



# PG Residency Medical Oncology

Smart Notes. Better Scores.



## Pathophysiology of CINV

### Chemotherapy-Induced Nausea & Vomiting

A complex reflex arc coordinated by the brainstem. While not fatal, CINV significantly impacts quality of life and treatment adherence.

#### 1. Chemoreceptor Trigger Zone (CTZ)

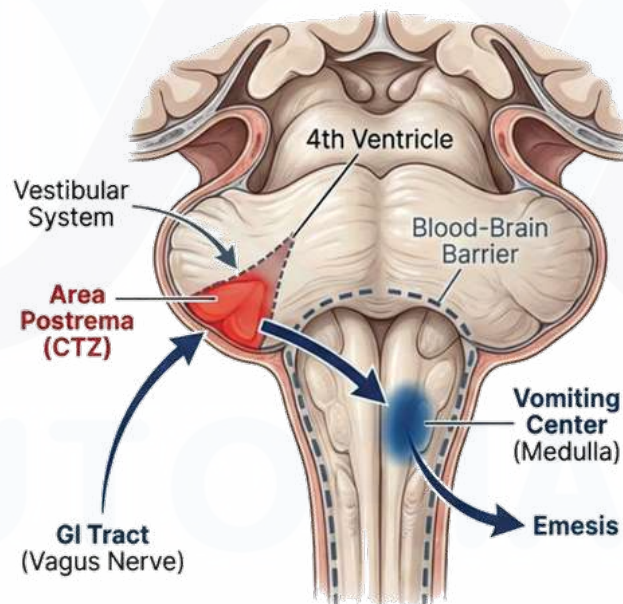
- Location: Area Postrema (Caudal 4th Ventricle)
- Key Feature: Lacks Blood-Brain Barrier (accessible to blood-borne toxins)

#### 2. Vomiting Center

- Location: Medulla (Lateral Reticular Formation)
- Function: Nucleus tractus solitarius coordinates efferent signals

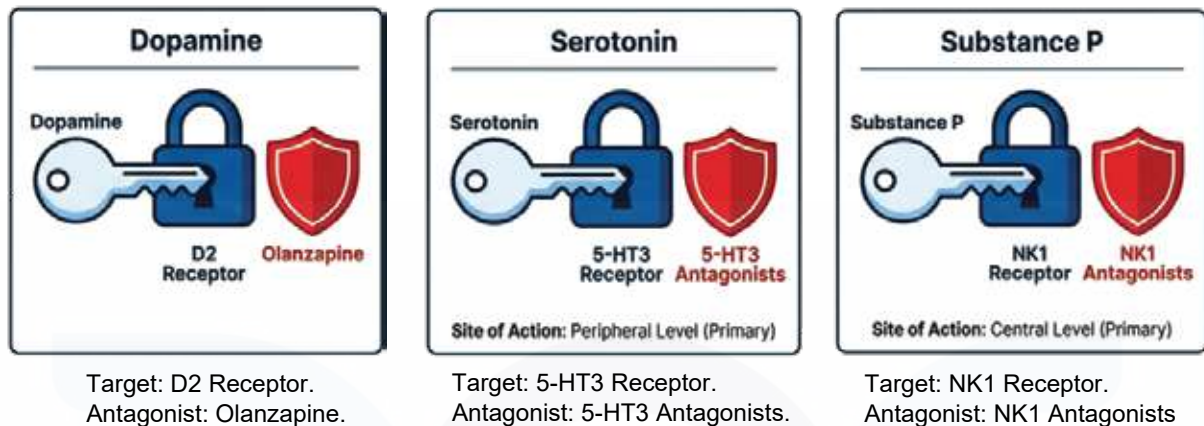
#### 3. Mechanism

- Afferent Signals → CTZ → Vomiting Center → Emesis

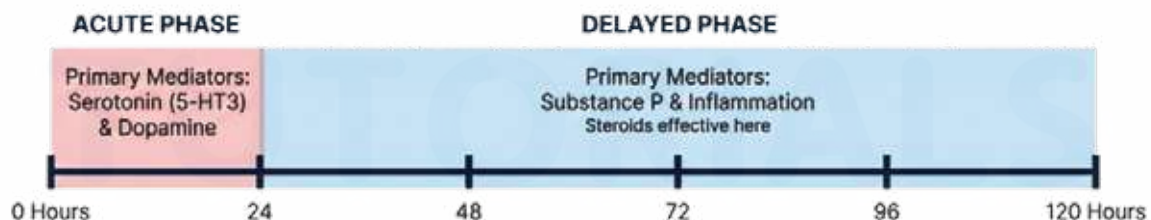


## Key Neurotransmitters in CINV

The Lock&Key Mechanism for Pharmacological Intervention



## Phases of Emesis & Definitions

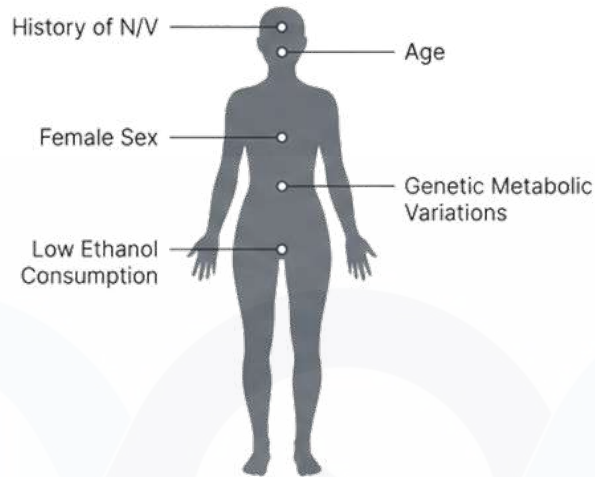


| Anticipatory                                                                                                                                                                                                      | Breakthrough                                                                                                                                               | Refractory                                                                                                            |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li><b>Definition:</b> Conditioned response before treatment.</li> <li><b>Prevalence:</b> ~20% of patients.</li> <li><b>Treatment:</b> Benzodiazepines (Lorazepam).</li> </ul> | <ul style="list-style-type: none"> <li><b>Definition:</b> Vomiting occurs despite prophylaxis.</li> <li><b>Action:</b> Requires rescue therapy.</li> </ul> | <ul style="list-style-type: none"> <li><b>Definition:</b> Persists despite prophylaxis AND rescue therapy.</li> </ul> |

## Risk Stratification

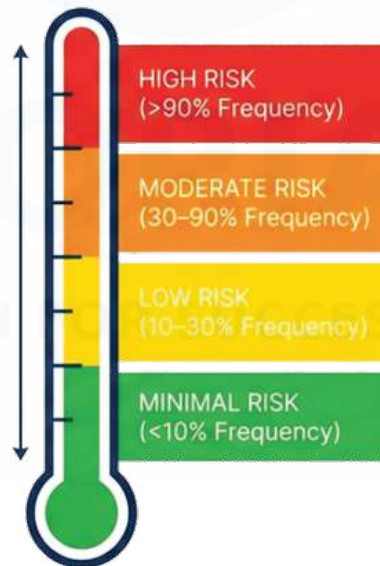
Patient Factors & NCCN Emetogenic Potential

### Patient Profile



**Treatment Factors:** Dose, Infusion Rate, Route (IV > Oral)

### The Risk Thermometer (NCCN Classification)



## High Risk Agents & The Multi-Drug Rule

### Specific High Emetogenic Agents:

- Anthracycline + Cyclophosphamide (Breast Cancer protocols)
- Cisplatin
- Carboplatin (Only if AUC  $\geq 4$ )

### The Multi-Drug Rule: Highest Risk Governs

Adriamycin (Low) + Bleomycin (Low) + Vinblastine (Low) + Dacarbazine (**HIGH**)

**= HIGH RISK REGIMEN**

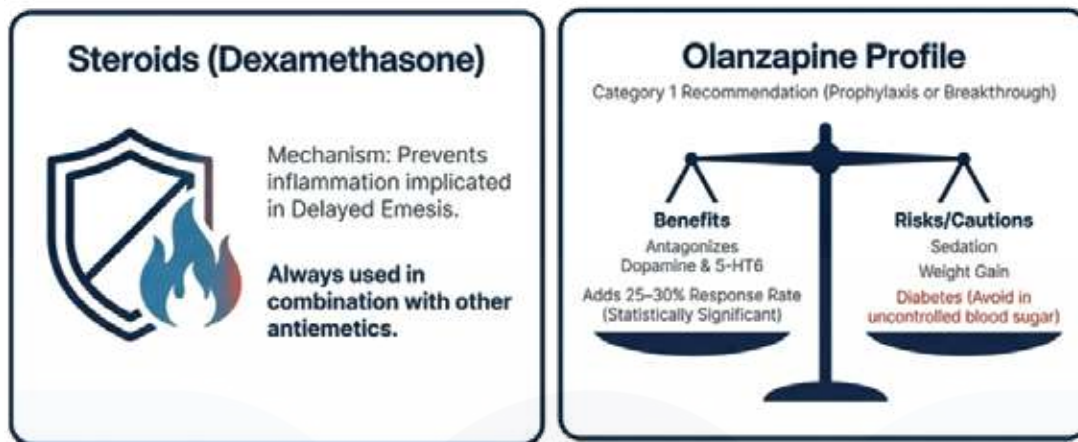
The regimen risk is determined by the single agent with the highest emetogenic potential.

## Pharmacology: Receptor Antagonists

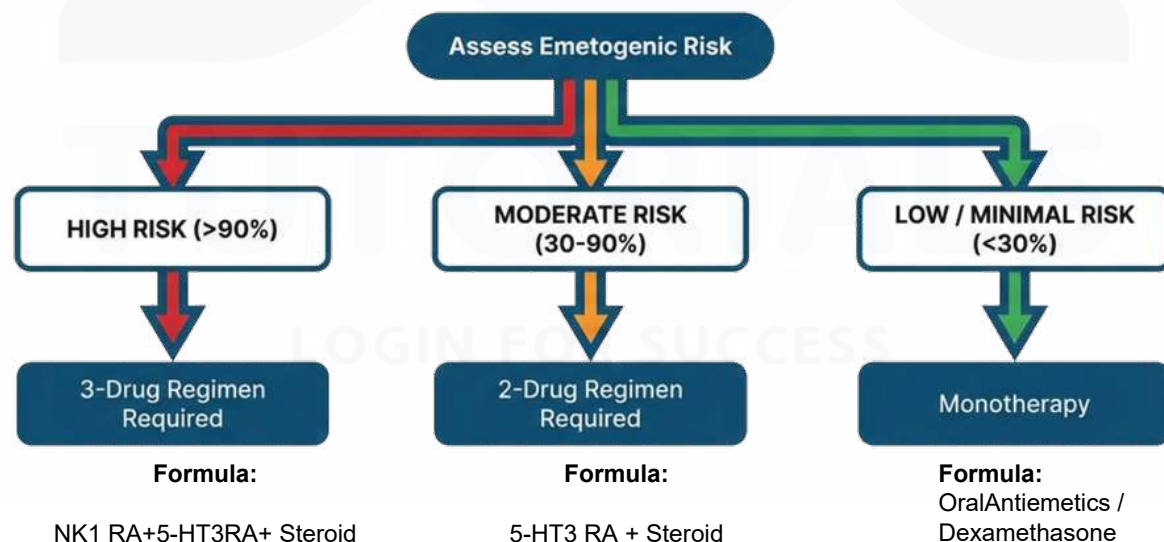
Comparison of 5-HT<sub>3</sub> and NK<sub>1</sub> Antagonists

| 5-HT <sub>3</sub> Receptor Antagonists<br>Target: Acute Phase (Serotonin)   | NK <sub>1</sub> Receptor Antagonists<br>Target: Acute & Delayed Phase (Substance P)                                                |
|-----------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Palonosetron (2nd Gen, Superior, Long Half-life), Ondansetron, Granisetron. | Aprepitant (Oral), Fosaprepitant (IV), Rolapitant, Netupitant.                                                                     |
| <b>Clinical Pearls</b><br>Oral efficacy equals IV if dosed correctly.       | <b>Clinical Pearls</b><br>Enhances response of other antiemetics.<br>Single dose IV Fosaprepitant $\approx$ 3-day Oral Aprepitant. |
| <b>Caution</b><br>Dolasetron unused due to QTc prolongation.                | <b>Interaction</b><br>Aprepitant inhibits cytochrome enzymes.                                                                      |

## Pharmacology: Adjuvant & Emerging Standard



## Prophylactic Regimens Decision Tree



**Formula:**

NK1 RA+5-HT3RA+ Steroid

**Examples:**

OP D (Olanzapine/Palonosetron/Dex) or  
APO (Aprepitant/Palonosetron/Dex)

**Timing:** Prior to Chemo (Risk lasts ~3 days)

**Formula:**

5-HT3 RA + Steroid

**Exception Note:**

AddNK1 RA if prior severe  
emesis history.

## Breakthrough & Special Populations



### Special Situations

#### Radiation (RINV)

- Acute phase mediated by
- 5-HT3 and Dopamine.

#### Stem Cell Transplant

- High-dose Chemo Standard of Care: NK1 RA + 5-HT3 RA + Steroids

## Febrile Neutropenia (FN)

### Diagnostic Criteria&Definitions

$$[\text{FEVER}] + [\text{NEUTROPENIA}] = [\text{FEBRILE NEUTROPENIA}]$$

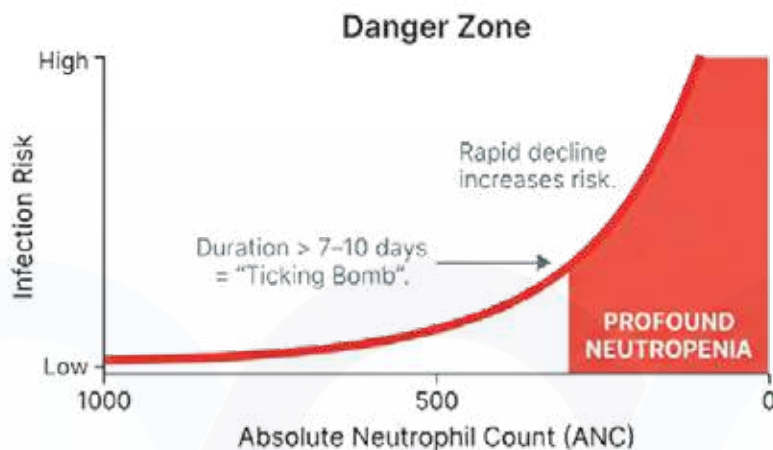
- |                                                                                                                                      |                                                                                                                                                         |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• Single Oral Temp &gt;38.3°C OR</li> <li>• Sustained Temp &gt;38.0°C for ≥ 1 hour</li> </ul> | <ul style="list-style-type: none"> <li>• Absolute Neutrophil Count (ANC) &lt; 500</li> <li>• OR Expected decrease to &lt; 500 in next 48 hrs</li> </ul> |
|--------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------|

**Critical Calculation:**  $\text{ANC} = \text{Total WBC} \times \% \text{ Neutrophils}$ . (Do not rely on Total WBC alone).

## Infection Risk & Phagocytic Defense

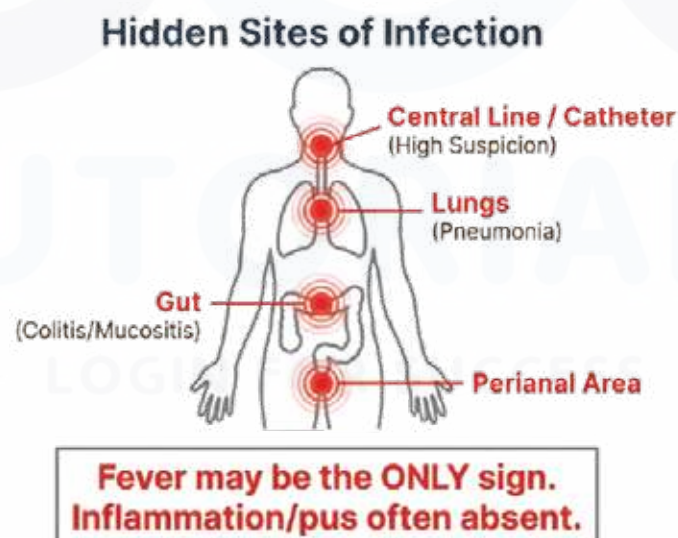
**Host Defense:** Neutrophils are the 1st line of innate defense.

**Clinical Rule:** Always suspect bacterial/fungal infection in FN. Never dismiss as viral.



## Clinical Manifestations & Workup

**Hidden Sites of Infection**



### The Pan-Culture Workup

1. **Blood Cultures (x2 Sets):**
  - One from Central Line + One Peripheral.
2. **Urine Culture** (if indicated).
3. **Stool Sample** (if C. diff suspected).
4. **Imaging:** Chest X-ray (Note: may be negative initially due to lack of neutrophils).
5. **Labs:** Monitor Liver/Renal function every 2-3 days.



Medicine

**Clinical Case**

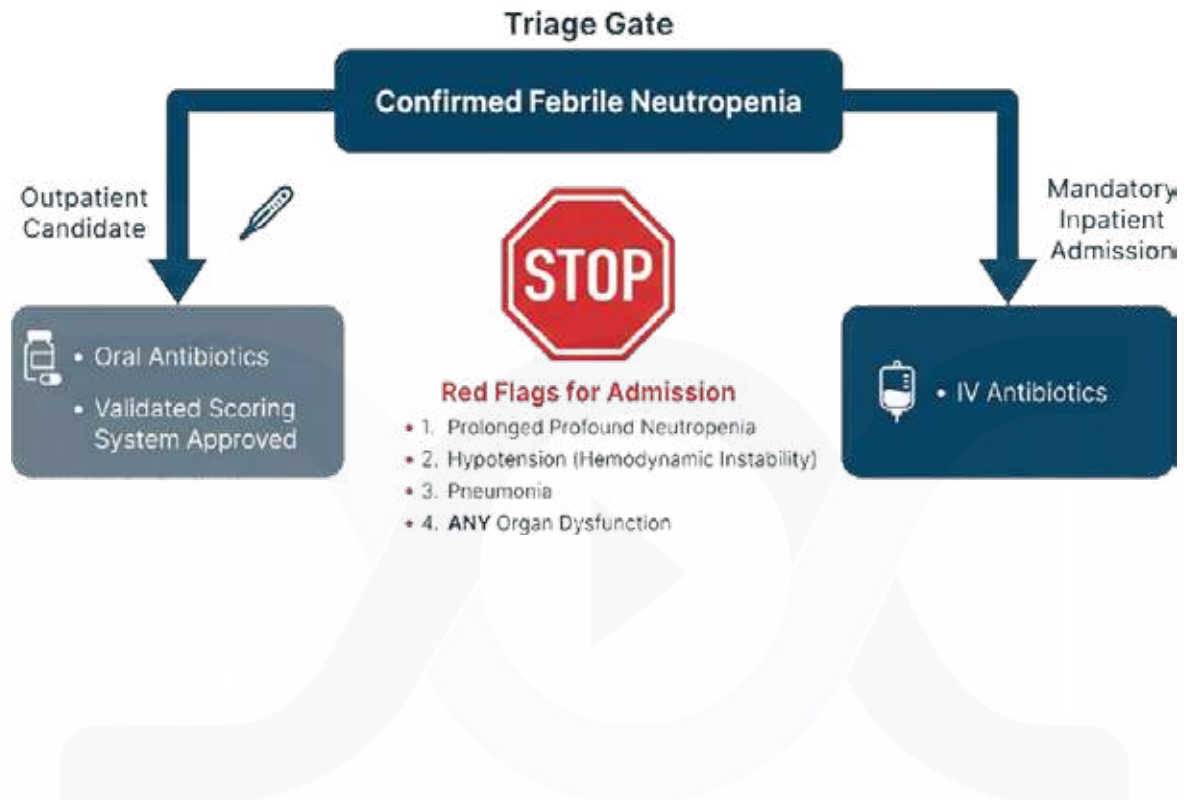
Structured Clinical Case Videos



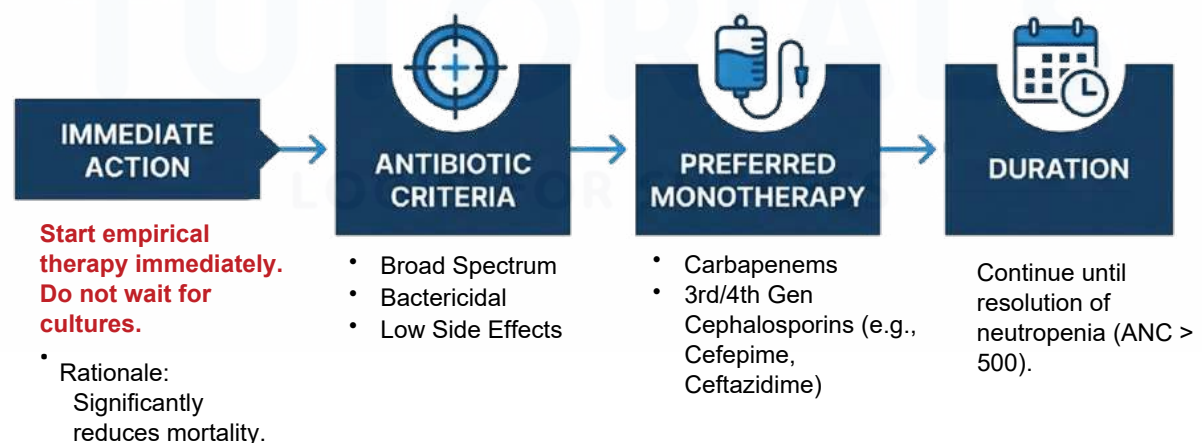
**Watch Now →**

## Risk Stratification

Triage for Admission vs. Discharge



## Empirical Management Strategy



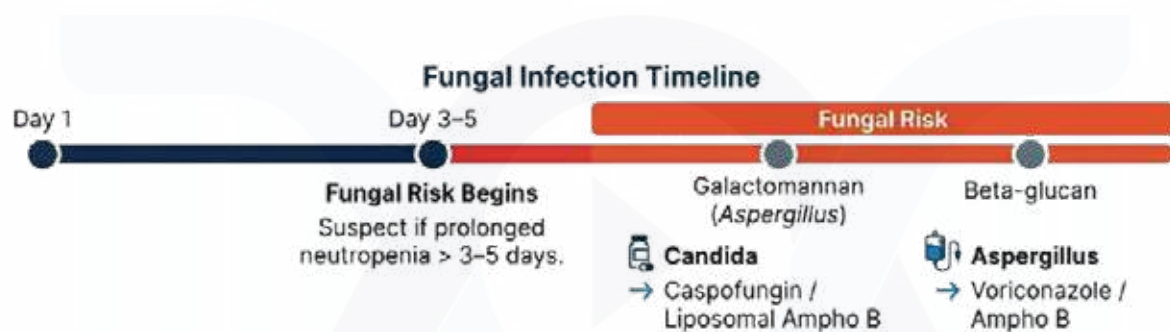
## Targeted Therapy & Fungal Management

Protocols for Resistant Bacteria and Fungal Infections in Febrile Neutropenia

### Resistant Bacteria Protocol

| Pathogen             |   | Targeted Therapy (Rx)       |
|----------------------|---|-----------------------------|
| MRSA                 | → | Rx: Vancomycin or Linezolid |
| VRE                  | → | Rx: Synercid or Linezolid   |
| Carbapenem-Resistant | → | Rx: Colistin or Tigecycline |

⚠ Note: Gram+ Cover Indicated for: Catheters, Skin infection, Hypotension, Pneumonia.



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