Oncologic Emergencies:
Cancer Immunotherapy-Related Adverse Events in the Emergency Department

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Disclosures

Daniel Pallin, MD, MPH, has a financial interest/relationship or affiliation in the form of:
Other Financial or Material Support from Chairing a Medical Advisory Board panel for Portola Pharmaceuticals, Inc.

Daniel Pallin, MD, MPH, does intend to discuss either non-FDA-approved or investigational use for the following products/devices: cancer immunotherapies.
Cancer Immunotherapy-Related Adverse Events in the Emergency Department

A Case to Set the Scene
Everyone’s Favorite Chief Complaint

Chief complaint: **Fatigue**
- 60-year-old male presents with 2 weeks of:
  - Fatigue
  - Feeling weak and dizzy
- Negative review of systems

**Medications**
- Sertraline x 1 year
- No other meds

Physical Exam

- Temperature: 98°F
- Heart rate: 112 bpm
- Blood pressure: 90/50 mmHg
- Respiratory rate: 22/min
- O₂ saturation: 98%

- Depressed and anxious; not suicidal
- Physical exam is otherwise normal
### Next Step?

- Discharge for outpatient follow-up
- Lab tests
- Head CT
- X-ray
- Obtain additional history

### Additional History

- **“Have you had treatment for cancer in the past year?”**
  - **“Yes, I had lung cancer. I finished treatment 2 months ago.”**

- **“What was the treatment?”**
  - **“I don’t know. Some kind of chemotherapy.”**
Chart Review

Patient was treated with nivolumab and ipilimumab

Next Step?

- Discharge for outpatient follow-up
- Head CT
- X-ray
- Call oncologist
- Lab tests
<table>
<thead>
<tr>
<th>Lab Tests</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.2</td>
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<td>42.3</td>
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<td>14.1</td>
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<table>
<thead>
<tr>
<th></th>
<th>125</th>
<th>108</th>
<th>18</th>
<th>96</th>
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<tr>
<td></td>
<td>5.7</td>
<td>18</td>
<td>1.2</td>
<td></td>
</tr>
</tbody>
</table>

**The Diagnosis?**
Adrenal Insufficiency!

- Hospitalize

Will need an endocrine workup
- Cortisol level
- ACTH
- Aldosterone
- Renin
- TSH
- Prolactin

Lessons Learned
# Lessons Learned

- PMHx cancer treatment now relevant
- Toxicity different from cytotoxic chemo
- Adverse events can present late

# Practice-Changing Knowledge

1. **History:** Cancer treatment within past year now relevant
2. **Consultation:** Call the oncologist!
3. **Diagnosis**
   - Almost any inflammatory condition
   - Endocrinopathies
   - Cytokine release syndrome
   - Neurological toxicities
4. **Treatment:**
   - Steroids
   - Infliximab
   - Tocilizumab
Introducing…

Checkpoint Inhibitors

Immunotherapy: T Cell Kills a Cancer Cell

**Ways to Enhance T-Cell Attack**

**Turning Up the Activating**

- Ipilimumab
- Nivolumab
- Pembrolizumab
- Atezolizumab
- Avelumab
- Durvalumab

**Blocking the Inhibiting**

- CTLA-4
- PD-1
- TIM-3
- BTLA
- VISTA
- LAG-3

**Drug** | **Mechanism**
--- | ---
Ipilimumab | Anti-CTLA-4
Nivolumab | Anti-PD-1
Pembrolizumab | Anti-PD-1
Atezolizumab | Anti-PD-L1
Avelumab | Anti-PD-L1
Durvalumab | Anti-PD-L1

Checkpoints Inhibitors Discussed Today
Checkpoint Inhibitors: MOA

A
Simplified Depiction of Normal T Cell Activation

B
Normal T Cell Inhibition by Interaction of CTLA-4 and B7

C
Normal T Cell Inhibition by Interaction of PD-1 and PD-L1

D
Monoclonal Antibodies Block the Checkpoints
What Are the FDA-Approved Indications for Checkpoint Inhibitors?

FDA-Approved Indications: Single Agents

<table>
<thead>
<tr>
<th>Drug</th>
<th>Target</th>
<th>Indication(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ipilimumab</td>
<td>CTLA-4</td>
<td>Melanoma (adjuvant and metastatic)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Melanoma (adjuvant and metastatic)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Non–small-cell lung cancer (NSCLC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Renal cell carcinoma (RCC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Classical Hodgkin lymphoma (cHL)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Squamous cell carcinoma of the head and neck (SCCHN)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Urothelial carcinoma (UC)</td>
</tr>
<tr>
<td>Nivolumab</td>
<td>PD-1</td>
<td>Microsatellite instability (MSI)–high or mismatch repair (MMR)–deficient colorectal cancer (CRC)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Hepatocellular cancer (HCC)</td>
</tr>
</tbody>
</table>
### FDA-Approved Indications: Single Agents (Cont’d)

<table>
<thead>
<tr>
<th>Drug</th>
<th>Target</th>
<th>Indication(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pembrolizumab</td>
<td>PD-1</td>
<td>Melanoma (metastatic) NSCLC cHL SCCHN UC MSI-high or MMR-deficient solid tumors Gastric cancer Cervical cancer</td>
</tr>
<tr>
<td>Atezolizumab</td>
<td>PD-L1</td>
<td>NSCLC UC</td>
</tr>
<tr>
<td>Avelumab</td>
<td>PD-L1</td>
<td>Merkel cell carcinoma UC</td>
</tr>
<tr>
<td>Durvalumab</td>
<td>PD-L1</td>
<td>UC Stage III NSCLC</td>
</tr>
</tbody>
</table>

### FDA-Approved Indications: Combinations

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Indication(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nivolumab + ipilimumab</td>
<td>Melanoma (metastatic) RCC MSI-high or MMR-deficient CRC</td>
</tr>
<tr>
<td>Pembrolizumab + chemotherapy</td>
<td>NSCLC</td>
</tr>
</tbody>
</table>
What Immune-Related Adverse Events (irAEs) Might We See in the ED?

- Hypophysitis
- Thyroiditis/hypothyroidism
- Rash and vitiligo
- Hepatitis
- Enteritis
- Colitis
- Pneumonitis
- Myocarditis
- Uveitis
- Encephalitis, aseptic meningitis
- Thrombocytopenia/anemia
- Vasculitis
- Adrenal insufficiency
- Nephritis
- Pancreatitis
- Autoimmune diabetes
- Arthralgia
- Neuropathy
- Dry mouth/mucositis
- Thyroiditis/hypothyroidism
- Myocarditis
- Vasculitis
- Adrenal insufficiency
- Nephritis
- Pancreatitis
- Autoimmune diabetes
- Arthralgia
- Neuropathy
When Do irAEs Occur?

When Do Side Effects Occur?\(^1\)

- Pooled study of ~500 patients with melanoma treated with nivolumab

How Are irAEs Treated?

- Steroids
- Infliximab
- Symptomatic care
### Steroids

- Mild skin inflammation: Topical steroids (low- to mid-potency)
- Mild colitis/enteritis: Oral budesonide
- Other inflammatory conditions: 0.5 to 2 mg/kg prednisone or methylprednisolone
- Adrenal crisis: Dexamethasone 4 mg IV x 1

### Infliximab

- In consultation with oncology
- Used after 3 days of failure to respond to corticosteroids
- Dose is 5 mg/kg once every 2 weeks
Introducing…

CAR-T Cell Therapy

- T cells isolated from the patient’s blood
- Modified by a viral vector
- Now express a synthetic T cell receptor

Chimeric Antigen Receptor T Cells

- Commandeer native antibody and T cell recognition pathways
- Synthetic receptor recognizes a particular protein, such as the B cell marker CD-19
- CAR-T cells are "a living drug," multiplying in the body and killing tumor cells
- Current FDA approvals are for B cell lymphomas and leukemias
- Other indications are being studied

CAR-T irAEs and Their Timing

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>Proportion of Patients Affected</th>
<th>Range for Time to Onset</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cytokine release syndrome</td>
<td>&gt;79%</td>
<td>1-22 days</td>
</tr>
<tr>
<td>Neurotoxicity</td>
<td>&gt;44%</td>
<td>Up to 8 weeks</td>
</tr>
</tbody>
</table>

- Relevance to ED
  - Cytokine release syndrome *almost* always occurs inpatient
  - Neurotoxicity frequently occurs after discharge
Cytokine Release Syndrome

- Looks like septic shock
  - Hypotension
  - Capillary leak syndrome
  - Hypoxia, dyspnea, tachypnea
  - Tachycardia
  - Fever, rigors, diaphoresis, myalgias
  - Renal insufficiency
  - CHF, arrhythmia, cardiac arrest
  - Nausea, vomiting, diarrhea
  - Rash
  - Encephalopathy
  - Coagulopathy

Cytokine Release Syndrome

- Treatment
  1. Treat for sepsis
  2. Tocilizumab (IL-6 receptor antagonist)
  3. Corticosteroids for severe cases
## Managing Cytokine Release Syndrome

<table>
<thead>
<tr>
<th>CRS Grade</th>
<th>Tocilizumab</th>
<th>Corticosteroids</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Symptoms require symptomatic treatment only (eg, fever, nausea, fatigue, headache, myalgia, malaise)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 2</td>
<td>Administer tocilizumab 8 mg/kg IV over 1 hour (not to exceed 800 mg) Repeat tocilizumab every 8 h as needed if not responsive to IV fluids or increasing supplemental oxygen Limit to a maximum of 3 doses in a 24-h period; maximum total of 4 doses</td>
<td>Manage per grade 3 if no improvement within 24 h after starting tocilizumab</td>
</tr>
<tr>
<td>Symptoms require and respond to moderate intervention Oxygen requirement less than 40% FiO₂ or hypotension responsive to fluids or low dose of one vasopressor or grade 2 organ toxicity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 3</td>
<td>Per grade 2</td>
<td>Administer methylprednisolone 1 mg/kg IV 2x/d or equivalent dexamethasone (eg, 10 mg IV every 6 h) Continue corticosteroids use until the event is grade 1 or less, then taper over 3 d</td>
</tr>
<tr>
<td>Symptoms require and respond to aggressive intervention Oxygen requirement greater than or equal to 40% FiO₂ or hypotension requiring high dose or multiple vaspressors or grade 3 organ toxicity or grade 4 transaminitis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 4</td>
<td>Per grade 2</td>
<td>Administer methylprednisolone 1,000 mg IV per day for 3 d; if improves, then manage as above</td>
</tr>
</tbody>
</table>


### Neurotoxicity

- Headache
- Encephalopathy
- Delirium
- Anxiety
- Tremor
- Agitation
- Mutism or aphasia
- Insomnia
### Neurotoxicity

#### Treatment
- Corticosteroids
- Consider levetiracetam

#### Neurologic Event (Grading Assessment CTCAE 4.03)\(^1\)

<table>
<thead>
<tr>
<th>Grade 2</th>
<th>Concurrent CRS</th>
<th>No Concurrent CRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples include:</td>
<td>Administer tocilizumab per the table on management of grade 2 CRS</td>
<td>Administer dexamethasone 10 mg IV every 6 h</td>
</tr>
<tr>
<td>Somnolence: Moderate, limiting instrumental ADLs</td>
<td>If no improvement within 24 h after starting tocilizumab, administer dexamethasone 10 mg IV every 6 h if not already taking other corticosteroids</td>
<td>Continue dexamethasone use until the event is grade 1 or less, then taper over 3 d</td>
</tr>
<tr>
<td>Confusion: Moderate disorientation</td>
<td>Continue dexamethasone use until the event is grade 1 or less, then taper over 3 d</td>
<td>Consider non-sedating antiseizure medicines (eg, levetiracetam) for seizure prophylaxis</td>
</tr>
<tr>
<td>Encephalopathy: Limiting instrumental ADLs</td>
<td>Consider non-sedating antiseizure medicines (eg, levetiracetam) for seizure prophylaxis</td>
<td></td>
</tr>
<tr>
<td>Dysphasia: Moderate, impairing ability to communicate spontaneously</td>
<td>Seizure(s)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade 3</th>
<th>Concurrent CRS</th>
<th>No Concurrent CRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples include:</td>
<td>Administer tocilizumab per the table for management of grade 2 CRS</td>
<td>Administer dexamethasone 10 mg IV every 6 h</td>
</tr>
<tr>
<td>Somnolence: Obtundation or stupor</td>
<td>In addition, administer dexamethasone 10 mg IV with the first dose of tocilizumab and repeat dose every 6 h; continue dexamethasone use until the event is grade 1 or less, then taper over 3 d</td>
<td>Continue dexamethasone use until the event is grade 1 or less, then taper over 3 d</td>
</tr>
<tr>
<td>Confusion: Severe disorientation</td>
<td>Consider non-sedating, antiseizure medicines (eg, levetiracetam) for seizure prophylaxis</td>
<td>Consider non-sedating, antiseizure medicines (eg, levetiracetam) for seizure prophylaxis</td>
</tr>
<tr>
<td>Encephalopathy: Limiting self-care ADLs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Dysphasia: Severe receptive or expressive characteristics, impairing ability to read, write, or communicate intelligibly</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade 4</th>
<th>Concurrent CRS</th>
<th>No Concurrent CRS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Life-threatening consequences</td>
<td>Administer tocilizumab per the table on management of grade 2 CRS</td>
<td>Administer methylprednisolone 1,000 mg IV per day for 3 d; if improves, then manage as above</td>
</tr>
<tr>
<td>Urgent intervention indicated</td>
<td>Administer methylprednisolone 1,000 mg IV per day for 2 more days; if improves, then manage as above</td>
<td>Consider non-sedating, antiseizure medicines (eg, levetiracetam) for seizure prophylaxis</td>
</tr>
<tr>
<td>Requirement for mechanical ventilation</td>
<td>Consider non-sedating, antiseizure medicines (eg, levetiracetam) for seizure prophylaxis</td>
<td></td>
</tr>
<tr>
<td>Consider cerebral edema</td>
<td></td>
<td></td>
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</tbody>
</table>

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1. Call the oncologist
2. Cytokine release syndrome
   - Treat as if septic
   - Tocilizumab ± corticosteroids
3. Neurotoxicity
   - Corticosteroids + levetiracetam

Case Presentations
62-Year-Old Man With Lung Cancer Has a Red Rash, Worst on His Chest

Differential Diagnosis

1. Cellulitis
2. Drug hypersensitivity reaction
3. Immunotherapy-related rash

Treatment?

a. Topical steroids
b. Oral steroids (prednisone 1 mg/kg x 2 weeks)
c. Admit for IV steroids

Very Rare to Have Stevens-Johnson or TEN

### 45-Year-Old Woman With Kidney Cancer Presents With Fatigue and Dizziness

**Vital Signs**
- Temp: 99.0 °F
- HR: 110 bpm
- Blood pressure: 92/44 mmHg
- Oxygen saturation: 97% on room air

**Physical Exam**
- Lethargic, dry

**Laboratory Data**
- CBC: normal
- LFTs: normal
- ABG: pH 7.1

<table>
<thead>
<tr>
<th>Value</th>
<th>Value</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>126</td>
<td>90</td>
<td>30</td>
</tr>
<tr>
<td>5.0</td>
<td>10</td>
<td>1.3</td>
</tr>
<tr>
<td>550</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Treatment:**
- As normal for DKA
- No evidence of benefit from steroids
Another Case

S.G. is a 64-year-old male who presents to the ED with chief complaints:
• Sinus congestion
  – Seen in urgent care center 1 week ago and given antibiotic
• Cough
• Chest tightness
• Shortness of breath

Medications
• Warfarin 5 mg daily
• Albuterol MDI, prn

PMHx
• DVT
• NSCLC

Current Treatment
• Anti-PD-1 checkpoint inhibitor every 3 weeks; s/p 6 cycles

Data

Vital Signs
• Oxygen saturation 92% on room air
• Temperature: 99.9° F
• Heart rate: 102 bpm
• Blood pressure: 118/68 mmHg
• Respiratory rate: 24/minute

Physical Exam
• Bilateral rales at bases on auscultation

Preliminary Testing
• Chest x-ray: Bilateral infiltrates at lung bases, right pleural effusion

Laboratory Data
• Anemic
• Otherwise unremarkable
Evaluation

**Differential Diagnosis**
- Pneumonia
- Worsening lung cancer
- Immune-mediated pneumonitis
- Lymphangitic disease spread

**Next Steps**
- Contact oncologist
- Administer oxygen
- CT of chest

**Image courtesy of Marianne Davies, DNP.**

**Additional Information**
- Oxygenation improved with supplemental O₂
- Chest CT
  - New ground glass opacities consistent with pneumonitis
  - Effusion unchanged from prior scan

**Image courtesy of Marianne Davies, DNP.**
Management

- Initiation of methylprednisolone IV (1 mg/kg/day)
- Admission to hospital

If no improvement, bronchoscopy, consider infliximab

If improvement, switch to prednisone and taper over 4 weeks
- Prophylactic trimethoprim-sulfamethoxazole
- Prophylactic proton-pump inhibitor

Another Case…

72-year-old female with metastatic melanoma who presents to the ED with chief complaints:
- Nausea
- Abdominal cramping and pain
- Increased flatus
- Explosive diarrhea – Associated incontinence this morning

PMHx
- Stage IV metastatic melanoma
- Hypertension
- Chronic pain

Medications
- ACE inhibitor/thiazide diuretic
- Oxycodone 20 mg twice daily
- Senna
- Ipilimumab and nivolumab s/p 3 cycles
Physical Exam

Vital Signs
• Temperature: 99.1° F
• Heart rate: 96 bpm
• Blood pressure: 110/64 mmHg

Physical Exam
• Alert, oriented, cooperative
• Lungs clear to auscultation
• Skin and mucous membranes: Pale, dry and poor turgor
• Abdominal exam
  – Hyperactive bowel sounds
  – Moderate diffuse tenderness

Evaluation

Differential Diagnosis
• Viral gastroenteritis
• *Clostridium difficile*
• Immune-mediated colitis
• Side effect of antibiotic
• Progression of melanoma intestinal infiltrates
• Perforation

Next Steps
✔ Stool studies
  • *Clostridium difficile*
  • Consider culture
✔ Abdominal CT scan
  • Shows colitis
Diarrhea and Colitis

- Steroids
- Hydration
- Supportive care
  - Antiemetic (eg, ondansetron)
  - Antidiarrheal (eg, loperamide)

Additional Considerations?

**Q** Are diagnostic test results needed before starting steroids?
- Not necessarily!
- If patient history points clearly to immune-mediated colitis, steroid immunosuppression can be started right away

**Q** What if a patient has mild diarrhea?
- Consider treatment with budesonide, an oral nonabsorbed steroid

Another Case!

Mrs. K.M. is a 53-year-old female who presents to the ED with:
- Severe fatigue
- Nausea
- Headache
- Blurred vision
- Lightheaded
- Anxiety
- Weakness

**PMHx**
- Metastatic urothelial carcinoma
- Chronic pain
- Hypothyroidism

**Medications**
- Oxycodone 40 mg every 12 hours
- Levothyroxine 50 mcg
- Lorazepam

**Current Therapy**
- No systemic therapy at this time
Physical Exam

Vital Signs
- Temperature: 97.8° F
- Heart rate: 112 bpm
- Blood pressure: 88/48 mmHg

Physical Exam
- Lethargic
- Slowed speech
- Lungs CTA
- Neurologic exam:
  - Muscle strength all extremities 4+/5
  - Deep tendon reflexes +1

Evaluation

Differential Diagnosis
- Immune-mediated hypophysitis
- Immune-mediated adrenal insufficiency
- Sepsis

Next Steps
- Contact oncologist
- Chart review
- MRI of brain with pituitary cuts
- Blood cultures
- Labs
  - TSH, T4
  - Cortisol
  - ACTH
  - CMP
**Additional Information**

**Chart Review**
- Treated with checkpoint inhibition for 1 year
- Developed transient hyperthyroidism followed by hypothyroidism while on therapy
- Started levothyroxine replacement
- Treatment completed 8 months ago

**Laboratory Values**
- Sodium level: 119
- Potassium: 6.1
- TSH: 0.05
- T4: 0.22
- Cortisol level: 0.6
- ACTH undetectable

**MRI of Brain**
- Enlargement of pituitary

---

**Management**

**Medication**
- Isotonic saline for sodium repletion
- Dexamethasone 4 mg IV
- Hospitalize
- Will likely require lifetime hormone replacement
Remember, this patient presented 8 months AFTER discontinuing checkpoint inhibitor therapy!

**Last Case**

Eric is an 11-year-old child brought to the ED at 2 am by his father. The father states he observed son sleeping when he demonstrated rigors. Father attempted to wake son, with the following symptoms:

- Fever
- Rash
- Disorientation
- Lethargy

**PMHx**
- Acute lymphoblastic leukemia
- Hematopoietic stem cell transplant (2016)
- Clinical trial with CAR T-cell therapy (1 month prior to ED visit)
Physical Exam

Vital Signs
- Temp: 40.2° C (104.36 °F)
- HR: 128 bpm
- Blood pressure: 70/40 mmHg
- Oxygen saturation: 87%

Physical Exam
- Lethargic, disoriented
- Skin: Cool, clammy, macular rash diffuse
- Diffuse rales
- Aphasic

Laboratory Values
- WBC: 1.2
- Hb: 8.2
- Hct: 36.6
- Platelets: 56 K
- ALT: 72
- AST: 68
- Total bilirubin: 1.8

Differential Diagnosis

Differential Diagnosis
- Infection/sepsis
- Cytokine-release syndrome
- Tumor lysis syndrome
## Management

- Cultures & antibiotics
- Oxygen
- Dopamine
- Tocilizumab 8 mg/kg IV over 1 hour
- Methylprednisolone 1 mg/kg IV
- Acetaminophen
- Admission to ICU

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## Wrap-Up


1. **History**: Cancer treatment within past year?

2. **Consultation**: Call the oncologist!

3. **Diagnosis**: Avoid premature closure
   - Checkpoint inhibition
     - Almost any inflammatory condition
     - Endocrinopathies
   - CAR-T cell therapy
     - Cytokine release syndrome
     - Neurotoxicity

4. **Treatment**: Choose from just 3 therapies

---

### Toxicity Proportion

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<th>Proportion of Patients Affected</th>
<th>Range for Time to Onset</th>
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<td>&gt;79%</td>
<td>1-22 days</td>
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<tr>
<td>Neurotoxicity</td>
<td>&gt;44%</td>
<td>Up to 8 weeks</td>
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**Diagnosis**

**Premature Closure on a Non-Oncology Diagnosis**

<table>
<thead>
<tr>
<th>Your Diagnosis</th>
<th>Real Diagnosis</th>
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<tbody>
<tr>
<td>Sepsis</td>
<td>Cytokine-release syndrome</td>
</tr>
<tr>
<td>Depression</td>
<td>Adrenal insufficiency</td>
</tr>
<tr>
<td>Benign headache</td>
<td>Hypophysitis</td>
</tr>
<tr>
<td>Cellulitis</td>
<td>Immune-mediated dermatitis or radiation recall</td>
</tr>
<tr>
<td>Viral syndrome</td>
<td>Immune-mediated hepatitis</td>
</tr>
<tr>
<td>Pneumonia</td>
<td>Immune-mediated pneumonitis</td>
</tr>
</tbody>
</table>

**Premature Closure on an Oncology Diagnosis**

<table>
<thead>
<tr>
<th>Your Diagnosis</th>
<th>Real Diagnosis</th>
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<tr>
<td>Immune-mediated colitis</td>
<td>C. difficile colitis</td>
</tr>
<tr>
<td>Cytokine-release syndrome</td>
<td>Sepsis</td>
</tr>
</tbody>
</table>

**Treatment**

- **Steroids**
  - Yes
  - No
- **Infliximab**
  - Yes
  - No
- **Tocilizumab**
  - Yes
  - No

*In consultation with oncology*
<table>
<thead>
<tr>
<th>Generic Name</th>
<th>Trade Name</th>
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