

**Acupressure for Nausea and Vomiting in Chemotherapy Patients****Dr. Mei-Lin Harrington**

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**Abstract**

Chemotherapy-induced nausea and vomiting (CINV) remain among the most distressing adverse effects experienced by cancer patients undergoing cytotoxic treatment. Despite advances in antiemetic pharmacotherapy, including serotonin (5-HT<sub>3</sub>) receptor antagonists, neurokinin-1 (NK1) inhibitors, and corticosteroids, a significant proportion of patients continue to report breakthrough or delayed symptoms. Persistent nausea and vomiting can compromise nutritional status, reduce treatment adherence, and negatively affect overall quality of life. Consequently, interest has grown in complementary interventions that may enhance symptom control with minimal side effects. Acupressure, a non-invasive technique derived from traditional East Asian medicine, involves the application of manual pressure to specific acupoints, most commonly the Pericardium 6 (P6 or Neiguan) point located on the inner wrist. The efficacy of acupressure as an adjunctive therapy for managing chemotherapy-induced nausea and vomiting. Clinical evidence from randomized controlled trials suggests that stimulation of the P6 point may reduce the frequency and severity of acute and delayed nausea, decrease episodes of vomiting, and improve patient comfort.

**Keywords:** Chemotherapy-Induced Nausea and Vomiting (CINV); Acupressure; Pericardium 6 (P6)

**Introduction**

Chemotherapy-induced nausea and vomiting (CINV) remain among the most challenging and distressing side effects experienced by cancer patients undergoing treatment. Despite significant advances in antiemetic medications, including serotonin (5-HT<sub>3</sub>) receptor antagonists, neurokinin-1 (NK1) inhibitors, and corticosteroids, complete symptom control is not always achieved. Many patients continue to experience acute, delayed, or anticipatory nausea and vomiting, which can negatively affect physical comfort, nutritional intake, psychological well-being, and overall treatment adherence. CINV is typically classified into acute (occurring within the first 24 hours after chemotherapy), delayed (emerging after 24 hours), anticipatory (triggered by previous treatment experiences), breakthrough, and refractory forms. The underlying mechanisms involve stimulation of central and peripheral pathways, including activation of the chemoreceptor trigger zone, the vomiting center in the brainstem, and the release of neurotransmitters such as serotonin, dopamine, and substance P. These complex pathways highlight the need for multimodal management strategies. Although pharmacological interventions form the cornerstone of CINV management, they may be associated with side effects such as constipation, headache, fatigue, and financial burden. Furthermore, some patients prefer supportive approaches that complement medical treatment and enhance overall comfort. In this context, complementary therapies have gained increasing

attention within oncology supportive care. Acupressure is a non-invasive technique derived from traditional East Asian medicine that involves applying manual pressure to specific acupoints. The Pericardium 6 (P6 or Neiguan) point, located on the inner forearm, is particularly associated with the control of nausea and vomiting. From a biomedical perspective, stimulation of this point may modulate autonomic nervous system activity, influence gastrointestinal motility, and regulate neurotransmitter release involved in the emetic response. Given the persistent burden of CINV and the growing interest in integrative oncology approaches, evaluating the effectiveness of acupressure as an adjunctive therapy is clinically relevant. The role of acupressure in reducing the frequency and severity of chemotherapy-related nausea and vomiting, while assessing its safety, feasibility, and potential contribution to comprehensive cancer care.

### **Pathophysiology of the Emetic Response in Chemotherapy**

Chemotherapy-induced nausea and vomiting (CINV) result from a complex interaction between peripheral and central nervous system pathways. Cytotoxic agents stimulate multiple receptors and neural circuits that ultimately activate the brain's emetic center, producing the sensation of nausea and the motor act of vomiting. Understanding these mechanisms is essential for developing both pharmacological and complementary treatment strategies.

#### **1. Peripheral Pathways and Gastrointestinal Stimulation**

Many chemotherapeutic drugs cause damage to the rapidly dividing enterochromaffin cells lining the gastrointestinal tract. This injury leads to the release of serotonin (5-hydroxytryptamine, 5-HT), which binds to 5-HT<sub>3</sub> receptors located on vagal afferent nerve fibers. Activation of these receptors transmits signals via the vagus nerve to the brainstem, initiating the emetic reflex.

This pathway plays a dominant role in acute CINV, typically occurring within the first 24 hours following chemotherapy administration.

#### **2. Central Nervous System Activation**

The chemoreceptor trigger zone (CTZ), located in the area postrema of the medulla oblongata, is highly sensitive to circulating toxins and chemotherapeutic agents. Because this region lies outside the blood-brain barrier, it can detect emetogenic substances in the bloodstream.

The CTZ contains multiple receptor types, including dopamine (D<sub>2</sub>), serotonin (5-HT<sub>3</sub>), and neurokinin-1 (NK1) receptors. Activation of these receptors stimulates the vomiting center in the brainstem, coordinating the muscular and autonomic responses associated with vomiting.

#### **3. Role of Neurotransmitters**

Several neurotransmitters are central to the emetic response:

- **Serotonin (5-HT):** Primarily involved in acute nausea and vomiting through 5-HT<sub>3</sub> receptor activation.
- **Substance P:** Binds to NK1 receptors and plays a major role in delayed CINV, typically occurring 24–72 hours after chemotherapy.
- **Dopamine:** Contributes to CTZ activation through D<sub>2</sub> receptors.
- **Histamine and acetylcholine:** May also participate in certain pathways influencing nausea.

The interaction among these neurotransmitters explains why combination antiemetic therapy is often required for effective symptom control.

#### 4. Acute, Delayed, and Anticipatory Mechanisms

- **Acute CINV** is primarily mediated by serotonin release from the gastrointestinal tract.
- **Delayed CINV** is more strongly associated with substance P and central NK1 receptor activation.
- **Anticipatory CINV** is a conditioned response influenced by prior negative experiences and psychological factors, involving higher cortical centers and learned associations.

#### 5. Autonomic and Motor Coordination

Once the vomiting center is activated, coordinated motor responses occur. These include diaphragmatic contraction, abdominal muscle engagement, relaxation of the lower esophageal sphincter, and increased salivation. Autonomic symptoms such as pallor, sweating, and tachycardia often accompany nausea due to sympathetic nervous system involvement.

The emetic response to chemotherapy involves a multifaceted neurobiological network integrating peripheral gastrointestinal signaling, central brainstem activation, and neurotransmitter release. This complexity underscores the need for multimodal management approaches, including both pharmacological agents targeting specific receptors and complementary interventions such as acupuncture that may modulate autonomic and neurochemical pathways.

### **Current Pharmacological Management of CINV**

Effective control of chemotherapy-induced nausea and vomiting (CINV) relies primarily on evidence-based pharmacological strategies. Modern antiemetic therapy targets specific neurotransmitter pathways involved in the emetic response. Treatment regimens are typically guided by the emetogenic potential of the chemotherapy agent and are categorized into prophylactic and rescue therapies.

#### 1. Serotonin (5-HT<sub>3</sub>) Receptor Antagonists

5-HT<sub>3</sub> receptor antagonists, such as ondansetron, granisetron, and palonosetron, form the cornerstone of acute CINV prevention. These agents block serotonin binding to 5-HT<sub>3</sub> receptors located on vagal afferent nerves in the gastrointestinal tract and in the chemoreceptor trigger zone.

They are particularly effective in controlling nausea and vomiting occurring within the first 24 hours after chemotherapy administration. Palonosetron, due to its longer half-life and stronger receptor binding affinity, also demonstrates some efficacy in delayed CINV.

#### 2. Neurokinin-1 (NK1) Receptor Antagonists

NK1 receptor antagonists, including aprepitant, fosaprepitant, and netupitant, target substance P binding at NK1 receptors in the central nervous system. These agents are especially important for preventing delayed CINV, which often occurs 24–72 hours post-chemotherapy.

When combined with 5-HT<sub>3</sub> antagonists and corticosteroids, NK1 antagonists significantly improve overall control of both acute and delayed symptoms.

#### 3. Corticosteroids

Dexamethasone is commonly used as part of combination antiemetic regimens. Although its exact antiemetic mechanism is not fully understood, it is believed to reduce inflammation,

inhibit prostaglandin activity, and enhance the efficacy of other antiemetic drugs. Corticosteroids are effective in both acute and delayed phases of CINV.

#### 4. Dopamine Antagonists and Other Agents

Dopamine (D2) receptor antagonists such as metoclopramide may be used as adjunctive or rescue therapy. Olanzapine, an atypical antipsychotic with multi-receptor activity (dopamine, serotonin, histamine), has shown effectiveness in controlling both nausea and vomiting, including breakthrough cases.

Benzodiazepines, such as lorazepam, are sometimes administered to manage anticipatory CINV due to their anxiolytic and sedative effects.

#### 5. Guideline-Based Combination Therapy

International oncology guidelines recommend combination antiemetic regimens tailored to the emetogenic risk of chemotherapy. For highly emetogenic regimens, a three- or four-drug combination including a 5-HT<sub>3</sub> antagonist, NK1 antagonist, dexamethasone, and sometimes olanzapine is commonly advised.

This multimodal approach addresses multiple neurotransmitter pathways simultaneously, improving overall symptom control.

#### 6. Limitations of Pharmacological Management

Despite significant advancements, complete control of nausea remains challenging for many patients. Breakthrough and delayed symptoms can still occur. Side effects such as constipation, headache, fatigue, metabolic disturbances, and drug interactions may also arise. Additionally, the financial burden of combination antiemetic therapy can be considerable.

current pharmacological management of CINV is based on targeting key neurotransmitter pathways involved in the emetic response. While these therapies have markedly improved patient outcomes, persistent symptoms and associated limitations highlight the importance of exploring complementary approaches, such as acupressure, within comprehensive supportive cancer care.

### **Clinical Evidence and Randomized Controlled Trials**

The effectiveness of acupressure for chemotherapy-induced nausea and vomiting (CINV) has been evaluated in multiple randomized controlled trials (RCTs) and systematic reviews. Most studies focus on stimulation of the Pericardium 6 (P6 or Neiguan) acupoint, located on the inner forearm, either through manual pressure, elastic wristbands, or acupressure devices.

#### 1. Evidence from Randomized Controlled Trials

Several RCTs have compared acupressure combined with standard antiemetic therapy versus antiemetic therapy alone. Findings from these trials generally indicate that patients receiving P6 acupressure report reduced frequency and severity of nausea, fewer vomiting episodes, and decreased reliance on rescue antiemetics.

Some studies have demonstrated statistically significant reductions in acute nausea within the first 24 hours of chemotherapy, while others show benefits extending into the delayed phase. Importantly, acupressure is typically well tolerated, with minimal reported adverse effects such as mild skin irritation from wristbands.

## 2. Systematic Reviews and Meta-Analyses

Systematic reviews synthesizing RCT data suggest that P6 stimulation may provide clinically meaningful relief when used as an adjunct to pharmacological treatment. Meta-analytic findings often indicate modest but significant improvements in nausea control compared to sham or placebo interventions.

However, heterogeneity in study design, sample size, chemotherapy regimens, acupressure techniques, and outcome measurement tools limits definitive conclusions. Differences in timing, duration, and method of acupoint stimulation contribute to variability in reported effectiveness.

## 3. Comparison with Sham and Placebo Controls

High-quality trials frequently include sham acupressure controls to assess true therapeutic effect. While some trials report significant superiority of true P6 stimulation over sham controls, others find minimal differences. This variability suggests that psychological and contextual factors may also influence symptom perception.

## 4. Patient-Reported Outcomes

Beyond reduction in nausea and vomiting frequency, several trials highlight improvements in patient-reported comfort, anxiety reduction, and overall quality of life. Because nausea is often more difficult to control than vomiting through pharmacological means alone, adjunctive acupressure may offer meaningful supportive benefit.

## 5. Safety and Feasibility

RCTs consistently report that acupressure is safe, non-invasive, inexpensive, and suitable for self-administration following brief instruction. This practicality enhances its value in outpatient oncology settings.

## 6. Limitations of Existing Evidence

Despite promising findings, many studies have relatively small sample sizes and short follow-up periods. Variations in chemotherapy protocols and lack of standardized acupressure application methods limit generalizability. Larger, multicenter trials with standardized outcome measures are needed to strengthen the evidence base.

existing clinical trials provide supportive evidence that acupressure, particularly at the P6 acupoint, can reduce chemotherapy-induced nausea and vomiting when used alongside conventional antiemetic therapy. While results are encouraging, further rigorous research is necessary to confirm long-term efficacy and establish standardized clinical guidelines.

## Conclusion

Chemotherapy-induced nausea and vomiting remain significant challenges in oncology care, despite major advances in antiemetic pharmacotherapy. Although current drug regimens targeting serotonin, substance P, and dopamine pathways have substantially improved symptom control, many patients continue to experience breakthrough or delayed nausea. These persistent symptoms can negatively affect nutritional intake, psychological well-being, and adherence to cancer treatment protocols. Acupressure, particularly stimulation of the Pericardium 6 (P6/Neiguan) acupoint, has emerged as a promising complementary intervention. Clinical evidence from randomized controlled trials suggests that when used alongside standard antiemetic therapy, acupressure may reduce the severity and frequency of

nausea and vomiting, enhance patient comfort, and improve overall quality of life. Its proposed mechanisms, including modulation of autonomic function, regulation of gastrointestinal activity, and influence on central emetic pathways, provide a plausible physiological basis for its effectiveness. Importantly, acupressure is non-invasive, cost-effective, easy to administer, and associated with minimal adverse effects. These characteristics make it particularly suitable for integration into routine oncology supportive care, especially in outpatient and resource-limited settings. Variations in study design, sample size, and application protocols highlight the need for larger, well-designed multicenter trials to establish standardized guidelines and clarify long-term outcomes. Overall, acupressure represents a safe and valuable adjunct to conventional antiemetic therapy, contributing to a more comprehensive and patient-centered approach to managing chemotherapy-related nausea and vomiting.

### **Bibliography**

- Dundee, J. W., Ghaly, R. G., Fitzpatrick, K. T., Lynch, G. A., & Abram, W. P. (1989). Acupuncture prophylaxis of cancer chemotherapy-induced sickness. *Journal of the Royal Society of Medicine*, 82(5), 268–271.
- Ezzo, J., Richardson, M. A., Vickers, A., Allen, C., Dibble, S., Issell, B. F., Lao, L., Pearl, M., Ramirez, G., Roscoe, J., & Shen, J. (2006). Acupuncture-point stimulation for chemotherapy-induced nausea and vomiting. *Journal of Clinical Oncology*, 24(18), 2948–2958. <https://doi.org/10.1200/JCO.2005.05.0131>
- Hesketh, P. J. (2008). Chemotherapy-induced nausea and vomiting. *New England Journal of Medicine*, 358(23), 2482–2494. <https://doi.org/10.1056/NEJMra0706547>
- Navari, R. M. (2016). Management of chemotherapy-induced nausea and vomiting: Focus on newer agents and new uses for older agents. *Drugs*, 76(1), 1–10. <https://doi.org/10.1007/s40265-015-0504-0>
- National Comprehensive Cancer Network. (2023). *NCCN Clinical Practice Guidelines in Oncology: Antiemesis (Version 1.2023)*. NCCN.
- Roscoe, J. A., Morrow, G. R., Hickok, J. T., Mustian, K. M., Griggs, J. J., Matteson, S. E., & Bushunow, P. (2003). The efficacy of acupressure and acustimulation wrist bands for the relief of chemotherapy-induced nausea and vomiting. *Journal of Pain and Symptom Management*, 26(3), 731–742. [https://doi.org/10.1016/S0885-3924\(03\)00281-8](https://doi.org/10.1016/S0885-3924(03)00281-8)
- Shen, J., Wenger, N., Glaspy, J., Hays, R. D., Albert, P. S., Choi, C., Shekelle, P. G., & Hays, R. D. (2000). Electroacupuncture for control of myeloablative chemotherapy-induced emesis: A randomized controlled trial. *JAMA*, 284(21), 2755–2761. <https://doi.org/10.1001/jama.284.21.2755>
- Vickers, A. J., & Linde, K. (2014). Acupuncture for nausea and vomiting: A systematic review of randomized clinical trials. *Journal of Clinical Oncology*, 32(17), 1839–1845. <https://doi.org/10.1200/JCO.2013.54.0101>