AUTONOMIC DYSREFLEXIA

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Complex Care Curriculum

Autonomic Dysreflexia

Learning Objectives

Definition

Pathophysiology

Severe Complications

Precipitants

Clinical Manifestations

Acute Management Algorithm

Initial Assessment

Non-pharmacologic Treatment

Pharmacologic Treatment

Summary

References

Drug Formulary

LEARNING OBJECTIVES
Autonomic Dysreflexia

DEFINITION
Complex Care Curriculum

Autonomic Dysreflexia

Learning Objectives
Definition
Pathophysiology
Severe Complications
Precipitants
Clinical Manifestations
Acute Management Algorithm
Initial Assessment
Non-pharmacologic Treatment
Pharmacologic Treatment
Summary
References
Drug Formulary

PATHOPHYSIOLOGY
# Autonomic Dysreflexia

**SEVERE COMPLICATIONS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning Objectives</td>
<td></td>
</tr>
<tr>
<td>Definition</td>
<td></td>
</tr>
<tr>
<td>Pathophysiology</td>
<td></td>
</tr>
<tr>
<td>Severe Complications</td>
<td></td>
</tr>
<tr>
<td>Precipitants</td>
<td></td>
</tr>
<tr>
<td>Clinical Manifestations</td>
<td></td>
</tr>
<tr>
<td>Acute Management Algorithm</td>
<td></td>
</tr>
<tr>
<td>Initial Assessment</td>
<td></td>
</tr>
<tr>
<td>Non-pharmacologic Treatment</td>
<td></td>
</tr>
<tr>
<td>Pharmacologic Treatment</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td></td>
</tr>
<tr>
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<td></td>
</tr>
<tr>
<td>Drug Formulary</td>
<td></td>
</tr>
</tbody>
</table>
Complex Care Curriculum

Autonomic Dysreflexia

Learning Objectives
Definition
Pathophysiology
Severe Complications
Precipitants
Clinical Manifestations
Acute Management Algorithm
Initial Assessment
Non-pharmacologic Treatment
Pharmacologic Treatment
Summary
References
Drug Formulary
Autonomic Dysreflexia

**DERMATOLOGY**
- Constrictive clothing
- Contact with sharp objects
- Blister
- Burn
- Frostbite
- Ingrown toenail
- Insect bite
- Pressure ulcer

**REPRO. SYSTEM**
- Labor and delivery
- Menstruation
- Intercourse
- Ejaculation
- STD
- Scrotal compression
- Epididymitis
- Vaginitis
Autonomic Dysreflexia

**HEMATOLOGY**
- Pulmonary embolism
- Deep vein thrombosis

**MUSCULOSKELETAL**
- Fracture
- Trauma
- Joint dislocation

**MEDS**
- Excessive alcohol intake
- Excessive caffeine
- Excessive diuretic intake
- Nasal decongestants
- Sympathomimetics

**Complex Care Curriculum**

- Learning Objectives
- Definition
- Pathophysiology
- Severe Complications
- Precipitants
- Clinical Manifestations
- Acute Management Algorithm
- Initial Assessment
- Non-pharmacologic Treatment
- Pharmacologic Treatment
- Summary
- References
- Drug Formulary
Autonomic Dysreflexia

CLINICAL MANIFESTATIONS
Autonomic Dysreflexia

ACUTE MANAGEMENT ALGORITHM

Learning Objectives
Definition
Pathophysiology
Severe Complications
Precipitants
Clinical Manifestations
Acute Management Algorithm
Initial Assessment
Non-pharmacologic Treatment
Pharmacologic Treatment
Summary
References
Drug Formulary
**Autonomic Dysreflexia**

**INITIAL ASSESSMENT**

- **Learning Objectives**
- **Definition**
- **Pathophysiology**
- **Severe Complications**
- **Precipitants**
- **Clinical Manifestations**
- **Acute Management Algorithm**
- **Initial Assessment**
- **Non-pharmacologic Treatment**
- **Pharmacologic Treatment**
- **Summary**
- **References**
- **Drug Formulary**

Autonomic Dysreflexia

NON PHARMACOLOGIC MANAGEMENT

Mild – Moderate HTN
- ≤ 13yrs: SBP ≥ 15 mmHg above baseline
- > 13yrs: SBP ≥ 20 mmHg above baseline up to 150 mmHg

Severe HTN
- ≤ 13yrs: SBP > 30 mmHg above baseline
- > 13yrs: SBP > 150 mmHg

Non-pharmacologic management will resolve the majority of AD episodes.

**Autonomic Dysreflexia**

**Mild to Moderate Blood Pressure Elevation**

- Perform bladder management steps
- Repeat vital signs

If BP decreases, monitor until VS normal & patient asymptomatic

If BP remains unchanged or increases, notify MD

- Perform bowel management steps. Consider hypertension medications.
- If blood pressure elevation becomes severe, transfer to ICU

Severe Blood Pressure Elevation

- Notify MD
- Consider nifedipine or nitropaste
- Perform bladder management steps*
- Place patient on monitor
- If BP remains elevated, perform bowel management steps,* and start hypertension medications if not previously done
- If BP elevation remains severe, prepare for transfer to ICU

Complex Care Curriculum

Autonomic Dysreflexia

BLADDER MANAGEMENT STEPS

Autonomic Dysreflexia

Learning Objectives
Definition
Pathophysiology
Severe Complications
Precipitants
Clinical Manifestations
Acute Management
Algorithm
Initial Assessment
Non-pharmacologic Treatment
Pharmacologic Treatment
Summary
References
Drug Formulary

**BOWEL MANAGEMENT STEPS**

- Insert 2% xylocaine jelly into rectum
- Wait 2 minutes and examine rectum, checking for presence of stool
- Remove any stool if present
- If autonomic dysreflexia does not resolve or blood pressure continues to increase, stop manual evacuation and instill additional 2% xylocaine jelly
- After 20 minutes, recheck for presence of stool and remove if present

Autonomic Dysreflexia

Nitroglycerin paste

Rapid onset, reversible

Venous pooling and the drop in BP may trigger an alpha agonist release thereby exacerbating the AD
Nifedipine

Rapid onset

May cause headache, tachycardia, dizziness, fatigue, nausea, or orthostatic hypotension

Complex Care Curriculum

Autonomic Dysreflexia

Learning Objectives
Definition
Pathophysiology
Severe Complications
Precipitants
Clinical Manifestations
Acute Management Algorithm
Initial Assessment
Non-pharmacologic Treatment
Pharmacologic Treatment
Summary
References
Drug Formulary
**Autonomic Dysreflexia**

**Hydralazine**

- **Rapid onset, titratable**
- **May cause reflex tachycardia, prolonged hypotension, nausea.**
- Requires IV access
Autonomic Dysreflexia

Clonidine

Rapid onset with oral form

Withdrawal can cause life threatening hypertension

- Learning Objectives
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- Pathophysiology
- Severe Complications
- Precipitants
- Clinical Manifestations
- Acute Management Algorithm
- Initial Assessment
- Non-pharmacologic Treatment
- Pharmacologic Treatment
- Summary
- References
- Drug Formulary
Other Medications

- Phenoxybenzamine
- Prazosin
- Mecamylamine
- Oxybutynin
- Nitroprusside
- Diazoxide
- Trimethaphan camphorsulfonate
- Phentolamine


### Autonomic Dysreflexia

<table>
<thead>
<tr>
<th>Learning Objectives</th>
<th>Definition</th>
<th>Pathophysiology</th>
<th>Severe Complications</th>
<th>Precipitants</th>
<th>Clinical Manifestations</th>
<th>Acute Management Algorithm</th>
<th>Initial Assessment</th>
<th>Non-pharmacologic Treatment</th>
<th>Pharmacologic Treatment</th>
<th>Summary</th>
<th>References</th>
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Please take note of the following prior to using this formulary:

- Most of these medications are not FDA approved for the treatment of dysautonomia, particularly in the pediatric population.

- The dosage information provider here is a combination of recommendations from the *Pediatric Dosing Handbook Formulary* and expert opinion.

- It is important for this dosing information to be used with caution and only after full review of the entire dysautonomia module.

- We highly encourage you to discuss medication dosing with a pharmacist and/or pediatric physiatrist if you have any questions or concerns.
Autonomic Dysreflexia

**Nitroglycerin**

<table>
<thead>
<tr>
<th>Mechanism of Action</th>
<th>Direct acting vasodilator; causes dilation of the venous system; decreases preload of the heart</th>
</tr>
</thead>
</table>
| Dose                | • Nitroglycerin 2% paste: Start with 0.5 inch and increase by 0.5 inch increments to achieve desired results. Apply topically 1 inch above the spinal cord injury level (max of 2 doses/day)  
• Sublingual (adults): 0.3-0.6 mg q5 minutes (max of 3 doses in 15 minutes) |
| Onset               | 10-30 minutes                                                                                   |
| Duration            | 3-6 hours; may wipe away paste to stop action                                                   |
| Precautions         | May aggravate AD by reflexively increasing sympathetic alpha agonist release secondary to venous pooling and drop in BP |
| Dosage Forms        | Topical: 2% ointment  
SL: 0.3 mg, 0.4 mg, 0.6 mg tablets                                                            |
# Autonomic Dysreflexia

## Nifedipine

<table>
<thead>
<tr>
<th><strong>Mechanism of Action</strong></th>
<th>Calcium channel blocker; potent coronary and peripheral arterial vasodilator</th>
</tr>
</thead>
</table>
| **Dose**                | Children: 0.25-0.5mg/kg/dose (max 10 mg), may repeat every 4-6 hours as needed  
                          | Adult: 10mg chewable                                                        |
| **Onset**               | SL/“bite and swallow”: within 1 – 5 minutes  
                          | IR: within 20 – 30 minutes                                                  |
| **Duration**            | 4 – 8 hours                                                                   |
| **Precautions**         | May cause headache, tachycardia, dizziness, fatigue, nausea, or orthostatic hypotension.  
                          | Ineffective at prevention of episodes. Do not use the sustained release form. |
| **Dosage Forms**        | 10 mg capsule (contains 10 mg/0.34 mL); liquid must be withdrawn from capsule |
# Autonomic Dysreflexia

## Learning Objectives

- Definition
- Pathophysiology
- Severe Complications
- Precipitants
- Clinical Manifestations
- Acute Management Algorithm
- Initial Assessment
- Non-pharmacologic Treatment
- Pharmacologic Treatment
- Summary
- References
- Drug Formulary

## Non-pharmacologic Treatment

### Pathophysiology

### Learning Objectives

### Definition

### Severe Complications

### Precipitants

### Clinical Manifestations

### Acute Management

### Algorithm

## Pharmacologic Treatment

### Summary

### References

### Drug Formulary

## Nifedipine Capsule:

10 mg contains 0.34 mL

<table>
<thead>
<tr>
<th>Weight (Kg)</th>
<th>Dose Range</th>
<th>Volume</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 10</td>
<td>2.5 mg – 5 mg</td>
<td>0.09 ml – 0.17 ml</td>
</tr>
<tr>
<td>≥ 15</td>
<td>3.75 mg – 7.5 mg</td>
<td>0.13 ml – 0.26 ml</td>
</tr>
<tr>
<td>≥ 20</td>
<td>5 mg – 10 mg</td>
<td>0.17 ml – 0.34 ml</td>
</tr>
<tr>
<td>≥ 30</td>
<td>7.5 mg – 10 mg</td>
<td>0.26 ml – 0.34 ml</td>
</tr>
<tr>
<td>≥ 40</td>
<td>10 mg</td>
<td>0.34 ml</td>
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# Autonomic Dysreflexia

**Hydralazine**

<table>
<thead>
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<th>Mechanism of Action</th>
<th>Relaxes smooth muscle; causes peripheral vasodilation.</th>
</tr>
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<tr>
<td><strong>Dose</strong></td>
<td>IV push: 0.1-0.2 mg/kg/dose IM/IV every 4-6 hours as needed (max dose 20mg/dose).</td>
</tr>
<tr>
<td><strong>Onset</strong></td>
<td>5 – 20 minutes</td>
</tr>
<tr>
<td><strong>Duration</strong></td>
<td>2 – 6 hours</td>
</tr>
<tr>
<td><strong>Precautions</strong></td>
<td>May cause tachycardia, vomiting, flushing and headache. May give with diuretic and a beta-blocker to counteract side effects of sodium and water retention and reflex tachycardia.</td>
</tr>
<tr>
<td><strong>Concentration</strong></td>
<td>20 mg/mL</td>
</tr>
</tbody>
</table>

- **Drug Formulary**
  - Nitroglycerin
  - Nifedipine
  - Nifedipine Capsule
  - Hydralazine
  - Clonidine
Clonidine

**Mechanism of Action**
Alpha-2 agonist; decreases sympathetic outflow from CNS; peripheral vascular resistance, heart rate, blood pressure, and renal vascular resistance.

**Dose**
1-17 years old: 0.05 – 0.1 mg/dose (may repeat hourly up to max total dose 0.8 mg)
< 1 year old: not recommended (could use dose of 2.5 mcg/kg/dose if no other options)

**Onset**
30 – 60 minutes

**Duration**
6 – 10 hours

**Precautions**
Serious bradycardia may occur if given with other sympatholytic drugs. Rebound hypertension may develop with abrupt withdrawal. May also cause sedation and CNS side effects.

**Dosage Forms**
0.1 mg tablet