic review [J]. Pain Pract, 2017, 17(3): 409-419. DOI: 10.1111/papr.12459.

[75] Gül ŞK, Tepetam H, Gül HL. Duloxetine and pregabalin in neuropathic pain of lung cancer patients [J]. Brain Behav, 2020, 10(3): e01527. DOI: 10.1002/brb3.1527.

[76] Salehifar E, Janbabaei G, Hendouei N, et al. Comparison of the efficacy and safety of pregabalin and duloxetine in taxane-induced sensory neuropathy: a randomized controlled trial [J]. Clin Drug Investig, 2020, 40(3): 249-257. DOI: 10.1007/s40261-019-00882-6.

[77] Lefebvre T, Tack L, Lycke M, et al. Effectiveness of adjunctive analgesics in head and neck cancer patients receiving curative (chemo-) radiotherapy: a systematic review [J]. Pain Med, 2021, 22(1): 152-164. DOI: 10.1093/pm/pnaa044.

[78] Jiang J, Li Y, Shen Q, et al. Effect of pregabalin on radiotherapy-related neuropathic pain in patients with head and neck cancer: a randomized controlled trial [J]. J Clin Oncol, 2019, 37(2): 135-143. DOI: 10.1200/JCO.18.00896.

[79] Farshchian N, Alavi A, Heydarheydari S, et al. Comparative study of the effects of venlafaxine and duloxetine on chemotherapy-induced peripheral neuropathy [J]. Cancer Chemother Pharmacol, 2018, 82(5): 787-793. DOI: 10.1007/s00280-018-3664-y.

[80] D'Souza RS, Alvarez GAM, Dombovy-Johnson M, et al. Evidence-based treatment of pain in chemotherapy-induced peripheral neuropathy [J]. Curr Pain Headache Rep, 2023, 27(5): 99-116. DOI: 10.1007/s11916-023-01107-4.

[81] Wang M, Pei Z, Molassiotis A. Recent advances in managing chemotherapy-induced peripheral neuropathy: a systematic review [J]. Eur J Oncol Nurs, 2022, 58: 102134. DOI: 10.1016/j.ejon.2022.102134.

[82] Lee JT, Sanderson CR, Xuan W, et al. Lidocaine for cancer pain in adults: a systematic review and meta-analysis [J]. J Palliat Med, 2019, 22(3): 326-334. DOI: 10.1089/jpm.2018.0257.

[83] Cabezón-Gutiérrez L, Custodio-Cabello S, Palka-Kotlowska M, et al. High-dose 8% capsaicin patch in treatment of chemotherapy-induced peripheral neuropathy. a systematic review [J]. J Pain Symptom Manage, 2020, 60(5): 1047-1054, e1. DOI: 10.1016/j.jpainsymman.2020.06.026.

[84] Larsson IM, Ahm Sørensen J, Bille C. The post-mastectomy pain syndrome-a systematic review of the treatment modalities [J]. Breast J, 2017, 23(3): 338-343. DOI: 10.1111/tbj.12739.

[85] Jiao J, Fan J, Zhang Y, et al. Efficacy and safety of ketamine to treat cancer pain in adult patients: a systematic review [J]. J Pain Symptom Manage, 2024, 67(3): E185-E210. DOI: 10.1016/j.jpainsymman.2023.11.004.

[86] Kim HJ, Kim YS, Park SH. Opioid rotation versus combination for cancer patients with chronic uncontrolled pain: a randomized study [J]. BMC Palliat Care, 2015, 14: 41. DOI: 10.1186/s12904-015-0038-7.

[87] Liang J, Chen L, Yang S, et al. A 12-hour rapid titration method for cancer pain: a randomized, controlled, open-label study [J]. Ann Palliat Med, 2021, 10(1): 88-96. DOI: 10.21037/apm-20-2336.

[88] Zhang YY, Zhou R, Gu WJ. Efficacy and safety of methylnaltrexone for the treatment of opioid-induced constipation: a meta-analysis of randomized controlled trials [J]. Pain Ther, 2021, 10(1): 165-179. DOI: 10.1007/s40122-021-00237-0.

[89] Marín-Conde F, Castellanos-Cosano L, Pachón-Ibañez J, et al. Photobiomodulation with low-level laser therapy reduces oral mucositis caused by head and neck radio-chemotherapy: prospective randomized controlled trial [J]. Int J Oral Maxillofac Surg, 2019, 48(7): 917-923. DOI: 10.1016/j.ijom.2018.12.006.

[90] De Pauli Paglioni M, Alves CGB, Fontes EK, et al. Is photobiomodulation therapy effective in reducing pain caused by toxicities related to head and neck cancer treatment? a systematic review [J]. Support Care Cancer, 2019, 27(11): 4043-4054. DOI: 10.1007/s00520-019-04939-2.

[91] Amadori F, Bardellini E, Conti G, et al. Low-level laser therapy for treatment of chemotherapy-induced oral mucositis in childhood: a randomized double-blind controlled study [J]. Lasers Med Sci, 2016, 31(6): 1231-1236. DOI: 10.1007/s10103-016-1975-y.

[92] He M, Zhang B, Shen N, et al. A systematic review and meta-analysis of the effect of low-level laser therapy (LLLT) on chemotherapy-induced oral mucositis in pediatric and young patients [J]. Eur J Pediatr, 2018, 177(1): 7-17. DOI: 10.1007/s00431-017-3043-4.

[93] Smoot B, Chiavola-Larson L, Lee J, et al. Effect of low-level laser therapy on pain and swelling in women with breast cancer-related lymphedema: a systematic review and meta-analysis [J]. J Cancer Surviv, 2015, 9(2): 287-304. DOI: 10.1007/s11764-014-0411-1.

[94] He L, Tan K, Lin X, et al. Multicenter, randomized, double-blind, controlled trial of transcutaneous electrical nerve stimulation for pancreatic cancer related pain [J]. Medicine (Baltimore), 2021, 100(5): E23748. DOI: 10.1097/MD.0000000000023748.

[95] Gewandter JS, Culakova E, Davis JN, et al. Wireless transcutaneous electrical nerve stimulation (TENS) for chronic chemotherapy-induced peripheral neuropathy (CIPN): a proof-of-

concept randomized clinical trial[J]. J Pain, 2024, 25(5): 104431. DOI: 10.1016/j.jpain.2023.11.014.

[96] Püsküllüoğlu M, Tomaszewski KA, Grela-Wojewoda A, et al. Effects of transcutaneous electrical nerve stimulation on pain and chemotherapy-induced peripheral neuropathy in cancer patients: a systematic review[J]. Medicina (Kaunas), 2022, 58(2): 284. DOI: 10.3390/medicina58020284.

[97] Kashyap K, Bhatnagar S. Evidence for the efficacy of scrambler therapy for cancer pain: a systematic review[J]. Pain Physician, 2020, 23(4): 349-364. PMID: 32709170.

[98] Capetti B, Conti L, Marzorati C, et al. The Application of tDCS to treat pain and psychocognitive symptoms in cancer patients: a scoping review[J]. Neural Plast, 2024, 2024: 6344925. DOI: 10.1155/2024/6344925.

[99] Yao C, Cheng Y, Zhu Q, et al. Clinical evidence for the effects of manual therapy on cancer pain: a systematic review and meta-analysis[J]. Evid Based Complement Alternat Med, 2021, 2021: 6678184. DOI: 10.1155/2021/6678184.

[100] Pattanshetty RB, Patil SN. Role of manual therapy for neck pain and quality of life in head and neck cancer survivors: a systematic review[J]. Indian J Palliat Care, 2022, 28(1): 99-112. DOI: 10.25259/IJPC_10_2021.

[101] Nakagawa N, Yamamoto S, Hanai A, et al. Exercise intervention for the management of chemotherapy-induced peripheral neuropathy: a systematic review and network meta-analysis[J]. Front Neurol, 2024, 15: 1346099. DOI: 10.3389/fneur.2024.1346099.

[102] Dhawan S, Andrews R, Kumar L, et al. A randomized controlled trial to assess the effectiveness of muscle strengthening and balancing exercises on chemotherapy-induced peripheral neuropathic pain and quality of life among cancer patients[J]. Cancer Nurs, 2020, 43(4): 269-280. DOI: 10.1097/NCC.0000000000000693.

[103] Buwenge M, Macchia G, Arcelli A, et al. Stereotactic radiotherapy of pancreatic cancer: a systematic review on pain relief[J]. J Pain Res, 2018, 11: 2169-2178. DOI: 10.2147/JPR.S167994.

[104] Guninski RS, Cuccia F, Alongi F, et al. Efficacy and safety of SBRT for spine metastases: a systematic review and meta-analysis for preparation of an ESTRO practice guideline[J]. Radiother Oncol, 2024, 190: 109969. DOI: 10.1016/j.radonc.2023.109969.

[105] Wang Z, Li L, Yang X, et al. Efficacy and safety of stereotactic body radiotherapy for painful bone metastases: evidence from randomized controlled trials[J]. Front Oncol, 2022, 12: 979201. DOI: 10.3389/fonc.2022.979201.

[106] Tariq UB, Naseer Khan MA, Barkha FNU, et al. Comparative analysis of stereotactic radiation therapy and conventional radiation therapy in cancer pain control: a systematic review and meta-analysis[J]. Clin Oncol (R Coll Radiol), 2024, 36(7): 452-462. DOI: 10.1016/j.clon.2024.04.004.

[107] Jong JM, Oprea-Lager DE, Hooft L, et al. Radiopharmaceuticals for palliation of bone pain in patients with castration-resistant prostate cancer metastatic to bone: a systematic review[J]. Eur Urol, 2016, 70(3): 416-426. DOI: 10.1016/j.eururo.2015.09.005.

[108] Agarwal KK, Singla S, Arora G, et al. (177) Lu-EDTMP for palliation of pain from bone metastases in patients with prostate and breast cancer: a phase II study[J]. Eur J Nucl Med Mol Imaging, 2015, 42(1): 79-88. DOI: 10.1007/s00259-014-2862-z.

[109] Han X, Huang R, Meng T, et al. The Roles of magnetic resonance-guided focused ultrasound in pain relief in patients with bone metastases: a systemic review and meta-analysis[J]. Front Oncol, 2021, 11: 617295. DOI: 10.3389/fonc.2021.617295.

[110] 北京市疼痛治疗质量控制和改进中心癌痛专家组. 癌痛规范化治疗中成药合理使用专家共识[J]. 中国疼痛医学杂志, 2021, 27(1): 9-17. DOI: 10.3969/j.issn.1006-9852.2021.01.003.

[111] 黄奕雪, 郭玉明, 桑秀秀, 等. 复方苦参注射液治疗癌性疼痛的系统评价[J]. 中国实验方剂学杂志, 2016, 22(2): 172-179. DOI: 10.13422/j.cnki.syfjx.2016020172.

[112] Yanju B, Yang L, Hua B, et al. A systematic review and meta-analysis on the use of Traditional Chinese Medicine compound kushen injection for bone cancer pain[J]. Support Care Cancer, 2014, 22(3): 825-836. DOI: 10.1007/s00520-013-2063-5.

[113] 许晶, 钱树树, 陈耀国, 等. 华蟾素治疗癌痛有效性和安全性的系统评价和Meta分析[J]. 中国中药杂志, 2019, 44(12): 2627-2636. DOI: 10.19540/j.cnki.cjcmm.20190304.003.

[114] Ye X, Lu D, Chen X, et al. A multicenter, randomized, double-blind, placebo-controlled trial of shuangbai san for treating primary liver cancer patients with cancer pain[J]. J Pain Symptom Manage, 2016, 51(6): 979-986. DOI: 10.1016/j.jpainsymman.2015.12.330.

[115] 王珍妮, 樊奕丹, 邢月蒙, 等. 中医外治法治疗癌性疼痛临床疗效与安全性的Meta分析[J]. 中医肿瘤学杂志, 2022, 4(2): 74-81. DOI: 10.19811/j.cnki.ISSN2096-6628.2022.03.013.

[116] 罗月红, 刘庆, 金芮玉, 等. 针刺治疗癌性疼痛的系统评价再评价[J]. 按摩与康复医学, 2022, 13(9): 40-45. DOI: 10.19787/j.issn.1008-1879.2022.09.012.

[117] 刘宇飞, 来保勇, 安甜, 等. 针刺治疗化疗相关周围神经病变的系统评价和Meta分析[J]. 上海针灸杂志, 2021, 40(4): 511-520. DOI: 10.13460/j.issn.1005-0957.2021.04.0511.

[118] Ge L, Wang Q, He Y, et al. Acupuncture for cancer pain: an evidence-based clinical practice guideline[J]. Chin Med, 2022, 17(1): 8. DOI: 10.1186/s13020-021-00558-4.

[119] Chiu HY, Hsieh YJ, Tsai PS. Systematic review and meta-analysis of acupuncture to reduce cancer-related pain[J]. Eur J Cancer Care (Engl), 2017, 26(2). DOI: 10.1111/ecc.12457.

[120] Faria M, Teixeira M, Pinto MJ, et al. Efficacy of acupuncture on cancer pain: a systematic review and meta-analysis[J]. J Integr Med, 2024, 22(3): 235-244. DOI: 10.1016/j.joim.2024.03.002.

[121] Abe H, Inoue R, Tsuchida R, et al. Efficacy of treatments for pain and numbness in cancer survivors: a systematic review and meta-analysis[J]. Ann Palliat Med, 2022, 11(12): 3674-3696. DOI: 10.21037/apm-22-420.

[122] He Y, Guo X, May BH, et al. Clinical evidence for association of acupuncture and acupressure with improved cancer pain: a

systematic review and meta-analysis[J]. JAMA Oncol, 2020, 6(2): 271-278. DOI: 10.1001/jamaoncol.2019.5233.

[123] Yan Z, MuRong Z, Huo B, et al. Acupuncture as a complementary therapy for cancer-induced bone pain: a systematic review and meta-analysis[J]. Front Pain Res (Lausanne), 2022, 3: 925013. DOI: 10.3389/fpain.2022.925013.

[124] Chien TJ, Liu CY, Fang CJ, et al. The efficacy of acupuncture in chemotherapy-induced peripheral neuropathy: systematic review and meta-analysis[J]. Integr Cancer Ther, 2019, 18: 1534735419886662. DOI: 10.1177/1534735419886662.

[125] Xu Z, Wang X, Wu Y, et al. The effectiveness and safety of acupuncture for chemotherapy-induced peripheral neuropathy: a systematic review and meta-analysis[J]. Front Neurol, 2022, 13: 963358. DOI: 10.3389/fneur.2022.963358.

[126] Zhang J, Wu W, Ren Y, et al. Electroacupuncture for the treatment of cancer pain: a systematic review and meta-analysis of randomized clinical trials[J]. Front Pain Res (Lausanne), 2023, 4: 1186506. DOI: 10.3389/fpain.2023.1186506.

[127] 张超月, 孙鲁源, 刘鑫, 等. 体针治疗癌性疼痛疗效及安全性Meta分析[J]. 世界科学技术-中医药现代化, 2023, 25(5): 1538-1547. DOI: 10.11842/wst.20220914002.

[128] 周杰, 梁宜, 陈勤, 等. 穴位注射治疗癌痛随机对照研究的Meta分析[J]. 浙江中医药大学学报, 2014(7): 927-932. DOI: 10.16466/j.issn1005-5509.2014.07.024.

[129] Yang Y, Wen J, Hong J. The Effects of auricular therapy for cancer pain: a systematic review and meta-analysis[J]. Evid Based Complement Alternat Med, 2020, 2020: 1618767. DOI: 10.1155/2020/1618767.

[130] 李武芬, 孙善斌, 丁盼盼, 等. 耳穴贴压治疗癌痛疗效的Meta分析[J]. 循证护理, 2021, 7(15): 2007-2012. DOI: 10.12102/j.issn.2095-8668.2021.15.003.

[131] Lee SH, Kim JY, Yeo S, et al. Meta-analysis of massage therapy on cancer pain[J]. Integr Cancer Ther, 2015, 14(4): 297-304. DOI: 10.1177/1534735415572885.

[132] Zhang X, Wang A, Wang M, et al. Non-pharmacological therapy for chemotherapy-induced peripheral neurotoxicity: a network meta-analysis of randomized controlled trials[J]. BMC Neurol, 2023, 23(1): 433. DOI: 10.1186/s12883-023-03485-z.

[133] Corasaniti MT, Bagetta G, Morrone LA, et al. Efficacy of essential oils in relieving cancer pain: a systematic review and meta-analysis[J]. Int J Mol Sci, 2023, 24(8): 7085. DOI: 10.3390/ijms24087085.

[134] Melesse TG, Chau JPC, Nan MA. Effects of cognitive-behavioural therapy on psychological, physical and social outcomes of children with cancer: a systematic review and meta-analysis[J]. J Psychosom Res, 2022, 157: 110805. DOI: 10.1016/j.jpsychores.2022.110805.

[135] Danon N, Al-Gobari M, Burnand B, et al. Are mind-body therapies effective for relieving cancer-related pain in adults? a systematic review and meta-analysis[J]. Psychooncology, 2022, 31(3): 345-371. DOI: 10.1002/pon.5821.

[136] Johannsen M, O'Connor M, O'Toole MS, et al. Efficacy of mindfulness-based cognitive therapy on late post-treatment pain in women treated for primary breast cancer: a randomized controlled trial[J]. J Clin Oncol, 2016, 34(28): 3390-3399. DOI: 10.1200/JCO.2015.65.0770.

[137] Ruano A, García-Torres F, Gálvez-Lara M, et al. Psychological and non-pharmacologic treatments for pain in cancer patients: a systematic review and Meta-analysis[J]. J Pain Symptom Manage, 2022, 63(5): E505-E520. DOI: 10.1016/j.jpainsymman.2021.12.021.

[138] Chang YC, Tseng TA, Lin GM, et al. Immediate impact of Mindfulness-Based Cognitive Therapy (MBCT) among women with breast cancer: a systematic review and meta-analysis[J]. BMC Womens Health, 2023, 23(1): 331. DOI: 10.1186/s12905-023-02486-x.

[139] Lin LY, Lin LH, Tzeng GL, et al. Effects of mindfulness-based therapy for cancer patients: a systematic review and meta-analysis[J]. J Clin Psychol Med Settings, 2022, 29(2): 432-445. DOI: 10.1007/s10880-022-09862-z.

[140] Ngamkham S, Holden JE, Smith EL. A systematic review: mindfulness intervention for cancer-related pain[J]. Asia Pac J Oncol Nurs, 2019, 6(2): 161-169. DOI: 10.4103/apjon.apjon_67_18.

[141] 杨婷, 陈佳增, 何路生, 等. 正念减压疗法对癌性疼痛患者干预效果的Meta分析[J]. 护理实践与研究, 2022, 19(10): 1529-1534. DOI: 10.3969/j.issn.1672-9676.2022.10.024.

[142] Sine H, Achbani A, Filali K. The effect of hypnosis on the intensity of pain and anxiety in cancer patients: a systematic review of controlled experimental trials[J]. Cancer Invest, 2022, 40(3): 235-253. DOI: 10.1080/07357907.2021.1998520.

[143] Thuma K, Ditsataporncharoen T, Arunpongpaisal S, et al. Hypnosis as an adjunct for managing pain in head and neck cancer patients post radiotherapy[J]. J Med Assoc Thai, 2016, 99(Suppl 5): S141-147. PMID: 29906024.

[144] Moreno Hernández D, Téllez A, Sánchez-Jáuregui T, et al. Clinical hypnosis for pain reduction in breast cancer mastectomy: a randomized clinical trial[J]. Int J Clin Exp Hypn, 2022, 70(1): 4-15. DOI: 10.1080/00207144.2022.2003697.

[145] De Paolis G, Naccarato A, Cibelli F, et al. The effectiveness of progressive muscle relaxation and interactive guided imagery as a pain-reducing intervention in advanced cancer patients: a multicentre randomised controlled non-pharmacological trial[J]. Complement Ther Clin Pract, 2019, 34: 280-287. DOI: 10.1016/j.ctcp.2018.12.014.

[146] 郭梦佳, 熊怡, 陶思路, 等. 音乐疗法对乳腺癌患者疼痛及负面情绪影响的Meta分析[J]. 牡丹江医学院学报, 2023, 44(5): 100-105. DOI: 10.13799/j.cnki.mdjyxyxb.2023.05.031.

[147] Behzadmehr R, Dastyar N, Moghadam MP, et al. Effect of complementary and alternative medicine interventions on cancer related pain among breast cancer patients: a systematic review[J]. Complement Ther Med, 2020, 49: 102318. DOI: 10.1016/j.ctim.2020.102318.

[148] Trigueros-Murillo A, Martinez-Calderon J, Casuso-Holgado MJ, et

al. Effects of music-based interventions on cancer-related pain, fatigue, and distress: an overview of systematic reviews[J]. Support Care Cancer, 2023, 31(8): 488. DOI: 10.1007/s00520-023-07938-6.

[149] Yangöz ŞT, Özer Z. The effect of music intervention on patients with cancer-related pain: a systematic review and meta-analysis of randomized controlled trials[J]. J Adv Nurs, 2019, 75(12): 3362-3373. DOI: 10.1111/jan.14184.

[150] Rennie C, Irvine DS, Huang E, et al. Music therapy as a form of nonpharmacologic pain modulation in patients with cancer: a systematic review of the current literature[J]. Cancers (Basel), 2022, 14(18): 4416. DOI: 10.3390/cancers14184416.

[151] Prinsloo S, Novy D, Driver L, et al. Randomized controlled trial of neurofeedback on chemotherapy-induced peripheral neuropathy: a pilot study[J]. Cancer, 2017, 123(11): 1989-1997. DOI: 10.1002/cncr.30649.

[152] Prinsloo S, Novy D, Driver L, et al. The long-term impact of neurofeedback on symptom burden and interference in patients with chronic chemotherapy-induced neuropathy: analysis of a randomized controlled trial[J]. J Pain Symptom Manage, 2018, 55(5): 1276-1285. DOI: 10.1016/j.jpainsymman.2018.01.010.

[153] Prinsloo S, Kaptchuk TJ, De Ridder D, et al. Brain-computer interface relieves chronic chemotherapy-induced peripheral neuropathy: a randomized, double-blind, placebo-controlled trial[J]. Cancer, 2024, 130(2): 300-311. DOI: 10.1002/cncr.35027.

[154] Li J, Zhu C, Liu C, et al. Effectiveness of eHealth interventions for cancer-related pain, fatigue, and sleep disorders in cancer survivors: a systematic review and meta-analysis of randomized controlled trials[J]. J Nurs Scholarsh, 2022, 54(2): 184-190. DOI: 10.1111/jnu.12729.

[155] Buonanno P, Marra A, Iacovazzo C, et al. Telemedicine in cancer pain management: a systematic review and meta-analysis of randomized controlled trials[J]. Pain Med, 2023, 24(3): 226-233. DOI: 10.1093/pm/pnac128.

[156] Chen W, Huang J, Cui Z, et al. The efficacy of telemedicine for pain management in patients with cancer: a systematic review and meta-analysis[J]. Ther Adv Chronic Dis, 2023, 14: 20406223231153097. DOI: 10.1177/20406223231153097.

[157] Lopez-Rodriguez MM, Fernández-Millan A, Ruiz-Fernández MD, et al. New technologies to improve pain, anxiety and depression in children and adolescents with cancer: a systematic review[J]. Int J Environ Res Public Health, 2020, 17(10): 3563. DOI: 10.3390/ijerph17103563.

[158] Simon JDHP, Schepers SA, van Gorp M, et al. Pain monitoring app leads to less pain in children with cancer at home: Results of a randomized controlled trial[J]. Cancer, 2024, 130(13): 2339-2350. DOI: 10.1002/cncr.35100.

[159] Zheng C, Chen X, Weng L, et al. Benefits of mobile apps for cancer pain management: systematic review[J]. JMIR Mhealth Uhealth, 2020, 8(1): E17055. DOI: 10.2196/17055.

[160] Abahussin AA, West RM, Wong DC, et al. Proms for pain in adult cancer patients: a systematic review of measurement properties[J]. Pain Pract, 2019, 19(1): 93-117. DOI: 10.1111/papr.12711.

[161] Weng L, Lin W, Lin X, et al. Randomized controlled trial of an app for cancer pain management[J]. Support Care Cancer, 2024, 32(4): 244. DOI: 10.1007/s00520-024-08442-1.

[162] Cheng Z, Yu S, Zhang W, et al. Virtual reality for pain and anxiety of pediatric oncology patients: a systematic review and meta-analysis[J]. Asia Pac J Oncol Nurs, 2022, 9(12): 100152. DOI: 10.1016/j.apjon.2022.100152.

[163] Ozturk CS, Toruner EK. Effectiveness of virtual reality in anxiety and pain management in children and adolescents receiving cancer treatment: a systematic review and meta-analysis of randomized controlled trials[J]. J Med Syst, 2023, 47(1): 103. DOI: 10.1007/s10916-023-01995-4.

[164] Ahmad M, Bani Mohammad E, Anshasi HA. Virtual reality technology for pain and anxiety management among patients with cancer: a systematic review[J]. Pain Manag Nurs, 2020, 21(6): 601-607. DOI: 10.1016/j.pmn.2020.04.002.

[165] 中国抗癌协会癌症康复与姑息治疗专业委员会. 患者自控镇痛治疗癌痛专家共识[J]. 中国肿瘤临床, 2023, 50(15): 757-763. DOI: 10.12354/j.issn.1000-8179.2023.20230486.

[166] Kizza IB, Muliira JK, Al Jabri KA, et al. Family caregivers of adult cancer patients in oman: predictors of caregivers' self-efficacy for cancer pain and related symptom management at home[J]. Cancer Nurs, 2022. DOI: 10.1097/NCC.0000000000001181.

[167] Liu HJ, Li WY, Chen HF, et al. Long-term intrathecal analgesia with a wireless analgesia pump system in the home care of patients with advanced cancer[J]. Am J Hosp Palliat Care, 2017, 34(2): 148-153. DOI: 10.1177/1049909115615110.

[168] 中华医学会麻醉学分会"智能化病人自控镇痛管理专家共识"工作小组. 智能化病人自控镇痛管理专家共识[J]. 中华麻醉学杂志, 2018, 38(10): 1161-1165. DOI: 10.3760/cma.j.issn.0254-1416.2018.10.002.

[169] 郁燕, 陈小红, 马根山, 等. 癌痛管控平台在居家癌痛患者远程镇痛管理中的应用[J]. 中华疼痛学杂志, 2022, 18(5): 651-655. DOI: 10.3760/cma.j.cn101658-20220525-00084.

[170] Duarte R, Copley S, Nevitt S, et al. Effectiveness and safety of intrathecal drug delivery systems for the management of cancer pain: a systematic review and meta-analysis[J]. Neuromodulation, 2023, 26(6): 1126-1141. DOI: 10.1016/j.neurom.2022.03.003.

[171] 冯智英, 王昆, 金毅, 等. 鞘内药物输注技术用于癌痛管理的中国专家共识(2022版)[J]. 中华疼痛学杂志, 2022, 18(5): 579-589. DOI: 10.3760/cma.j.cn101658-20220208-00140.

[172] 中国医师协会疼痛科医师分会癌痛与安宁疗护专家组, 中华医学会疼痛学分会癌痛学组. 癌痛患者静脉自控镇痛中国专家共识[J]. 中华医学杂志, 2023, 103(11): 793-802. DOI: 10.3760/cma.j.cn112137-20221105-02319.

[173] Lin R, Lin S, Feng S, et al. Comparing patient-controlled analgesia versus non-pca hydromorphone titration for severe cancer pain: a randomized phase iii trial[J]. J Natl Compr Canc Netw, 2021,19(10): 1148-1155. DOI: 10.6004/jnccn.2020.7699.

[174] Nijland L, Schmidt P, Frosch M, et al. Subcutaneous or

intravenous opioid administration by patient-controlled analgesia in cancer pain: a systematic literature review[J]. Support Care Cancer, 2019, 27(1): 33-42. DOI: 10.1007/s00520-018-4368-x.

[175]刘小立, 宛春甫, 马柯, 等. 皮下持续输注癌痛治疗中国专家共识(2020版)[J]. 中华疼痛学杂志, 2020, 16(2): 85-91. DOI: 10.3760/cma.j.cn101658-20200410-2004-099.

[176]Wan CF, Meng QZ, Wang YW, et al. Patient-controlled subcutaneous analgesia using sufentainil or morphine in home care treatment in patients with stage III-IV cancer: a multi-center randomized controlled clinical trial[J]. Cancer Med, 2020, 9(15): 5345-5352. DOI: 10.1002/cam4.3194.

[177]He QH, Liu QL, Li Z, et al. Impact of epidural analgesia on quality of life and pain in advanced cancer patients[J]. Pain Manag Nurs, 2015, 16(3): 307-13. DOI: 10.1016/j.pmn.2014.08.003.

[178]Hsieh YL, Chen HY, Lin CR, et al. Efficacy of epidural analgesia for intractable cancer pain: a systematic review[J]. Pain Pract, 2023, 23(8): 956-969. DOI: 10.1111/papr.13273.

[179]Kong FL, Bie ZX, Li B, et al. Comparison of analgesic effect in celiac plexus neurolysis: ethanol injection with or without iodine-125 radioactive seeds implantation[J]. J Cancer Res Ther, 2022, 18(5): 1306-1311. DOI: 10.4103/jcrt.jcrt_483_22.

[180]Reyad RM, Hakim SM, Abbas DN, et al. A novel technique of saddle rhizotomy using thermal radiofrequency for intractable perineal pain in pelvic malignancy: a pilot study [J]. Pain Physician, 2018, 21(6): E651-E660. PMID: 30508996.

[181]Matsumoto T, Yoshimatsu R, Osaki M, et al. Percutaneous splanchnic nerve neurolysis analgesic efficacy and safety for cancer-related pain: a systematic review and meta-analysis[J]. Support Care Cancer, 2023, 31(6): 324. DOI: 10.1007/s00520-023-07746-y.

[182]Koulouris AI, Alexandre L, Hart AR, et al. Endoscopic ultrasound-guided celiac plexus neurolysis (EUS-CPN) technique and analgesic efficacy in patients with pancreatic cancer: a systematic review and meta-analysis [J]. Pancreatology, 2021, 21(2): 434-442. DOI: 10.1016/j.pan.2020.12.016.

[183]Pacheco-Feijoó GM, Amado-Tineo JP, Plancarte-Sánchez R, et al. Efficacy and safety of celiac plexus neurolysis in the treatment of chronic pain secondary to oncological pathology of the upper hemiabdomen: a systematic review and meta-analysis[J]. Indian J Palliat Care, 2023, 29(4): 394-406. DOI: 10.25259/IJPC_203_2022.

[184]Asif AA, Walayat SK, Bechtold ML, et al. EUS-guided celiac plexus neurolysis for pain in pancreatic cancer patients - a meta-analysis and systematic review[J]. J Community Hosp Intern Med Perspect, 2021, 11(4): 536-542. DOI: 10.1080/20009666.2021.1929049.

[185]Okita M, Otani K, Gibo N, et al. Systematic review and meta-analysis of celiac plexus neurolysis for abdominal pain associated with unresectable pancreatic cancer[J]. Pain Pract, 2022, 22(7): 652-661. DOI: 10.1111/papr.13143.

[186]Bang JY, Sutton B, Hawes RH, et al. EUS-guided celiac ganglion radiofrequency ablation versus celiac plexus neurolysis for palliation of pain in pancreatic cancer: a randomized controlled trial (with videos)[J]. Gastrointest Endosc, 2019, 89(1): 58-66, E3. DOI: 10.1016/j.gie.2018.08.005.

[187]Matsumoto T, Yoshimatsu R, Osaki M, et al. Analgesic efficacy and safety of percutaneous thermal ablation plus cementoplasty for painful bone metastases: a systematic review and meta-analysis[J]. Int J Clin Oncol, 2024, 29(4): 372-385. DOI: 10.1007/s10147-023-02458-z.

[188]Murali N, Turmezei T, Bhatti S, et al. What is the effectiveness of radiofrequency ablation in the management of patients with spinal metastases? A systematic review and meta-analysis[J]. J Orthop Surg Res, 2021, 16(1): 659. DOI: 10.1186/s13018-021-02775-x.

[189]Ravikanth R. Management of metastatic vertebral lesions by interventional techniques: systematic review of outcomes[J]. J Craniovertebr Junction Spine, 2020, 11(2): 61-70. DOI: 10.4103/jcvjs.JCVJS_56_20.

[190]Piras A, La Vecchia M, Boldrini L, et al. Radiofrequency thermoablation (RFA) and radiotherapy (RT) combined treatment for bone metastases: a systematic review [J]. Eur Rev Med Pharmacol Sci, 2021, 25(10): 3647-3654. DOI: 10.26355/eurrev_202105_25930.

[191]Gennaro N, Sconfienza LM, Ambrogi F, et al. Thermal ablation to relieve pain from metastatic bone disease: a systematic review[J]. Skeletal Radiol, 2019, 48(8): 1161-1169. DOI: 10.1007/s00256-018-3140-0.

[192]Yao PF, Hu A, Mansour F, et al. Image-guided energy blation for palliation of painful bony metastases-a systematic review[J]. J Vasc Interv Radiol, 2024, 35(9): 1268-1277. DOI: 10.1016/j.jvir.2024.05.011.

[193]Vachirakorntong B, Kawana E, Zhitny VP, et al. Radiofrequency ablation′s effectiveness for treating abdominal and thoracic chronic pain syndromes: a systematic review of the current literature[J]. Pain Physician, 2023, 26(7): E737-E759. PMID: 37976476.

[194]Abbas DN, Reyad RM. Thermal versus super voltage pulsed radiofrequency of stellate ganglion in post-mastectomy neuropathic pain syndrome: a prospective randomized trial[J]. Pain Physician, 2018, 21(4): 351-362. PMID: 30045592.

[195]Amr SA, Reyad RM, Othman AH, et al. Comparison between radiofrequency ablation and chemical neurolysis of thoracic splanchnic nerves for the management of abdominal cancer pain, randomized trial[J]. Eur J Pain, 2018, 22(10): 1782-1790. DOI: 10.1002/ejp.1274.

[196]Khanmohammadi S, Noroozi A, Yekaninejad MS, et al. Cryoablation for the palliation of painful bone metastasis: a systematic review[J]. Cardiovasc Intervent Radiol, 2023, 46(11): 1469-1482. DOI: 10.1007/s00270-022-03356-z.

[197]Ferrer-Mileo L, Luque Blanco AI, González-Barboteo J. Efficacy of cryoablation to control cancer pain: a systematic review[J]. Pain Pract, 2018, 18(8): 1083-1098. DOI: 10.1111/papr.12707.

[198]Health Quality Ontario. Vertebral augmentation involving

vertebroplasty or kyphoplasty for cancer-related vertebral compression fractures: a systematic review[J]. Ont Health Technol Assess Ser, 2016, 16(11): 1-202. PMID: 27298655.

[199] Sørensen ST, Kirkegaard AO, Carreon L, et al. Vertebroplasty or kyphoplasty as palliative treatment for cancer-related vertebral compression fractures: a systematic review[J]. Spine J, 2019, 19(6): 1067-1075. DOI: 10.1016/j.spinee.2019.02.012.

[200] Mattie R, Brar N, Tram JT, et al. Vertebral augmentation of cancer-related spinal compression fractures: a systematic review and meta-analysis[J]. Spine (Phila Pa 1976), 2021, 46(24): 1729-1737. DOI: 10.1097/BRS.0000000000004093.

[201] Kong FL, Bie ZX, Li B, et al. Comparison of analgesic effect in celiac plexus neurolysis: ethanol injection with or without iodine-125 radioactive seeds implantation[J]. J Cancer Res Ther, 2022, 18(5): 1306-1311. DOI: 10.4103/jcrt.jcrt_483_22.

[202] Han Q, Deng M, Lv Y, et al. Survival of patients with advanced pancreatic cancer after iodine125 seeds implantation brachytherapy: a meta-analysis[J]. Medicine (Baltimore), 2017, 96(5): E5719. DOI: 10.1097/MD.0000000000005719.

[203] Perruchoud C, Dupoiron D, Papi B, et al. Management of cancer-related pain with intrathecal drug delivery: a systematic review and meta-analysis of clinical studies[J]. Neuromodulation, 2023, 26(6): 1142-1152. DOI: 10.1016/j.neurom.2021.12.004.

[204] Kenfield M, Zacharias N, Abd-Elsayed A. Intrathecal drug delivery for the treatment of cancer-associated chronic pain in children[J]. Neuromodulation, 2023, 26(6): 1153-1163. DOI: 10.1111/ner.13535.

[205] L'Hotta AJ, Randolph SB, Reader B, et al. Clinical practice guideline and expert consensus recommendations for rehabilitation among children with cancer: a systematic review[J]. CA Cancer J Clin, 2023, 73(5): 524-545. DOI: 10.3322/caac.21783.

[206] 中国抗癌协会癌症康复与姑息治疗专业委员会难治性癌痛学组, 中华医学会疼痛学分会癌痛学组. 癌性爆发痛专家共识(2019年版)[J]. 中国肿瘤临床, 2019, 46(6): 267-271. DOI: 10.3969/j.issn.1000-8179.2019.06.228.

[207] Brant JM, Rodgers BB, Gallagher E, et al. Breakthrough cancer pain: a systematic review of pharmacologic management[J]. Clin J Oncol Nurs, 2017, 21(3 Suppl): 71-80. DOI: 10.1188/17.CJON.S3.71-80.

[208] Hashemi M, Zali A, Golmakani E, et al. Efficacy, safety, and tolerability of sublingual fentanyl orally disintegrating tablet in the treatment of breakthrough cancer pain: a randomized, double-blind, placebo-controlled study[J]. Daru, 2021, 29(1): 51-59. DOI: 10.1007/s40199-020-00381-6.

[209] Yousef AA, Alzeftawy AE. The efficacy of oral piroxicam fast-dissolving tablets versus sublingual fentanyl in incident breakthrough pain due to bone metastases: a double-blinded randomized study[J]. Support Care Cancer, 2019, 27(6): 2171-2177. DOI: 10.1007/s00520-018-4469-6.

[210] Alberts DS, Smith CC, Parikh N, et al. Fentanyl sublingual spray for breakthrough cancer pain in patients receiving transdermal fentanyl[J]. Pain Manag, 2016, 6(5): 427-434. DOI: 10.2217/pmt-2015-0009.

[211] Thronæs M, Popper L, Eeg M, et al. Efficacy and tolerability of intranasal fentanyl spray in cancer patients with breakthrough pain[J]. Clin Ther, 2015, 37(3): 585-596. DOI: 10.1016/j.clinthera.2014.12.010.

（收稿日期：2024-08-15）

（本文编辑：杨棋棋，吴振华，张立生）

**执笔人简介**

程志祥，男，1972年7月出生，博士学位，主任医师，硕士研究生导师，南京医科大学第二附属医院疼痛科主任；专业特长：慢性疼痛诊疗；研究方向：体外冲击波疗法临床应用、富血小板血浆临床应用及数字疗法在慢性疼痛治疗中应用。

**通信作者简介**

刘延青，男，1957年10月出生，硕士，主任医师、教授，现任全国疼痛病学继续教育培训学院院长。中华医学会疼痛学分会前任主任委员，中国老年保健协会疼痛病学分会会长，《中华疼痛学杂志》副总编，《中国疼痛医学杂志》副主编，国家卫健委疼痛病诊疗专项能力培训项目专家组组长，全国继续医学教育委员会专家组成员。2017年获得人民网组织评选的“国家名医——卓越建树”称号。从事慢性疼痛病诊疗工作30余年；主编人卫版《实用疼痛学》《疼痛病学诊疗手册》系列丛书，参编专著11本，发表论文90余篇，获省部级科技进步奖2项，局级科技奖7项。1999年被评为北京市卫生系统先进个人；2002年荣获“首都五一劳动奖章”。

**本文引用格式**

中国慢性癌症相关性疼痛诊疗指南制订专家组, 中国老年保健协会疼痛病学分会. 中国慢性癌症相关性疼痛诊疗指南(2024版)[J]. 中华疼痛学杂志, 2024, 20(5): 646-664. DOI: 10.3760/cma.j.cn101658-20240815-00115.