

Review Article

A Chinese Guideline for the Diagnosis and Treatment of Chronic Cancer-related Pain

Cheng Zhixiang¹ , Ma Ke² , Wang Jianxiu³ , Wang Dequan⁴ , Shi Cunwei⁵ ,
Liu Jinfeng⁶ , Liu Haipeng⁷ , Song Tao⁸ , Zhang Baojuan⁹ , Lin Xuewu¹⁰ ,
Zhou Huacheng¹¹ , Wan Chunfu¹² , Cao Hanzhong¹³ , Shu Ya¹⁴ ,
Fan Xiaochong¹⁵ , Liu Yanqing¹⁶ 

¹Department of Painology, The Second Affiliated Hospital of Nanjing Medical University, Nanjing, China

²Department of Painology, Xinhua Hospital Affiliated to Shanghai Jiao Tong University School of Medicine, Shanghai, China

³Department of Painology, Zibo Central Hospital, Zibo, China

⁴Department of Painology, People's Hospital of Xinjiang Uygur Autonomous Region, Urumqi, China

⁵Department of Painology, Qinghai University Affiliated Hospital, Xining, China

⁶Department of Painology, The Second Affiliated Hospital of Harbin Medical University, Harbin, China

⁷Department of Painology, Gansu Provincial Hospital, Lanzhou, China

⁸Department of Painology, The First Hospital of China Medical University, Shenyang, China

⁹Department of Painology, The First People's Hospital of Jining City, Jining, China

¹⁰Department of Painology, The First Affiliated Hospital of Bengbu Medical University, Bengbu, China

¹¹Department of Painology, The Fourth Affiliated Hospital of Harbin Medical University, Harbin, China

¹²Department of Painology, The Fourth Hospital of Hebei Medical University, Shijiazhuang, China

¹³Department of Painology, Nantong Tumor Hospital, Nantong University, Nantong, China

¹⁴Department of Painology, The First Affiliated Hospital of Xi'an Medical University, Xi'an, China

¹⁵Department of Painology, The First Affiliated Hospital of Zhengzhou University, Zhengzhou, China

¹⁶Department of Painology, Beijing Tiantan Hospital, Capital Medical University, Beijing, China

Abstract

Background: 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. **Objective:** To further enhance the diagnosis and treatment capabilities for chronic cancer-related pain management, the Chinese Clinical Guideline for Chronic Cancer-Related Pain convened an expert panel to develop the guideline. **Main ideas:** 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

*Corresponding author: lyqytyy@126.com (Liu Yanqing)

Received: 24 June 2025; **Accepted:** 7 July 2025; **Published:** 28 July 2025



Copyright: © The Author(s), 2025. Published by Science Publishing Group. This is an **Open Access** article, distributed under the terms of the Creative Commons Attribution 4.0 License (<http://creativecommons.org/licenses/by/4.0/>), which permits unrestricted use, distribution and reproduction in any medium, provided the original work is properly cited.

cancer-related pain. This guideline adopts GRADE methodology to evaluate the level of evidence and strength of recommendation for the treatments of chronic cancer-related pain. This guideline gives treatment recommendations for different types of chronic cancer-related pain in International Classification of Diseases-11, as well as for breakthrough cancer pain. **Conclusion:** Although there are many treatments to relieve chronic cancer-related pain, it is still a global medical challenge. According to the characteristics of cancer-related pain, stepped and personalized treatment is the key to relieve pain.

Keywords

Chronic Cancer-related Pain, Cancer Pain, Guideline

1. Introduction

Chronic cancer-related pain (CCRP) seriously endangers patients' physical and mental health, accelerates disease progression, impairs physiological function, and may even force the interruption of anti-tumor therapy, ultimately leading to shortened survival [1]. Compared to death, cancer patients fear cancer pain more. Relief from CCRP is a legitimate demand and fundamental right for patients, while controlling and eliminating it is the duty of healthcare professionals. Although academic organizations, institutions, and expert groups worldwide have published numerous principles, standards, expert consensus reports, and clinical guidelines for managing CCRP, a clinical diagnosis and treatment guideline for CCRP fully based on the International Classification of Diseases-11 (ICD-11) has yet to be released. To further enhance the diagnosis and treatment capabilities for CCRP and meet clinical needs, we have organized a panel of domestic experts in pain medicine to develop the Chinese Clinical Guideline for Chronic Cancer-Related Pain. It should be noted that, due to space limitations, this guideline cannot cover every detailed aspect of CCRP diagnosis and treatment.

2. Guideline Development Methodology

The literature search period was from January 2014 to May 2024. The search terms included 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, etc. Data sourced from Wanfang, China National Knowledge Infrastructure (CNKI), PubMed, and Cochrane Library. Selected high-grade evidence literature such as systematic review, meta-analysis, randomized controlled trials (RCTs), expert consensus, and clinical guidelines as the basis. After multiple rounds of discussion and online voting using the Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology (Table 1) and consensus conference method, this guideline was ultimately developed [2-4].

Table 1. GRADE System Evidence Quality and Recommendation Strength.

Level	Description
Evidence Quality	
High (A)	We are very confident that the true effect lies close to the estimate.
Moderate (B)	We are moderately confident in the effect estimate: The true effect is likely close to the estimate, but there is a possibility of substantial difference.
Low (C)	Our confidence in the effect estimate is limited: The true effect may be substantially different.
Very Low (D)	We have very little confidence in the effect estimate: The true effect is likely substantially different.
Recommendation Strength	
Strong (1)	Most individuals in this situation would want the recommended course of action, and only a small proportion would not; most clinicians should adopt the intervention; >70% panel agreement.
Weak (2)	Most individuals would choose the recommended course, but many would not; clinicians should help patients make decisions consistent with values/preferences; 50–70% panel agreement.

Level	Description
No Recommendation (3)	Trade-offs uncertain; target population unclear; insufficient evidence; <50% panel agreement.

3. Overview of CCRP

3.1. Definition

CCRP refers to chronic pain caused either by the cancer itself or its metastases, as well as pain resulting from cancer treatments [5, 6].

3.2. Epidemiology

CCRP can occur at any stage of cancer. Approximately 25.0% of newly diagnosed cancer patients, 75.0% of metastatic cancer patients, and 59.0% of patients currently undergoing anticancer treatment report pain. Notably, one-third of patients continue to experience pain even after completing curative treatment [7]. Among patients with advanced cancer nearing the end of life, 66.0% have experienced pain, with 55.0% reporting moderate to severe pain [5, 6].

3.3. Category [5-7]

According to the causes of pain, CCRP is divided into chronic cancer pain (CCP) and chronic post-cancer treatment pain (CPCTP).

3.3.1. CCP

Including chronic visceral cancer pain (CVCP), chronic bone cancer pain (CBCP), chronic neuropathic cancer pain (CNCP), etc.

- 1) CVCP It refers to the chronic pain caused by the injury of internal organs in the head and neck or chest, abdomen and pelvic cavity by the primary tumor and tumor metastasis. For example, pain caused by liver metastasis, pancreatic tumor invasion of celiac plexus, and retrosternal pain caused by local progression of esophageal or lung tumor.
- 2) CBCP It refers to chronic pain caused by the destruction or damage of bone by primary tumor and tumor metastasis, and is the most common type of CCP. Because primary bone tumors are relatively rare, pain caused by metastasis of tumors from other parts to bone is the most common type of CBCP.
- 3) CNCP It refers to the chronic pain caused by the destruction or damage of the peripheral or central nervous system by the primary tumor or tumor metastasis. Chronic peripheral neuropathic cancer pain includes destruction of brachial plexus by primary or metastatic

tumors in the chest, or injury of lumbosacral plexus by abdominal and pelvic tumors. Spinal cord compression (vertebral collapse caused by cancer bone metastasis) can lead to chronic central neuropathic cancer pain.

3.3.2. CPCTP

Including chronic post-cancer medicine pain (CPCMP), chronic post-radiotherapy pain (CPRP), chronic post-cancer surgery pain (CPCSP), etc.

- 1) CPCMP It refers to chronic pain caused by any anti-cancer drugs, including drugs used in systemic chemotherapy, hormone therapy and biological therapy. Chronic painful chemotherapy induced polyneuropathy (CIPN) is a diagnostic category of ICD-11. Among female breast cancer patients receiving hormone therapy, 45% were accompanied by chronic joint pain, which showed symmetrical joint pain, and the most common parts were wrists, hands, and knees. Chronic painful chemotherapy induced neuropathy (CPCIN) refers to chronic peripheral neuropathic pain caused by oral or intravenous chemotherapy for the treatment of primary tumor or tumor metastasis.
- 2) CPRP It refers to the chronic pain caused by the delayed damage of nerves, bones or soft tissues in the irradiation field when radiotherapy is performed on the primary tumor or metastatic tumor. The occurrence of this kind of pain can begin within a few months or years after the end of radiotherapy. The risk factors for the occurrence include the excessive total treatment dose, the excessive dose of each radiotherapy, and the combined use of surgery or chemotherapy.
- 3) CPCSP It refers to pain caused by cancer surgery or invasive operation (such as tissue biopsy or chest drainage tube insertion). It is particularly common after breast cancer surgery (pain after mastectomy) or lung cancer surgery (pain after thoracotomy).

4. Mechanisms of CCRP

The mechanism of CCRP is complex and unique, involving the interaction between tumor tissue, normal tissue, tumor microenvironment, nervous system and immune system [8, 9].

4.1. Mechanisms of Cancer-related Nociceptive Pain

During tumorigenesis and progression, tumor infiltration, compression, and metastasis lead to the release of inflamma-

tory mediators including prostaglandin E2 (PGE2), bradykinin, substance P, and tumor necrosis factor (TNF). These mediators directly interact with receptors or ion channels on peripheral sensory nerves innervating cancerous tissues, thereby inducing pain [9]. Cancer-related bone pain, particularly associated with osteolytic metastases or bone destruction, is mediated by excessive secretion of inflammatory factors during osteoclastic activity. These biochemical agents stimulate sensitive nerve fibers, resulting in severe pain [10].

4.2. Mechanisms of Cancer-related Neuropathic Pain

Malignant involvement of the somatosensory nervous system represents the primary pathogenic mechanism. Tumor cells may directly infiltrate peripheral nerves or induce immune-mediated neural invasion, while mass compression, radiotherapy, chemotherapy, and surgical interventions can all contribute to neural injury. These pathological processes may disrupt axonal transport, alter ion channel and receptor activity, and cause neuronal damage, inflammation, oxidative stress, and mitochondrial dysfunction. Such changes ultimately lead to peripheral and central nervous system sensitization, resulting in neuropathic pain [9, 11].

4.3. Other Mechanisms

Psychological and stress-related mechanisms also play significant roles in CCRP pathogenesis. Cancer-related visceral pain frequently induces alterations in patients' psychological status and increased stress levels, which may further exacerbate pain perception through neuroendocrine pathways and central sensitization [12].

5. Clinical Features of CCRP

- 1) Persistent chronic pain lasting throughout the disease course, characterized by nocturnal pain and pain at rest.
- 2) Frequent episodes of severe, intolerable breakthrough pain.
- 3) Manifests as "total pain" - a multidimensional experience encompassing: somatic components, psychological distress, spiritual suffering, social dimensions.

6. Diagnostic Workup

6.1. Laboratory Test

Standard laboratory workup should encompass complete blood count (CBC), assessment of liver and renal functions, electrolyte measurements, coagulation studies, and tumor marker testing.

6.2. Imaging Examinations

6.2.1. X-ray

X-ray examination provides high spatial resolution but limited density resolution, making it suitable for imaging bones and air-containing tissues, primarily used to identify fractures and similar conditions.

6.2.2. Computed Tomography (CT)

CT clearly visualizes most human tissues and organs, including bones. Contrast-enhanced CT further improves tissue density differentiation and resolution.

6.2.3. Magnetic Resonance Imaging (MRI)

MRI offers superior soft tissue contrast and is particularly valuable for evaluating neural structures, commonly employed to detect spinal canal involvement.

6.2.4. Positron Emission Tomography (PET)

PET represents a highly efficient, safe, and non-invasive modality that ensures diagnostic accuracy, demonstrating particular advantages in cases of suspected multiple metastases.

6.2.5. Single-photon Emission Computed Tomography (SPECT/ECT)

SPECT/ECT not only displays morphological structures of organs or lesions but also provides functional and metabolic information, exhibiting high sensitivity for detecting metastatic bone tumors.

6.2.6. Ultrasonography

Ultrasonography enables observation of fine visceral structures and functional status while permitting real-time evaluation of muscle and tendon movement, playing a crucial role in diagnosing abdominal, pelvic, and extremity soft tissue disorders.

6.2.7. Medical Infrared Thermography

Medical infrared thermography utilizes sensitive detection of surface temperature variations through bilateral comparative analysis, allowing early identification of pathologies that alter surface temperature patterns, including vascular dysfunction, inflammatory processes, and neoplastic conditions.

7. Diagnostic Criteria and Pain Assessment

7.1. Diagnostic Criteria

- 1) Documented history of malignancy with confirmed pathological diagnosis.
- 2) In cases lacking definitive pathological confirmation,

the presence of characteristic cancer manifestations supported by imaging studies and laboratory findings is required.

- 3) Pain etiology must be directly attributable to either tumor progression/metastasis or antineoplastic therapies.

7.2. Pain Assessment

Pain assessment is the premise of obtaining reasonable and effective treatment for CCRP.

7.2.1. Assessment Principles [13]

- 1) Initial assessment: Healthcare providers must screen and assess pain during the first clinical encounter with cancer patients.
- 2) Routine assessment: Perform pain evaluation at least once daily.
- 3) Quantitative assessment: Use pain intensity scales to quantify and document patient-reported pain levels.
- 4) Comprehensive assessment: Evaluate pain type, temporal pattern, triggering factors, and treatment response.
- 5) Dynamic assessment: Conduct continuous pain monitoring across all care settings including outpatient visits, hospitalization, post-discharge, and before/after pain management interventions.

7.2.2. Assessment Tools

Appropriate pain intensity scales should be selected based on individual patient conditions to record pain levels, with psychological assessment performed when necessary. Commonly used pain assessment tools include [13]:

- 1) Numerical Rating Scale (NRS)
- 2) Visual Analogue Scale (VAS)
- 3) Faces Pain Scale (FPS)
- 4) Brief Pain Inventory (BPI)
- 5) Distress Thermometer (DT)
- 6) Patient Health Questionnaire-9 (PHQ-9)
- 7) Generalized Anxiety Disorder-7 (GAD-7)

8. Treatments

8.1. Principles of Treatment

CCRP has complex pathogenesis and requires individualized treatment based on pain etiology, characteristics, and patient's physical condition [14, 15]. The three-step analgesic ladder proposed by the World Health Organization (WHO) remains the primary approach for cancer pain management [16]. Standardized pain assessment, standardized treatment [17], and palliative care [18, 19] can effectively relieve pain and improve quality of life.

8.2. Goals of Treatment

The "5A" goals of cancer pain management [14, 15]:

- 1) Analgesia: Optimize pain relief.
- 2) Activities: Optimize daily activities (psychosocial function).
- 3) Adverse effects: Minimize adverse events.
- 4) Aberrant behavior: Monitor abnormal medication use.
- 5) Affect: Address the relationship between pain and mood.

8.3. Treatment Methods

The management of CCRP should prioritize etiological treatment, particularly antitumor therapy, followed by targeted individualized analgesic approaches including general therapy, pharmacotherapy, physical therapy, traditional Chinese medicine, psychotherapy, digital healthcare, and minimally invasive interventions [20].

Table 2. Evidence Quality and Recommendation Strength for General Therapies.

Intervention	Evidence Level	Recommendation Strength
Health education [22-24]	A	1
Self-management [25-27]	A	1

8.3.1. General Treatment

General treatment primarily includes health education and self-management (Table 2).

- 1) Health Education: Health education for patients and their families should cover treatment goals, therapeutic methods, and potential adverse effects. This education helps develop patients' self-control abilities, improves treatment compliance, significantly reduces pain intensity and frequency, and enhances quality of life [21].
- 2) Self-Management: Cancer pain self-management refers to patients managing their own pain by integrating pain relief strategies into daily life [21]. Effective pain management requires both professional guidance from healthcare providers and active patient participation in self-management.

8.3.2. Pharmacological Treatment

(i) Overview: Pharmacological treatment is the most important and commonly used approach for CCRP management. Standardized and effective drug therapy can alleviate 80-90% of CCRP cases. Potent opioids form the cornerstone of CCRP treatment, with morphine being the gold standard among

strong opioids [28].

(ii) Medication categories for cancer pain management:

The primary medications used for CCRP treatment include analgesics and adjuvant analgesic drugs.

Table 3. Evidence Quality Grading and Recommendation Strength for Analgesics.

Drug Class	Drug Name	CVCP	CNCP	CPCMP	CPRP
NSAIDs	Indomethacin [29, 41]			B2	B2
	Diclofenac [29, 42, 43]	B2			B2
Opioid-like agents	Tramadol [44, 45]	A2			
Weak opioids	Codeine [46]	A2			
	Morphine [30, 47-49]	A1			
	Oxycodone [28, 47, 49-52]	A1			
	Fentanyl [32, 47, 48, 53]	A1			
Strong opioids	Hydromorphone [54-57]	A1			
	Buprenorphine [47, 58]	A2			
	Methadone [59-64]	B2	B2		B2
	Dezocine [45, 65, 66]	B2			
Combination Analgesia	Oxycodone/Naloxone Prolonged-Release Tablets [67-70]	A1			
	Oxycodone/Acetaminophen Tablets [71]	B2			

Abbreviations: CVCP, Chronic Visceral Cancer Pain; CNCP, Chronic Neuropathic Cancer Pain; CPCMP, Chronic Post-Cancer Treatment Medication Pain; CPRP, Chronic Post-Radiotherapy Pain; NSAIDs, Non-Steroidal Anti-Inflammatory Drugs.

Analgesics (Table 3 [28, 29, 41-71]):

A. Non-steroidal anti-inflammatory drugs (NSAIDs): Celecoxib, Ibuprofen, Indomethacin, Diclofenac, Dexametoprolfen Trometamol [29].

B. Opioids: Morphine, oxycodone, fentanyl. morphine or oxycodone are first-line oral opioids for moderate-to-severe CCRP [28, 30]. Compared with oral opioids, transdermal fentanyl shows more advantages in treating moderate-to-severe CCRP [31, 32], making transdermal administration the optimal choice for patients with stable opioid requirements [33]. Fentanyl

transdermal patches are preferred for: patients unable/unwilling to take oral medications; those with moderate-to-severe hepatic/renal dysfunction; malignant bowel obstruction; chronic/refractory constipation; intolerable nausea/vomiting from oral opioids; and those with poor oral medication compliance [34].

C. Biotoxins: cobra neurotoxin, tetrodotoxin [35, 36], botulinum toxin [37, 38]. Chinese cobra neurotoxin has been developed into an analgesic for CCRP treatment [39, 40].

Adjuvant analgesics (Table 4 [43, 63, 72-85]):

Table 4. Evidence Quality Grading and Recommendation Strength for Adjuvant analgesics.

Drug Class	Drug Name	CVCP	CNCP	CPCMP	CPRP	CPCSP
Calcium channel modulators	Gabapentin [63, 74]	A2			B2	
	Pregabalin [63, 74-78]	A1	A1	A1	A1	
Tricyclic antidepressants	Amitriptyline [43, 74]	B2			B2	
	Doxepin [43, 77]			B2	B2	
SNRIs	Duloxetine [75, 76, 79-81]		A1	A1		
	Venlafaxine [74, 79]	A2		B2		

Drug Class	Drug Name	CVCP	CNCP	CPCMP	CPRP	CPCSP
Other	Lidocaine [82]	B2				
	Capsaicin [83, 84]	B2				B2
	Ketamine [63, 85]	B2			B2	

Abbreviations: CVCP, Chronic Visceral Cancer Pain; CNCP, Chronic Neuropathic Cancer Pain; CPCMP, Chronic Post-Cancer Treatment Medication Pain; CPRP, Chronic Post-Radiotherapy Pain; NSAIDs, Non-Steroidal Anti-Inflammatory Drugs; CPCSP, Post-mastectomy/post-thoracotomy pain; SNRIs, Serotonin-norepinephrine reuptake inhibitors

A. Calcium channel modulators: gabapentin, pregabalin.

B. Tricyclic antidepressants: amitriptyline, doxepin.

C. Serotonin-norepinephrine reuptake inhibitors (SNRIs): Duloxetine, Venlafaxine.

D. Other medications: lidocaine, capsaicin, ketamine, cor-

ticosteroids, tetrandrine, spleen polypeptide injection [72, 73, 82-84].

(iii) Opioid dose conversion, titration, common adverse effects and management, and usage principles.

Opioid dose conversion (Table 5)

Table 5. Opioid Dose Conversion Between Different Administration Routes.

Morphine (mg/day)	Fentanyl (µg/hour)			Oxycodone (mg/day)		Codeine (mg/day)	
Intravenous/Subcutaneous /Epidural/Intrathecal	Oral	Parenteral	Patch	Intravenous/Subcutaneous	Oral	Intravenous/Subcutaneous	Oral
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

Opioid rotation refers to switching between different opioid medications or different formulations of the same opioid to achieve a balance between pain control and adverse effects. Opioid rotation can improve analgesic efficacy and patient satisfaction [86].

Principles of opioid dose titration:

A. The goal is to achieve effective analgesia rapidly and administer as-needed doses for breakthrough pain.

B. Titration should be simple and flexible, following the principle of combining short-acting drugs for titration with controlled/extended-release formulations to man-

age both baseline pain and breakthrough pain.

C. When rapid dose titration is required, fast-onset short-acting drugs are recommended, preferably via subcutaneous or intravenous routes.

D. Opioid titration is the optimal method to balance moderate-to-severe cancer pain relief with tolerable adverse effects, and rapid dose titration facilitates early pain control [87].

Common adverse effects of opioids and their management (Table 6 [88]).

Principles of opioid administration

Table 6. Common Adverse Effects of Opioids and Their Management.

Adverse Effect	Clinical Manifestations	Management Strategies
Nausea / Vomiting	These adverse effects are dose-dependent and self-limiting, typically becoming tolerable within 3-7 days of drug initiation.	Metoclopramide, promethazine, haloperidol, and chlorpromazine. Intravenous granisetron and ondansetron.
Constipation		Therapeutic agents include methylnaltrexone [88], etc. Laxatives consist of lubricants (docusate sodium, senna, bisacodyl), bulk-forming agents (plant fiber), osmotic

Adverse Effect	Clinical Manifestations	Management Strategies
Respiratory Depression	Dose-dependent, more likely with intravenous administration. Respiratory depression typically becomes tolerable within 5-7 days after initiating medication.	agents (lactulose), and stool softeners. Non-pharmacological methods are also effective, such as increased fluid intake and activity, and regular bowel habits. Arouse the patient, apply painful stimulation to induce respiration. Administer naloxone for antagonism.
Urinary Retention		Apply non-pharmacological methods, such as listening to running water, perineal heat compress, gentle bladder massage, acupuncture, etc. If ineffective, catheterization may be performed.
Pruritus		Antihistamines remain first-line treatment for pruritus, commonly used medications include diphenhydramine, promethazine, cyproheptadine, etc. Basic therapy involves enhanced skin care and wearing soft cotton undergarments.
Sedation / Somnolence		Dose reduction or switching to alternative opioids is required, and low-dose central nervous system stimulants may also be utilized for treatment.

A. The five fundamental principles of opioid therapy for cancer pain:

- 1) Non-invasive routes (oral, transdermal, or transmucosal administration).
- 2) Around-the-clock dosing.
- 3) By-the-ladder approach.
- 4) Individualized dosage.
- 5) Attention to therapeutic details.

B. Supplementary clinical principles:

- 1) Early intervention.
- 2) Alternative administration routes.
- 3) Opioid rotation.
- 4) Combination pharmacotherapy.
- 5) Three-step analgesic ladder for cancer pain management.

First step (mild pain):

Non-opioid analgesics (e.g., NSAIDs) are recommended. These medications exhibit a ceiling effect for analgesia.

Second step (moderate pain):

Weak opioids (e.g., codeine, tramadol), which may be combined with NSAIDs, are employed. Weak opioids also demonstrate a ceiling effect.

Third step (severe pain):

Strong opioids (e.g., morphine) without a ceiling effect are utilized, allowing for dose escalation as needed.

8.3.3. Physical Therapy

Physical therapy for CCRP primarily includes photobiomodulation therapy (PBMT), low-level laser therapy (LLLT), transcutaneous electrical nerve stimulation (TENS), scrambler therapy (ST), transcranial direct current stimulation (tDCS), manual therapy (MT), exercise therapy, stereotactic body radiotherapy (SBRT), magnetic resonance-guided focused ultrasound (MRgFUS), and radionuclide therapy, all of which are widely used in CCRP treatment (Table 7 [89-109]).

Table 7. Evidence Quality Grading and Recommendation Strength for Physical therapy.

Treatment	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
Exercise Therapy [101, 102]			B2		

Treatment	CVCP	CNCP	CPCMP	CPRP	CPCSP
SBRT [103-106]	B2	A1			
Radionuclide Therapy [107, 108]		A2			
MRgFUS [109]		B2			

Abbreviations: CVCP, Chronic Visceral Cancer Pain; CNCP, Chronic Neuropathic Cancer Pain; CPCMP, Chronic Post-Cancer Treatment Medication Pain; CPRP, Chronic Post-Radiotherapy Pain; NSAIDs, Non-Steroidal Anti-Inflammatory Drugs; CPCSP, Post-mastectomy/post-thoracotomy pain; PBMT, Photobiomodulation Therapy; LLLT, Low-Level Laser Therapy; TENS, Transcutaneous Electrical Nerve Stimulation; ST, Scrambler Therapy; tDCS, ranscranial Direct Current Stimulation; MT, manual therapy; SBRT, Exercise Therapy, Stereotactic Body Radiotherapy; MRgFUS, Magnetic Resonance-guided Focused Ultrasound

8.3.4. Traditional Chinese Medicine (TCM) Treatment

Table 8. Evidence Quality Grading and Recommendation Strength for Traditional Chinese Medicine (TCM).

TCM	CVCP	CBCP
Fufang Kushen Zhushuye [111, 112] (<i>Sophora flavescens Aiton</i>)	B2	B2
Cinobufotalin [113]	B2	
Shuangbai Powder [114] (<i>Rheum palmatum</i> , <i>Mentha haplocalyx</i> , <i>Phellodendron chinense</i> , <i>Lycopus lucidus</i> , <i>Platycladus orientalis</i>)	B2	

Abbreviations: CVCP, Chronic Visceral Cancer Pain; CBCP, Chronic Bone Cancer Pain.

Table 9. Evidence Quality Grading and Recommendation Strength for External Traditional Chinese Medicine (TCM) therapy.

Treatment	CVCP	CBCP	CPCMP	CPRP	CPCSP
Acupuncture [116, 117]	B3		B3		
Moxibustion [118-125]	A2	A2	A2		A2
Electroacupuncture [126]	B2				
Body Acupuncture [127]	B2	B2		B2	
Acupoint Injection [128]	B3				
Auricular Therapy [129]	B3				
Auricular Plaster Therapy [130]	B3				
Therapeutic Massage (Tuina) [131, 132]	B3		B3		
Aromatherapy [133]	B2				

Abbreviations: CVCP, Chronic Visceral Cancer Pain; CBCP, Chronic Bone Cancer Pain; CPCMP, Chronic Post-Cancer Treatment Medication Pain; CPRP, Chronic Post-Radiotherapy Pain; NSAIDs, Non-Steroidal Anti-Inflammatory Drugs; CPCSP, Post-mastectomy/post-thoracotomy pain

Based on syndrome differentiation theory, TCM approaches for CCRP mainly include internal and external therapies.

- 1) Internal TCM treatments primarily involve herbal decoctions and Chinese patent medicines, which can alleviate pain and reduce opioid-related adverse effects as

adjuvant therapies for cancer pain (Table 8 [110-114]).

- 2) External TCM therapies mainly consist of acupuncture, moxibustion, electroacupuncture, massage, auricular therapy, acupoint injection, and aromatherapy (Table 9 [115-133]).

8.3.5. Psychotherapy

Psychotherapy refers to the therapeutic process of applying psychological principles and methods to establish a positive treatment relationship and interaction with patients while utilizing professional theories and techniques. Cancer pain patients often exhibit emotional disturbances such as anxiety, fear, and depression, and may even develop suicidal tendencies,

making psychotherapy essential. Common psychological interventions for cancer pain management include cognitive-behavioral therapy (CBT), mindfulness-based cognitive therapy (MBCT), mindfulness-based stress reduction (MBSR), hypnosis, music therapy, guided imagery, muscle relaxation training, mind-body therapy, and neurofeedback (NFB) (Table 10 [134-153]).

Table 10. Evidence Quality Grading and Recommendation Strength for Psychotherapy.

Treatment	Evidence Level	Recommendation Strength
CBT [134]	A	2
Mind-Body Therapy [135]	A	2
MBCT [136-140]	A	1
MBSR [139-141]	A	2
Hypnotherapy [142-144]	B	2
Progressive Muscle Relaxation [137, 145]	B	2
Guided Imagery [137, 145]	B	3
Music Therapy [146-150]	B	2
NFB [151-153]	B	2

Abbreviations: CBT, Cognitive Behavioral Therapy; MBCT, Mindfulness-Based Cognitive Therapy; MBSR, Mindfulness-Based Stress Reduction; NFB, Neurofeedback Therapy

8.3.6. Digital Healthcare

Digital healthcare represents a novel medical approach that applies modern digital information technologies throughout

the entire healthcare process, having evolved from e-health and telemedicine to mobile health and now digital therapeutics (DTx) (Table 11 [26, 154-164]).

Table 11. Evidence Quality Grading and Recommendation Strength for Digital Healthcare.

Treatment	Evidence Level	Recommendation Strength
E-Health [154]	B	2
Telemedicine [155, 156]	B	2
Mobile Health [26, 157-161]	B	2
Digital Therapeutics [157, 162-164]	B	2

8.3.7. Minimally Invasive Interventional Therapy

Minimally invasive interventional treatments primarily include patient-controlled analgesia (PCA), neurolytic ablation, percutaneous vertebroplasty, radioactive seed implantation, and intrathecal drug delivery systems (IDDS).

1) PCA Technology

Definition

PCA is a pain management technique where healthcare providers preset analgesic dosages based on patients' pain levels and physical conditions, then allow patients to self-administer medication [165]. PCA offers rapid onset, stable blood concentration, effective analgesia, on-demand dosing, and high individualization.

Classification

PCA primarily includes: Patient-controlled intravenous analgesia (PCIA), Patient-controlled subcutaneous analgesia (PCSA), Patient-controlled epidural analgesia (PCEA), Intrathecal PCA, Regional block PCA.

Indications

- A. Patients with difficulty taking oral medications, gastrointestinal dysfunction, or bowel obstruction caused by digestive tract tumors.
- B. Patients with inadequate pain relief from high-dose oral analgesics or who have developed tolerance.
- C. Patients experiencing severe adverse effects from oral medications.
- D. Opioid dose titration.
- E. Patients with frequent cancer-related breakthrough pain (≥ 5 episodes daily).

Intelligent PCA Management

Cancer pain management requires long-term, dynamic monitoring and controlled substance regulation, necessitating digitalized platforms. A smart pain management platform connects tertiary-secondary-community-home care institutions and providers into a unified network, enabling standardized remote monitoring and real-time communication between providers and patients. AI-enhanced PCA (Ai-PCA) integrates IoT and AI technologies through terminals, wireless transmission, and central control systems, providing intelligent analysis, alerts, and remote monitoring for comprehensive, personalized PCA management [166-169].

2) Neurolytic Ablation

Neurolytic ablation is an interventional technique that involves applying chemical agents or physical modalities to target nerves in the pain region, inducing nerve tissue degeneration and structural damage to partially or completely disrupt sensory transmission, thereby achieving prolonged analgesia. Based on the ablation method, it is classified into chemical neurolysis and physical neurolysis.

Chemical Neurolysis

Chemical neurolysis involves the precise interventional application of chemical agents to the epidural space, subarachnoid space, nerve roots, nerve trunks, nerve plexuses, or even intratumoral nerve endings to control severe cancer-related pain without causing significant adverse effects. Neurolytic agents include absolute ethanol, phenol, doxorubicin, and methylene blue, with absolute ethanol being the most commonly used. The analgesic effect of chemical neurolysis typically lasts 2-4 months.

Physical Neurolysis

Physical neurolysis utilizes physical methods to induce nerve damage, partially or completely interrupting sensory nerve conduction to achieve analgesia. Common techniques include splanchnic nerve neurolysis (SNN), endoscopic ultrasound-guided celiac plexus neurolysis (EUS-CPN), radiofrequency ablation (RFA), EUS-guided radiofrequency

ablation (EUS-RFA), percutaneous thermal ablation (PTA), microwave ablation, cryoablation, and high intensity focused ultrasound (HIFU).

3) Percutaneous Vertebroplasty

Percutaneous vertebroplasty (PVP), formally known as percutaneous puncture vertebroplasty, is a technique that involves injecting bone cement (polymethylmethacrylate) or artificial bone into affected vertebral bodies to reinforce their structural integrity. Percutaneous kyphoplasty (PKP), an advanced modification of PVP, utilizes balloon expansion prior to staged bone cement injection, thereby reducing cement leakage risks. PKP demonstrates superior vertebral stabilization and height restoration capabilities compared to PVP. Both PVP and PKP effectively alleviate pain from primary or metastatic vertebral tumors while enhancing spinal stability, with additional tumoricidal effects that may inhibit neoplastic progression.

4) Radioactive Seed Implantation

Radioactive seed implantation is a procedure that involves precisely placing miniature radiation sources (^{125}I) into tumors under CT or DSA guidance using implantation needles. The seeds continuously emit γ -rays and X-rays, which destroy tumor cells through direct DNA ionization damage and indirect oxygen free radical generation. Clinical observations have demonstrated that ^{125}I seed implantation exhibits significant analgesic effects on cancer-related pain. This technique offers advantages including high intra-tumoral radiation dose concentration, low peripheral tissue exposure, excellent dose conformity, minimal complications, and good patient tolerance.

5) Intrathecal Drug Delivery System

The Intrathecal Drug Delivery System (IDDS) administers medications to the subarachnoid space at precisely controlled rates. By bypassing the blood-brain barrier and acting directly on the central nervous system, intrathecal delivery achieves significant analgesia with minimal doses, thereby reducing systemic adverse effects. IDDS should be considered for patients who cannot tolerate medication side effects and/or experience inadequate pain control with systemic opioids [170]. Intrathecal analgesia represents a viable treatment option for cancer patients at any disease stage, particularly prioritized for those with limited life expectancy to achieve timely pain relief. According to the Chinese Expert Consensus on Intrathecal Drug Infusion for Cancer Pain Management (2022 Edition), intrathecal regimens should be opioid-centric with stepwise medication protocols [171]. Opioids alone or combined with local anesthetics constitute first-line intrathecal therapy for cancer pain. The most common IDDS complication is low-pressure headache, while frequent adverse effects include urinary retention, nausea, and vomiting.

Evidence levels and recommendation strengths for commonly used minimally invasive interventions are presented in Table 12 [55, 57, 165, 169, 170, 172-204].

Table 12. Evidence Quality Grading and Recommendation Strength for Minimally Invasive Interventional Therapy.

Type	Treatment	Evidence Level	Recommendation Strength
PCA	PCIA [57, 165, 172-174]	A	1
	PCSA [55, 165, 174-176]	A	1
	PCEA [177, 178]	A	1
Chemical Neurolysis [179, 180]		B	1
Physical Neurolysis	SNN [181]	A	1
	EUS-CPN [182-185]	A	1
	EUS-RFA [186]	A	2
	PTA [187]	A	1
	RFA [188-195]	A	1
	Microwave Ablation [191, 192]	A	1
	Cryoablation [191, 192, 196, 197]	A	1
	HIFU [191, 192]	A	2
Percutaneous Vertebroplasty	PVP [198-200]	A	1
	PKP [198-200]	A	1
Radioactive Seed Implantation [179, 201]		A	1
IDDS [169, 170, 203, 204]		A	1

Abbreviations: PCA, Patient-Controlled Analgesia; PCIA, Patient-Controlled Intravenous Analgesia; PCSA, Patient-Controlled Subcutaneous Analgesia; PCEA, Patient-Controlled Epidural Analgesia; SNN, Splanchnic Nerve Neurolysis; EUS-CPN, Endoscopic Ultrasound-Guided Celiac Plexus Neurolysis; RFA, Radiofrequency Ablation; EUS-RFA, EUS-Guided Radiofrequency Ablation; PTA, Percutaneous Thermal Ablation; HIFU, High Intensity Focused Ultrasound; PVP, Percutaneous Vertebroplasty; PKP, Percutaneous Kyphoplasty

8.3.8. Rehabilitation Therapy

Rehabilitation for cancer pain patients is a comprehensive and individualized process that should be customized based on each patient's specific condition and needs. High-level evidence supports rehabilitation recommendations including long-term follow-up care, fatigue management, and psychosocial/mental health screening [205], all aimed at helping patients alleviate pain, restore physical and mental health, and improve quality of life.

8.3.9. Palliative Care

Following a diagnosis of advanced cancer, patients' primary concerns typically include physical symptoms and adverse effects, functional decline, potential disease progression, and survival duration. Appropriate palliative care approaches should focus on pain management, nutritional support, and psychological interventions to optimize quality of life [18, 19].

9. Breakthrough Cancer Pain

9.1. Concept

Breakthrough cancer pain (BTcP) refers to a transient pain exacerbation that occurs spontaneously or is triggered by specific factors despite relatively stable background pain control and adequate analgesic use, with a reported incidence of 33%-95%. BTcP is classified as either incident (precipitated) or spontaneous (idiopathic) - the former typically caused by predictable factors and thus more preventable, while the latter arises unpredictably and is more challenging to manage. BTcP represents a refractory cancer pain characterized by rapid onset, moderate-to-severe intensity, short duration, unpredictable nature, complex pathophysiology, and inherent treatment latency for all rescue medications.

9.2. Diagnostic Criteria [205]

- 1) Has the patient experienced persistent pain (background pain) in the past week?
- 2) Was the patient's background pain adequately controlled ($\text{NRS} \leq 3$) during this period?
- 3) Did the patient experience transient pain exacerbations ($\text{NRS} \geq 4$)?

Affirmative answers to all three questions confirm a BTcP diagnosis.

9.3. Treatment Methods

Etiological treatment is essential. BTcP management primarily involves opioid-based rescue therapy (with fentanyl preparations most frequently recommended) combined with minimally invasive interventions.

9.3.1. Pharmacological Treatment

Current domestic approaches primarily include: (1) rapid-onset rescue medications; (2) PCA typically administered via intravenous or subcutaneous routes. Commonly used

opioids comprise morphine and hydromorphone injections [56], with an emerging trend toward specialized fentanyl formulations including transmucosal oral lozenges, sublingual tablets, and nasal sprays [206-210].

9.3.2. Minimally Invasive Interventional Therapy

Appropriate selection of minimally invasive interventions can enhance cancer pain management efficacy while reducing BTcP frequency and intensity. Treatment options tailored to clinical conditions include: (1) tumor-targeted therapies (radioactive seed implantation, physical/chemical tumor ablation); (2) blockade of cancer pain pathways (splanchnic nerve/ganglion ablation, spinal nerve root/trunk neurolysis); (3) structural stabilization (percutaneous vertebroplasty/osteoplasty); (4) drug delivery optimization for enhanced efficacy and faster onset (IDDS, PCA).

10. Diagnostic and Therapeutic Pathway for CCRP

Diagnostic and Therapeutic Pathway is shown in Figure 1.

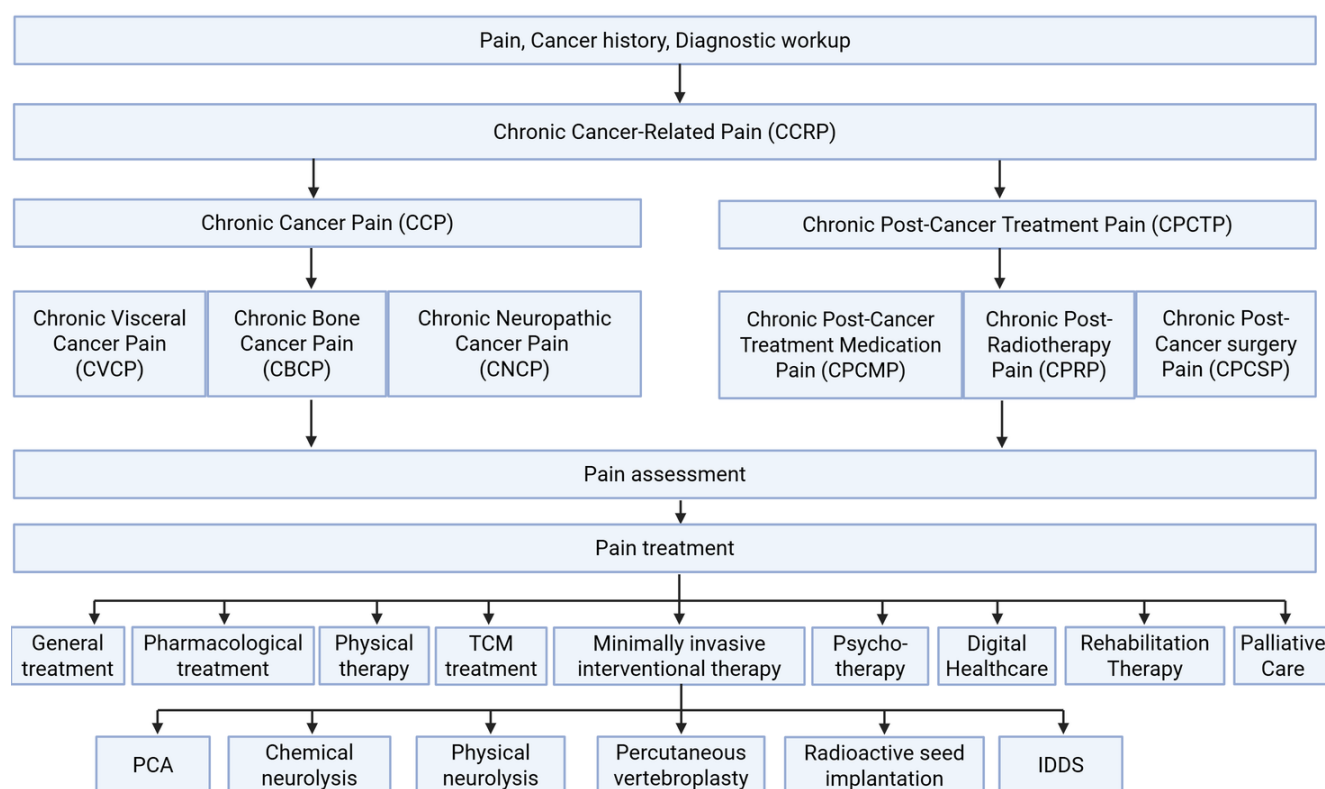


Figure 1. Diagnostic and Therapeutic Pathway for CCRP.

Notes: Chronic Cancer-Related Pain (CCRP); Chronic Cancer Pain (CCP); Chronic Visceral Cancer Pain (CVCP); Chronic Bone Cancer Pain (CBCP); Chronic Neuropathic Cancer Pain (CNCP); Chronic Post-Cancer Treatment Pain (CPCTP); Chronic Post-Radiotherapy Pain; (CPRP); Chronic Post-Cancer Treatment Medication Pain (CPCMP); Patient-Controlled Analgesia (PCA); Chronic Post-Cancer surgery Pain (CPCSP); Intrathecal Drug Delivery systems (IDDS)

Abbreviations

BTcP	Breakthrough Cancer Pain
BPI	Brief Pain Inventory
CCP	Chronic Cancer Pain
CCRP	Chronic Cancer-related Pain
CPCTP	Chronic Post-cancer Treatment Pain
CVCP	Chronic Visceral Cancer Pain
CBCP	Chronic Bone Cancer Pain
CNCP	Chronic Neuropathic Cancer Pain
CIPN	Chronic Painful Chemotherapy Induced Polyneuropathy
CPCIN	Chronic Painful Chemotherapy Induced Neuropathy
CPCMP	Chronic Post-cancer Treatment Medication Pain
CPRP	Chronic Post-radiotherapy Pain
CPCSP	Chronic Post-cancer Surgery Pain
CNKI	China National Knowledge Infrastructure
ICD-11	Classification of Diseases-11
CBT	Cognitive-behavioral Therapy
CBC	Complete Blood Count
CT	Computed Tomography
DT	Distress Thermometer
DTx	Digital Therapeutics
PGE2	Prostaglandin E2
TNF	Tumor Necrosis Factor
RCTs	Randomized Controlled Trials
GRADE	Grading of Recommendations Assessment, Development, and Evaluation
FPS	Faces Pain Scale
TCM	Traditional Chinese Medicine
TENS	Transcutaneous Electrical Nerve Stimulation
tDCS	Transcranial Direct Current Stimulation
GAD-7	Generalized Anxiety Disorder-7
IDDS	Intrathecal Drug Delivery Systems
LLLT	Low-level Laser Therapy
MRI	Magnetic Resonance Imaging
MRgFUS	Magnetic Resonance-guided Focused Ultrasound
MBCT	Mindfulness-based Cognitive Therapy
MBSR	Mindfulness-based Stress Reduction
NSAIDs	Non-steroidal Anti-inflammatory Drugs
NFB	Neurofeedback
NRS	Numerical Rating Scale
PCA	Patient-controlled Analgesia
PHQ-9	Patient Health Questionnaire-9
PBMT	Photobiomodulation Therapy
PET	Positron Emission Tomography
PVP	Percutaneous Vertebroplasty
PKP	Percutaneous Kyphoplasty
SPECT/ECT	Single-photon Emission Computed Tomography
SNRIs	Serotonin-norepinephrine Reuptake Inhibitors
ST	Scrambler Therapy
VAS	Visual Analogue Scale
WHO	World Health Organization

Acknowledgments

Special thanks to Kan Houming from Macau University of Science and Technology for professional translation assistance.

Conflict of Interest

All authors declare no conflict of interest.

References

- [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. <https://doi.org/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): 383-394. <https://doi.org/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): 401-406. <https://doi.org/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. <https://doi.org/10.1136/bmj.a744>
- [5] Li XM, Yuan WQ, Cao BX, et al. Chronic cancer-related pain [J]. *Chinese Journal of Pain Medicine*, 2021, 27(3): 161-165. <https://doi.org/10.3969/j.issn.1006-9852.2021.03.001>. (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.20471/acc.2022.61.s2.13>
- [9] Mardelle U, Bretaude N, Daher C, et al. From pain to tumor immunity: influence of peripheral sensory neurons in cancer [J]. *Front Immunol*, 2024, 15: 1335387. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1097/j.pain.0000000000002655>
- [13] Pain Physician Branch of Chinese Medical Doctor Association, Pain Medicine Branch of Chinese Medical Association, National Pain Medicine Quality Control Center, et al. Chinese expert consensus on cancer-related pain assessment (2023 version) [J]. *Chinese Journal of Pain Medicine*, 2023, 29(12): 881-886. <https://doi.org/10.3969/j.issn.1006-9852.2023.12.001> (In Chinese).
- [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. <https://doi.org/10.6004/jnccn.2023.0061>
- [15] National Comprehensive Cancer Network. "NCCN Guidelines". Available from: <https://www.nccn.org/guidelines/guidelines-detail?category=3&id=1413> [Accessed 15 July 2025].
- [16] Vargas-Schaffer G. Is the WHO analgesic ladder still valid? Twenty-four years of experience[J]. *Can Fam Physician*, 2010, 56(6): 514-7.
- [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. <https://doi.org/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 fatigue [J]. *J Clin Oncol*, 2020, 38(9): 905-914. <https://doi.org/10.1200/JCO.19.00470>
- [19] Feng D, Chen P, Liu X, et al. Systematic evaluation of pain management guidelines in hospice care [J]. *Chinese Nursing Research*, 2021, 35(1): 48-54. <https://doi.org/10.12102/j.issn.1009-6493.2021.01.009> (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.3390/cancers15164123>
- [23] Edwards Z, Ziegler L, Craig 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. <https://doi.org/10.1111/ijpp.12516>

- [24] Makhoulf 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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1002/14651858.CD003870.pub7>
- [29] Rodríguez MJ, Contreras D, Gámez R, et al. Double-blind evaluation of short-term analgesic efficacy of orally administered dextropropofol, tramadol and ketorolac in bone cancer pain[J]. *Pain*, 2003, 104(1-2): 103-10. [https://doi.org/10.1016/s0304-3959\(02\)00470-0](https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1177/10600280241247363>
- [33] Caraceni A, Hanks G, Kaasa S, et al; European Palliative Care Research Collaborative (EPCRC); European Association for Palliative Care (EAPC). Use of opioid analgesics in the treatment of cancer pain: evidence-based recommendations from the EAPC [J]. *Lancet Oncol*, 2012, 13(2): e58-68. [https://doi.org/10.1016/S1470-2045\(12\)70040-2](https://doi.org/10.1016/S1470-2045(12)70040-2)
- [34] Professional Committee of Cancer Rehabilitation and Palliative Care, Hubei Anti-Cancer Association. Guideline for rational clinical use of fentanyl transdermal patches [J]. *Herald of Medicine*, 2021, 40(11): 1463-1474. <https://doi.org/10.3870/j.issn.1004-0781.2021.11.001> (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1097/JS9.0000000000000916>
- [39] Xu JM, Song ST, Feng FY, Huang FL, Yang Y, Xie GR, Xu LG, Zhang CZ, Bruno M, Paradiso A. 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 Nov; 16(5): 1077-84. <https://doi.org/10.3892/or.16.5.1077>
- [40] Yang HP, Huai ZR, Zhu TX. Efficacy observation of cobratide enteric-coated capsules in treating moderate to severe cancer pain in advanced stage [J]. *Journal of Snakes*, 2001, 13(2): 4-5. <https://doi.org/10.3969/j.issn.1001-5639.2001.02.002> (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.2174/1381612825666190717091230>.
- [48] Chen LJ, Tang R, Xiang F, et al. Systematic evaluation of fentanyl transdermal patches versus morphine sustained-release tablets for moderate to severe cancer pain [J]. *China Pharmaceuticals*, 2015(18): 51-54, 55. (In Chinese).
- [49] Li Q, Xu JQ, Chen B. Meta-analysis comparing analgesic effects of oxycodone and morphine in patients with moderate to advanced cancer pain [J]. *Practical Pharmacy and Clinical Remedies*, 2016, 19(3): 318-321. <https://doi.org/10.14053/j.cnki.ppcr.201603016> (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/10.1136/bmjspcare-2017-001457>
- [52] Zhang XY, Li PB, Yang J, et al. Systematic evaluation of safety and efficacy of oxycodone hydrochloride controlled-release tablets for moderate to severe cancer pain [J]. *Chinese Journal of Hospital Pharmacy*, 2024, 44(8): 916-924. <https://doi.org/10.13286/j.1001-5213.2024.08.09> (In Chinese).
- [53] Xi Y. Systematic evaluation of fentanyl transdermal patch versus morphine for moderate to severe cancer pain [J]. *Journal of Medicine Frontiers*, 2017, 7(24): 147-148. (In Chinese).
- [54] Li Y, Ma J, Lu G, et al. Hydromorphone for cancer pain [J]. *Cochrane Database Syst Rev*, 2021, 8(8): CD011108. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1097/j.pain.0000000000001957>
- [57] Zeng YD, Xi SL, Tang HQ. Efficacy and safety of hydromorphone patient-controlled analgesia for cancer pain: A meta-analysis [J]. *Chinese Journal of Painology*, 2022, 18(5): 670-677. <https://doi.org/10.3760/cma.j.cn101658-20221018-00158> (In Chinese).
- [58] Schmidt-Hansen M, Bromham N, Taubert M, et al. Buprenorphine for treating cancer pain [J]. *Cochrane Database Syst Rev*, 2015, 2015(3): CD009596. <https://doi.org/10.1002/14651858.CD009596.pub4>
- [59] Nicholson AB, Watson GR, Derry S, et al. Methadone for cancer pain [J]. *Cochrane Database Syst Rev*, 2017, 2(2): CD003971. <https://doi.org/10.1002/14651858.CD003971.pub4>
- [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, S0885-3924(24)00790-5. <https://doi.org/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. <https://doi.org/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: 121-9. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1111/papr.12609>
- [65] Zhao DB. Systematic evaluation of dezocine injection for persistent pain in cancer patients [J]. *Northern Pharmacy*, 2017, 14(12): 187. <https://doi.org/10.3969/j.issn.1672-8351.2017.12.153> (In Chinese).
- [66] Dong WS, Li J, Chen HJ, et al. Systematic evaluation of dezocine injection for persistent pain in cancer patients [J]. *Chinese Journal of Pain Medicine*, 2016, 22(2): 123-127. <https://doi.org/10.3969/j.issn.1006-9852.2016.02.009> (In Chinese).
- [67] Dupoirson 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. <https://doi.org/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): 823-30. <https://doi.org/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. <https://doi.org/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): 2389-96. <https://doi.org/10.1185/03007995.2014.971355>
- [71] Li L, Liu Y, Qian WJ. Clinical efficacy and safety of oxycodone controlled-release tablets versus acetaminophen-oxycodone for moderate to severe pain: A meta-analysis [J]. *Shenzhen Journal of Integrated Traditional Chinese and Western Medicine*, 2015, 25(24): 9-11. <https://doi.org/10.16458/j.cnki.1007-0893.2015.24.005> (In Chinese).
- [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. <https://doi.org/10.3389/fnmol.2024.1333842>
- [73] Fan YF, Yu ZP, Cui XY. Therapeutic efficacy of spleen polypeptide injection combined with morphine sustained-release tablets for moderate to severe cancer pain [J]. *Chinese Journal of Practical Medicine*, 2015(19): 80-81. <https://doi.org/10.3760/cma.j.issn.1674-4756.2015.19.042> (In Chinese).
- [74] van den Beuken-van Everdingen MH, de Graeff A, Jongen JL, et al; national guideline working group "Diagnosis treatment of cancer pain". Pharmacological Treatment of Pain in Cancer Patients: The Role of Adjuvant Analgesics, a Systematic Review [J]. *Pain Pract*, 2017, 17(3): 409-419. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1093/pm/pnaa044>
- [78] 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. <https://doi.org/10.1007/s00280-018-3664-y>
- [79] Zhang XL, Yuan HY, Zhang XH. Meta-analysis of gabapentin for diabetic peripheral neuropathic pain [J]. *Drug Evaluation Research*, 2015, 38(5): 557-562. <https://doi.org/10.7501/j.issn.1674-6376.2015.05.020> (In Chinese).
- [80] D'Souza RS, Alvarez GAM, Dombrovsky-Johnson M, et al. Evidence-Based Treatment of Pain in Chemotherapy-Induced Peripheral Neuropathy [J]. *Curr Pain Headache Rep*, 2023, 27(5): 99-116. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1089/jpm.2018.0257>
- [83] Cabeza-Gutiérrez L, Custodio-Cabello S, Palka-Kotłowska 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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.21037/apm-20-2336>
- [88] Zhang YY, Zhou R, Gu WJ. Efficacy and Safety of Methyl-naltrexone for the Treatment of Opioid-Induced Constipation: A Meta-analysis of Randomized Controlled Trials. *Pain Ther*, 2021, 10(1): 165-179. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1097/MD.00000000000023748>
- [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. <https://doi.org/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. <https://doi.org/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.
- [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. <https://doi.org/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. <https://doi.org/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. https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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): 416-26. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.3389/fonc.2021.617295>
- [110] Cancer Pain Expert Group of Beijing Pain Treatment Quality Control and Improvement Center. Expert consensus on rational use of Chinese patent medicines in standardized cancer pain management [J]. *Chinese Journal of Pain Medicine*, 2021, 27(1): 9-17. <https://doi.org/10.3969/j.issn.1006-9852.2021.01.003> (In Chinese).
- [111] Huang YX, Guo YM, Sang XX, et al. Systematic review of Compound Kushen Injection for cancer pain treatment [J]. *Chinese Journal of Experimental Traditional Medical Formulae*, 2016, 22(2): 172-179. <https://doi.org/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. <https://doi.org/10.1007/s00520-013-2063-5>

- [113] Xu J, Qian SS, Chen YG, et al. Systematic review and Meta-analysis of the efficacy and safety of Cinobufacini injection for cancer pain [J]. *China Journal of Chinese Materia Medica*, 2019, 44(12): 2627-2636.
<https://doi.org/10.19540/j.cnki.cjcm.20190304.003> (In Chinese).
- [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): 979-86.
<https://doi.org/10.1016/j.jpainsymman.2015.12.330>
- [115] Wang ZN, Fan YD, Xing YM, et al. Meta-analysis of clinical efficacy and safety of external treatments in traditional Chinese medicine for cancer pain [J]. *Journal of Oncology in Chinese Medicine*, 2022, 4(2): 74-81.
<https://doi.org/10.19811/j.cnki.ISSN2096-6628.2022.03.013> (In Chinese).
- [116] Luo YH, Liu Q, Jin RY, et al. Overview of systematic reviews of acupuncture for cancer pain [J]. *Chinese Manipulation and Rehabilitation Medicine*, 2022, 13(9): 40-45.
<https://doi.org/10.19787/j.issn.1008-1879.2022.09.012> (In Chinese).
- [117] Liu YF, Lai BY, An T, et al. Systematic review and Meta-analysis of acupuncture for chemotherapy-induced peripheral neuropathy [J]. *Shanghai Journal of Acupuncture and Moxibustion*, 2021, 40(4): 511-520.
<https://doi.org/10.13460/j.issn.1005-0957.2021.04.0511> (In Chinese).
- [118] Ge L, Wang Q, He Y, et al; International Trustworthy traditional Chinese Medicine Recommendations (TCM Recs) Working Group. Acupuncture for cancer pain: an evidence-based clinical practice guideline [J]. *Chin Med*, 2022, 17(1): 8.
<https://doi.org/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. *Eur J Cancer Care (Engl)*, 2017, 26(2).
<https://doi.org/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.
<https://doi.org/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. <https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/10.3389/fpain.2023.1186506>
- [127] Zhang CY, Sun LY, Liu X, et al. Efficacy and safety of body acupuncture for cancer pain: A Meta-analysis [J]. *Modernization of Traditional Chinese Medicine and Materia Medica-World Science and Technology*, 2023, 25(5): 1538-1547.
<https://doi.org/10.11842/wst.20220914002> (In Chinese).
- [128] Zhou J, Liang Y, Chen Q, et al. Meta-analysis of randomized controlled trials on acupoint injection therapy for cancer pain [J]. *Journal of Zhejiang Chinese Medical University*, 2014(7): 927-932. (In Chinese).
- [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.
<https://doi.org/10.1155/2020/1618767>
- [130] Li WF, Sun SB, Ding PP, et al. Meta-analysis of the efficacy of auricular acupressure for cancer pain [J]. *Chinese Evidence-Based Nursing*, 2021, 7(15): 2007-2012.
<https://doi.org/10.12102/j.issn.2095-8668.2021.15.003> (In Chinese).
- [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.
<https://doi.org/10.1177/1534735415572885> (In Chinese).
- [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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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. <https://doi.org/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): 3390-9. <https://doi.org/10.1200/JCO.2015.65.0770>
- [137] Ruano A, Garc á-Torres F, G ávez-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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. https://doi.org/10.4103/apjon.apjon_67_18
- [141] Yang T, Chen JZ, He LS, et al. Meta-analysis of the intervention effect of mindfulness-based stress reduction on cancer pain patients [J]. *Nursing Practice and Research*, 2022, 19(10): 1529-1534. <https://doi.org/10.3969/j.issn.1672-9676.2022.10.024> (In Chinese).
- [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. <https://doi.org/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: S141-7.
- [144] Moreno Hernández D, T ález A, Sánchez-J áuregui 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. <https://doi.org/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. <https://doi.org/10.1016/j.ctcp.2018.12.014>
- [146] Guo MJ, Xiong Y, Tao SL, et al. Meta-analysis of the effects of music therapy on pain and negative emotions in breast cancer patients [J]. *Journal of Mudanjiang Medical University*, 2023, 44(5): 100-105. (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/10.1007/s00520-023-07938-6>
- [149] Yang   ŞT,  zer 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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/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. <https://doi.org/10.1016/j.pmn.2020.04.002>
- [165] Professional Committee of Cancer Rehabilitation and Palliative Care, Chinese Anti-Cancer Association. Expert consensus on patient-controlled analgesia for cancer pain management [J]. *Chinese Journal of Clinical Oncology*, 2023, 50(15): 757-763. <https://doi.org/10.12354/j.issn.1000-8179.2023.20230486> (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/10.1177/1049909115615110>
- [168] Expert Consensus on Intelligent Patient-Controlled Analgesia Management" Working Group of Chinese Society of Anesthesiology, Chinese Medical Association. Expert consensus on intelligent patient-controlled analgesia management [J]. *Chinese Journal of Anesthesiology* 2018, 38(10): 1161-1165. <https://doi.org/10.3760/cma.j.issn.0254-1416.2018.10.002> (In Chinese).
- [169] Yu Y, Chen XH, Ma GS, et al. Application of cancer pain management platform in remote analgesia management for home-based cancer pain patients [J]. *Chinese Journal of Painology*, 2022, 18(5): 651-655. <https://doi.org/10.3760/cma.j.cn101658-20220525-00084> (In Chinese).
- [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. <https://doi.org/10.1016/j.neurom.2022.03.003>
- [171] Feng ZY, Wang K, Jin Y, et al. Chinese expert consensus on intrathecal drug delivery systems for cancer pain management (2022 version) [J]. *Chinese Journal of Painology*, 2022, 18(5): 579-589. <https://doi.org/10.3760/cma.j.cn101658-20220208-00140> (In Chinese).
- [172] Cancer Pain and Palliative Care Expert Group of Pain Physician Branch, Chinese Medical Doctor Association; Cancer Pain Group of Pain Medicine Branch, Chinese Medical Association. Chinese expert consensus on patient-controlled intravenous analgesia for cancer pain patients [J]. *National Medical Journal of China*, 2023, 103(11): 793-802. <https://doi.org/10.3760/cma.j.cn112137-20221105-02319> (In Chinese).
- [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. <https://doi.org/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. <https://doi.org/10.1007/s00520-018-4368-x>
- [175] Liu XL, Wan CF, Ma K, et al. Chinese expert consensus on continuous subcutaneous infusion for cancer pain management (2020 version) [J]. *Chinese Journal of Painology*, 2020, 16(2): 85-91. <https://doi.org/10.3760/cma.j.cn101658-20200410-2004-099> (In Chinese).
- [176] Wan CF, Meng QZ, Wang YW, et al. Patient-controlled subcutaneous analgesia using sufentanil 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. <https://doi.org/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. <https://doi.org/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.
<https://doi.org/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.
https://doi.org/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.
- [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.
<https://doi.org/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. <https://doi.org/10.1016/j.pan.2020.12.016>
- [183] Pacheco-Feijó 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.
https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
https://doi.org/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.
https://doi.org/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.
<https://doi.org/10.1007/s00256-018-3140-0>
- [192] Yao PF, Hu A, Mansour F, et al. Image Guided Energy Ablation for Palliation of Painful Bony Metastases - A Systematic Review [J]. *J Vasc Interv Radiol*, 2024, S1051-0443(24)00374-9.
<https://doi.org/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.
- [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.
- [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.
<https://doi.org/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.
<https://doi.org/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.
<https://doi.org/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.
- [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.
<https://doi.org/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.
<https://doi.org/10.1097/BRS.0000000000004093>

- [201] Han Q, Deng M, Lv Y, et al. Survival of patients with advanced pancreatic cancer after iodine-125 seeds implantation brachytherapy: A meta-analysis [J]. *Medicine (Baltimore)*, 2017, 96(5): e5719. <https://doi.org/10.1097/MD.0000000000005719>
- [202] Perruchoud C, Dupoirion 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. <https://doi.org/10.1016/j.neurom.2021.12.004>
- [203] Kenfield M, Zacharias N, Abd-Elseyed A. Intrathecal Drug Delivery for the Treatment of Cancer-Associated Chronic Pain in Children [J]. *Neuromodulation*, 2023, 26(6): 1153-1163. <https://doi.org/10.1111/ner.13535>
- [204] 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. <https://doi.org/10.3322/caac.21783>
- [205] Refractory Cancer Pain Group of Professional Committee of Cancer Rehabilitation and Palliative Care, Chinese Anti-Cancer Association; Cancer Pain Group of Pain Medicine Branch, Chinese Medical Association. Expert consensus on cancer-related breakthrough pain (2019 version) [J]. *Chinese Journal of Clinical Oncology*, 2019, 46(6): 267-271. <https://doi.org/10.3969/j.issn.1000-8179.2019.06.228> (In Chinese).
- [206] Brant JM, Rodgers BB, Gallagher E, et al. Breakthrough Cancer Pain: A Systematic Review of Pharmacologic Management. *Clin J Oncol Nurs*, 2017, 21(3 Suppl): 71-80. <https://doi.org/10.1188/17.CJON.S3.71-80>
- [207] 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. *Daru*, 2021, 29(1): 51-59. <https://doi.org/10.1007/s40199-020-00381-6>
- [208] 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. *Support Care Cancer*, 2019, 27(6): 2171-2177. <https://doi.org/10.1007/s00520-018-4469-6>
- [209] Alberts DS, Smith CC, Parikh N, et al. Fentanyl sublingual spray for breakthrough cancer pain in patients receiving transdermal fentanyl. *Pain Manag*, 2016, 6(5): 427-34. <https://doi.org/10.2217/pmt-2015-0009>
- [210] Thronæs M, Popper L, Eeg M, et al. Efficacy and tolerability of intranasal fentanyl spray in cancer patients with breakthrough pain. *Clin Ther*, 2015, 37(3): 585-96. <https://doi.org/10.1016/j.clinthera.2014.12.010>