

Perioperative Anxiety: Recent Advances in Western and Traditional Chinese Medicine Treatments

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Abstract

Anxiety, as an unpleasant subjective experience, not only adversely affects postoperative recovery and treatment satisfaction in surgical patients but also increases the risk of postoperative complications and mortality. Current management strategies for perioperative anxiety primarily involve pharmacotherapy and non-pharmacological interventions. Pharmacological options include selective serotonin reuptake inhibitors (SSRIs), serotonin-norepinephrine reuptake inhibitors (SNRIs), tricyclic antidepressants (TCAs), monoamine oxidase inhibitors (MAOIs), benzodiazepines, antiepileptic drugs, and certain herbal medicines. However, the clinical application of anxiolytic drugs is often limited by their considerable side effects. In contrast, traditional Chinese medicine (TCM) therapies—such as massage/tuina, acupoint stimulation, aromatherapy, and herbal treatments—are gaining increasing recognition for their favorable safety profiles. This review comprehensively analyzes and summarizes recent advances in both Western and TCM approaches for perioperative anxiety, aiming to provide evidence-based guidance for clinical practice.

Keywords: Perioperative anxiety, risk factors, pharmacotherapy, traditional Chinese medicine

INTRODUCTION

Anxiety is a subjective negative experience characterized by nervousness, distractibility, and somatic symptoms^[1]. Studies indicate that 20%-80% of surgical patients experience perioperative anxiety (from 5-7 days before surgery to 7-12 days postoperatively)^[2]. Its triggers encompass multidimensional factors, including preoperative concerns about surgical risks, intraoperative stress responses to the medical environment, and postoperative worries about recovery^[3]. By activating the neuroendocrine system and promoting catecholamine release, anxiety triggers a cascade of physiological and psychological reactions^[4]. Clinical evidence demonstrates that it can significantly impair anesthetic efficacy, prolong hospitalization (increasing readmission rates by 8%-12%)^[5], and elevate the risk of complications such as postoperative pain (23%-41% increase in acute/chronic pain incidence)^[6] and delirium (1.5-2.3-fold higher risk)^[7]. Notably, severe anxiety serves as an independent predictor of postoperative mortality (OR=2.15, 95% CI 1.78-2.60)^[8]. This article systematically reviews the pathological mechanisms of perioperative anxiety and its

intervention strategies in both Western and traditional Chinese medicine, providing evidence to optimize surgical patient management.

CURRENT STATUS, RISK FACTORS, AND ADVERSE EFFECTS OF PERIOPERATIVE ANXIETY

Globally, over 300 million surgical procedures are performed annually^[9], with perioperative anxiety affecting >50% of patients. Notably, its prevalence varies by cohort: 51% in general surgery patients, 57% in outpatient surgery populations, and even higher among female patients (65%)^[10].

Pittman et al. classified risk factors for perioperative anxiety into independent and dependent categories^[11].

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Independent risk factors for severe anxiety in adults include a history of cancer, smoking, female sex, preexisting psychiatric disorders, moderate-to-severe pain, self-perceived poor health, and lower educational attainment. Dependent risk factors encompass fear of the unknown, separation from family/friends, concerns about death or disfigurement, worries regarding personal safety or pain, fear of losing independence, and apprehension about prolonged postoperative recovery^[11]. Conversely, Kiyohara et al. demonstrated that preoperative education about anesthesia and surgical procedures significantly reduces anxiety levels^[12].

Anxiety inevitably triggers physiological stress responses. As a fundamental adaptive mechanism to environmental challenges, stress primes the body to confront potential threats^[13]. This response engages multiple organ systems, driven by endocrine and autonomic nervous system activation, leading to excessive secretion of corticotropin-releasing hormone, adrenocorticotrophic hormone, cortisol, epinephrine, and norepinephrine^[13]. Consequently, it elevates heart rate and blood pressure^[14], increasing the risk of perioperative cardiovascular events (e.g., myocardial infarction, heart failure)^[15]. Furthermore, anxiety correlates with anesthesia-related complications, acute/chronic postoperative pain, prolonged hospitalization, higher readmission rates, and reduced patient satisfaction^[5].

Thus, proactively addressing modifiable risk factors for perioperative anxiety through targeted interventions may improve surgical outcomes and enhance patient satisfaction.

TREATMENT OF PERIOPERATIVE ANXIETY: WESTERN AND TRADITIONAL CHINESE MEDICINE APPROACHES

Pharmacological Therapy in Western Medicine

Current evidence suggests that patients with severe anxiety, especially those with comorbid low mood or depression, may benefit from pharmacological intervention. The primary drug classes include antidepressants and benzodiazepines^[16], which exert anxiolytic effects by modulating neurotransmitter systems such as serotonin (5-HT), norepinephrine (NE), and γ -aminobutyric acid (GABA). However, these medications are often associated with adverse effects.

Selective Serotonin Reuptake Inhibitors (SSRIs) and Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs)

SSRIs (e.g., sertraline, paroxetine) and SNRIs (e.g., venlafaxine) alleviate anxiety by regulating 5-HT and

NE pathways. Emerging research indicates that these systems not only influence mood but also modulate anxiety, aggression, sexual behavior, and pain perception. The World Federation of Societies of Biological Psychiatry (WFSBP) guidelines recommend SSRIs as first-line agents for various anxiety disorders, while SNRIs are indicated for anxiety disorders other than obsessive-compulsive disorder (OCD)^[17]. Key considerations include:

- SNRIs are typically reserved for patients with inadequate response to SSRIs.
- Concomitant use of SSRIs and SNRIs may trigger serotonin syndrome, characterized by hypertension, hyperthermia, and autonomic instability^[18].
- Common adverse effects include discontinuation syndrome (particularly with venlafaxine and paroxetine), initial exacerbation of anxiety, and increased suicidal ideation^[17].

Tricyclic Antidepressants (TCAs)

TCAs (e.g., amitriptyline) demonstrate comparable efficacy to SSRIs/SNRIs by inhibiting NE reuptake. However, their anticholinergic side effects (e.g., dry mouth, constipation, orthostatic hypotension) are pronounced. More critically, TCAs carry a risk of QT interval prolongation, and overdose—especially with alcohol co-ingestion—can be fatal^[27]. Due to these risks, clomipramine is the only TCA recommended for SSRI-resistant OCD, and its use mandates strict electrocardiographic monitoring^[19].

Monoamine Oxidase Inhibitors (MAOIs)

MAOIs are classified into reversible and irreversible subtypes. Although irreversible MAOIs have demonstrated efficacy in treating anxiety disorders^[17], their use requires specialist oversight due to significant risks and adverse effects, including nausea, orthostatic hypotension, insomnia, and anticholinergic symptoms. A critical safety concern is MAOIs' interaction with tyramine- or dopamine-containing foods, sympathomimetic drugs, and certain alcoholic beverages, which may precipitate life-threatening hypertensive crises^[17]. Furthermore, these agents may interact dangerously with other antidepressants, opioids, levodopa, and anesthetic drugs, potentially leading to severe complications^[17]. The reversible MAOI moclobemide exhibits a more favorable safety profile, though its therapeutic efficacy remains inconsistently supported by evidence, warranting further investigation^[17]. Given these limitations, MAOIs are currently reserved as third-line options and should only be prescribed under psychiatric supervision.

Benzodiazepines

Benzodiazepines (e.g., alprazolam) provide rapid anxiolytic effects by potentiating GABAergic neurotransmission. However, their long-term use carries significant risks of dependence, and abrupt discontinuation may precipitate seizures or even death, relegating them to non-first-line status in anxiety management^[20]. These agents also impair cognitive function, with elderly patients facing a 2-3-fold increased risk of falls^[19]. Alprazolam's short half-life particularly predisposes patients to morning rebound anxiety, creating a vicious cycle of medication use^[17]. Current guidelines therefore restrict benzodiazepines to short-term control of acute anxiety episodes or as salvage therapy for refractory cases after failure of other pharmacological interventions.

Antiepileptic Drugs

Pregabalin demonstrates anxiolytic efficacy by modulating calcium channels, achieving response rates up to 60% in generalized anxiety disorder and earning second-line recommendation in UK guidelines^[21]. However, dose-dependent dizziness and somnolence affect 30% of patients, and high-dose regimens carry abuse potential comparable to benzodiazepines^[22]. While gabapentin exhibits a more favorable side effect profile, its therapeutic benefits are modest. Both agents require gradual dose titration to minimize adverse effects^[21].

Traditional Chinese Medicine Therapies

Given the limitations of Western pharmacotherapy, including side effects and uncertain efficacy, there has been growing interest in exploring Traditional Chinese Medicine (TCM) approaches that can effectively alleviate perioperative anxiety while maintaining an excellent safety profile. Substantial clinical evidence has demonstrated the significant efficacy and clinical feasibility of various TCM modalities in reducing perioperative anxiety^[23].

Massage/Tuina Therapy

As a cornerstone of TCM with a history spanning millennia, Tuina represents a systematic soft tissue manipulation technique with therapeutic intent^[24]. Hand massage, in particular, has emerged as a simple, cost-effective, and non-invasive intervention that not only effectively reduces preoperative pain and anxiety but also induces positive psychological states including relaxation and tranquility^[25]. Clinical studies have consistently validated its efficacy: Li et al. demonstrated that just 15 minutes of hand massage significantly reduced preoperative anxiety while improving patient satisfaction in surgical patients^[26]. In ophthalmic surgery patients, a brief 5-minute hand or

foot massage protocol proved equally effective in anxiety reduction^[27]. For patients undergoing percutaneous coronary intervention, 20 minutes of preoperative massage yielded dual benefits: decreased anxiety levels and improved postoperative outcomes including blood pressure control and pain scores^[28].

Notably, the current literature contains no reported adverse effects associated with massage/Tuina interventions^[29], further supporting its safety advantage over pharmacological approaches.

Acupoint Stimulation Therapy

Acupuncture therapy, another pillar of TCM, exerts therapeutic effects through precise stimulation of specific acupoints^[30]. Among various approaches, auricular acupressure and Yintang (EX-HN3) stimulation have been most extensively studied: Kuo et al. reported that auricular acupressure significantly improved anxiety symptoms, fatigue status, and cortisol levels in obstetric patients^[31]. Wiles et al. demonstrated that needling at Yintang for 30 minutes produced marked anxiety reduction in neurosurgical patients^[32]. A recent systematic review concluded that acupuncture yields significantly greater anxiety relief compared to conventional treatment or placebo^[33]. Additional acupoints such as Zusanli (ST36) and Hegu (LI4) have also shown promising anxiolytic effects with minimal adverse reactions^[34], further expanding the therapeutic options within this modality.

Aromatherapy

Aromatherapy, a traditional therapeutic practice with origins dating back thousands of years in ancient Egypt and India, utilizes essential oils administered via inhalation or dermal absorption to produce physiological and psychological effects. Over 40 essential oils are currently employed in clinical settings, with lavender, rose, and citrus oils being among the most commonly used^[35]. This modality has gained global popularity due to its simplicity of administration and minimal requirement for specialized equipment^[36]. A growing body of clinical evidence supports the anxiolytic efficacy of lavender oil across various surgical populations. Multiple trials have demonstrated that lavender—delivered through inhalation, transdermal patches, or massage—significantly reduces preoperative anxiety in patients undergoing cataract surgery, breast surgery, prostate procedures, and colorectal operation^[37-40], with concurrent improvements in physiological parameters such as heart rate and blood pressure. However, its benefits appear less pronounced in orthognathic surgery patients, with one study reporting no significant anxiety reduction^[41]. The evidence for rose

oil remains inconclusive. While some studies suggest potential anti-anxiety properties^[42], others have failed to replicate these findings^[35]. Emerging research indicates that bergamot extract may offer promise in alleviating preoperative anxiety for cholecystectomy patients^[43], though further validation is required.

Herbal Medicine Therapy

Clinical data indicate that approximately 34% of patients have utilized herbal medicine, with anxiety and depression being primary indications^[44, 45]. Emerging evidence suggests certain botanicals such as German chamomile and hawthorn possess notable anxiolytic properties^[46, 47]. Systematic reviews have confirmed kava kava's anti-anxiety effects, though its clinical use remains limited due to hepatotoxicity concerns^[48]. However, herbal therapies present several inherent limitations: (1) Their complex active components exhibit variable efficacy influenced by cultivation and storage conditions; (2) They typically require prolonged administration for therapeutic effects; and (3) Potential herb-drug interactions necessitate caution^[49]. While most adverse reactions are mild (e.g., diarrhea, nausea)^[50], rigorous clinical evaluation remains imperative prior to implementation.

Traditional Chinese Medicine modalities (including herbal medicine, therapeutic massage, and acupoint stimulation) demonstrate significant potential in modulating stress responses to alleviate preoperative anxiety. Clinicians should note that certain contraindications exist (e.g., pregnancy, bleeding disorders), and many techniques require specialized practitioner expertise. Treatment selection should be individualized based on comprehensive patient evaluation.

CONCLUSIONS AND FUTURE DIRECTIONS

With expanding surgical populations, perioperative anxiety prevalence continues to rise. The therapeutic armamentarium has diversified to include both conventional (e.g., atypical antipsychotics) and complementary approaches (e.g., music therapy). Current clinical practice emphasizes personalized intervention strategies tailored to surgical type, anesthesia method, and individual patient characteristics to optimize outcomes. Future research should focus on:

- Developing standardized protocols for integrative therapies
- Investigating novel anxiolytic compounds with improved safety profiles
- Establishing predictive models for treatment response

- Conducting large-scale comparative effectiveness studies

This evolving landscape promises enhanced management strategies to improve perioperative care quality while addressing the multidimensional nature of surgical anxiety.

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