Graft-Versus-Host Disease

Jaime Wilson-Chiru, HMS III
Gillian Lieberman, M.D.

November 2006
History

21-year-old male presents with 2 days of nausea, vomiting, diarrhea
Our Patient’s Abdominal Plain Films

Supine

PACS, BIDMC

Upright

PACS, BIDMC
Increased mesenteric fat
Featureless small bowel

Axial CT Slice

Our Patient
Findings on CT

- Featureless small bowel
- Mild bowel wall thickening
- Increased visceral fat
- “Target” pattern of bowel
21-year-old male presents with 2 days of nausea, vomiting, diarrhea

Day 39 s/p allogenic bone marrow transplant for non-Hodgkin lymphoma

Acute graft-versus-host-disease
Complication of allogenic bone marrow transplantation in which mature donor lymphocytes attack recipient tissues (including intestinal mucosa)

T-cells present in the graft produce inflammatory cytokines, including TNF-α and IL-1

HLA antigens principal initiators GVHD
Epidemiology

- Occurs in up to 50% of patients who receive an allogenic transplant from an HLA-identical sibling

Risk factors
- HLA disparity
- Older age
- Donor and recipient gender disparity
- Splenectomy
## Acute vs Chronic GVHD

<table>
<thead>
<tr>
<th></th>
<th>Acute GVHD</th>
<th>Chronic GVHD</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Time of onset</strong></td>
<td>≤ 100 d post-transplant</td>
<td>&gt; 100 d post-transplant</td>
</tr>
<tr>
<td><strong>Target tissues</strong></td>
<td>liver, skin, and GI tract</td>
<td>Liver, skin, GI – oral mucosa and esophagus</td>
</tr>
<tr>
<td><strong>Clinical manifestation</strong></td>
<td>Rash, skin blistering, diarrhea, abdominal pain, nausea and vomiting</td>
<td>Rash, dry/irritated eyes, pain/dryness in mouth, dysphagia from esophageal involvement</td>
</tr>
</tbody>
</table>
Now, let’s focus on the radiological manifestations of GVHD
GVHD – Companion
Patient #1

Intraluminal Hemorrhage

Contrast study of the GI tract

Contrast-enhanced axial CT

Featureless small bowel

Courtesy of J. Kruskal
Now, back to our patient...
GVHD – Our Patient

Increased mesenteric fat

Featureless small bowel

Target sign

Non-contrast coronal CT

Axial CT Slice
Radiologic Findings

- Diffuse featureless loops of bowel with loss of mucosal pattern
- Submucosal edema
- “Target” sign or “halo” sign

http://faculty.southwest.tn.edu/jiwilliams/models_of_the_digestive_system.htm
Differential Diagnosis of GVHD

- Neutropenic Colitis (Typhlitis)
- Pseudomembranous Colitis
- Infectious Colitis
- Inflammatory Bowel Disease
Companion Patient #2: Neutropenic Colitis

- Diffuse wall thickening
- Fat stranding
- Mucosal pattern remains

Contrast-enhanced axial CT

Coy et al, Radiologics 2003

Kirkpatrick et al, Radiology 2003
Companion Patient #3: 

**C. diff. Colitis**

- Diffuse wall thickening
- Mucosal irregularity
- Shaggy wall contour

Contrast-enhanced axial CT

Coy et al, Radiographics 2003
Diagnosis of GVHD

- Diagnosis from clinical grounds, with radiological and histological confirmation

- Severity of disease is variable

- Grading determined by an assessment of the degree of involvement of the skin, liver, and GI tract
<table>
<thead>
<tr>
<th>ORGAN</th>
<th>GRADE</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>+1</td>
<td>Maculopapular rash over &lt;25 % of body area</td>
</tr>
<tr>
<td></td>
<td>+2</td>
<td>Maculopapular rash over 25 to 50 % of body area</td>
</tr>
<tr>
<td></td>
<td>+3</td>
<td>Generalized erythema</td>
</tr>
<tr>
<td></td>
<td>+4</td>
<td>Generalized erythema with bullous formation, desquamation</td>
</tr>
<tr>
<td>Liver</td>
<td>+1</td>
<td>Bilirubin 2.0 to 3.0 mg/dL; SGOT 150 to 750</td>
</tr>
<tr>
<td></td>
<td>+2</td>
<td>Bilirubin 3.1 to 6.0 mg/dL</td>
</tr>
<tr>
<td></td>
<td>+3</td>
<td>Bilirubin 6.1 to 15.0 mg/dL</td>
</tr>
<tr>
<td></td>
<td>+4</td>
<td>Bilirubin &gt;15.0 mg/dL</td>
</tr>
<tr>
<td>Gut</td>
<td>+1</td>
<td>Diarrhea &gt;30 mL/kg or &gt;500 mL/day</td>
</tr>
<tr>
<td></td>
<td>+2</td>
<td>Diarrhea &gt;60 mL/kg or &gt;1000 mL/day</td>
</tr>
<tr>
<td></td>
<td>+3</td>
<td>Diarrhea &gt;90 mL/kg or &gt;1500 mL/day</td>
</tr>
<tr>
<td></td>
<td>+4</td>
<td>Diarrhea &gt;90 mL/kg or abdominal pain with or without ileus &gt;2000 mL/day</td>
</tr>
</tbody>
</table>
Prophylaxis & Treatment

- Prophylactic regimen a combination of methotrexate and cyclosporine

- Corticosteroids first and most effective treatment option

- One study demonstrated a 30% cure rate of moderate to severe acute GVHD
Conclusions

- Patients who undergo hematopoietic cell transplant are at risk for GVHD

- Radiological manifestations of GVHD can look like other inflammatory and infectious entities

- Prompt diagnosis is essential, since prognosis is dependent on early treatment
Acknowledgements

- Andrew Hines-Peralta, MD
- Gillian Lieberman, MD
- Pamela Lepkowskio
- Larry Barbaras, Webmaster
References


