Prevention of Infection: Rhyme and Reason

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Is Infection Prevention Necessary?

• Neutropenic: Some preventive measures are reasonable

• Not neutropenic (resolved or on treatment): **Live a normal life!**

• In between: depends on
  – ANC
  
  *and*
  
  – Mechanism of neutropenia (less risk with autoimmune and idiopathic)
<table>
<thead>
<tr>
<th>ANC</th>
<th>Clinical Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1000-1500</td>
<td>No increased risk of infection</td>
</tr>
<tr>
<td>500-1000</td>
<td>Little or no increased risk of infection</td>
</tr>
<tr>
<td>200-500</td>
<td>Increased risk of infection</td>
</tr>
<tr>
<td>&lt;200</td>
<td>Very high risk of infection</td>
</tr>
</tbody>
</table>

Risk also depends on duration and mechanism of neutropenia, e.g. destruction or lack of production, presence or absence of accompanying immunodeficiency.

The classification in this table is based largely on cancer patients receiving chemotherapy. They have additional risk factors of bone marrow suppression and immune suppression, and often poor nutrition, central venous catheters, organ damage from the cancer, etc.
Human Immunity –
Not Just Neutrophils
(much as we love them)

• Surface barriers
  – Skin, mucous membranes, lungs, GI tract

• Reticuloendothelial system (liver, spleen)

• Hormonal Immunity
  – Antibodies, complement

• Cellular immunity
  – Neutrophils, monocytes/macrophages
  – T & B lymphocytes, NK cells
Are We Under Constant Attack by Microbes?
NO – they are already in and on us!

A human body contains 10 times as many microbial cells as human cells.
Every Body Part Has Its Own “Flora”
Hygiene Hypothesis: Dirt Is Good
Like every scientific idea, it has already been turned into a diet.
Lessons from the Microbiome

- Most microbes are your friends
- Excessive hygiene removes your friends and opens the door to invaders
But What About “Bad Bugs?”
Lessons from the Hospital Studies

Effective precautions
• Hand washing!!!
• Laminar airflow and HEPA filtration
• Everything in between: not very effective

Ineffective precautions
  – “Neutropenic diet”
  – Gowns, gloves, etc.
  – Prophylactic antibiotics
  – Not studied, but by implication: disinfecting the home, disinfecting the playground, social isolation
Most infections in neutropenic patients come from their own bacteria

But I just said that most of our microbes are our friends!

Why good bugs go bad:

• Antibiotics
• Hospital environment
• Good bug in a bad place (e.g. the bloodstream)
• Breakdown of other defenses: skin, gums, intestinal wall, immune system
What are reasonable precautions?
From the NNN website:

• **Mouth Care**: This should include regular dental check ups. Excellent oral hygiene is very important and the use of an antibacterial mouthwash is recommended.

• **Immunizations and Vaccinations**: People with SCN have an intact immune system that allows them to make normal antibodies protecting from the devastating effects of viral illnesses. Therefore all routine immunizations according to the standard vaccination schedule of your country are recommended.

• **General Hygiene**: This includes thorough hand washing and attention to scrapes and cuts on the skin.

• **Oral Prophylaxis**: Antibiotics/antifungals, either oral or intravenous, may be given to SCN patients but this is very much based on individual physician choice.

• **Foreign Travel**: Travel is an option but should always be considered with the counsel of your physician
Reasonable Precautions

Mouth Care:

• Regular dental check ups
• Excellent oral hygiene  
  (brushing/flossing)
• antibacterial mouthwash  
  (for poor oral hygiene or periodontal disease)
• Avoid sweets
• Fluoride toothpaste and/or gel, varnish, etc.

Oral Prophylaxis: Antibiotics for dental procedures?

To be discussed in much greater detail by Dr. Dabiri
Reasonable precautions

**Immunizations:**

All routine immunizations according to the standard vaccination schedule of your country are recommended.

NO increased risk from live virus vaccines
Reasonable precautions

General Hygiene:
• Thorough hand washing (but excessive washing can damage skin)
• Good nail care
• Cleaning of scrapes and cuts on the skin
• No rectal thermometers or suppositories

Foreign Travel:
• Consult your physician
• Study the CDC website
Reasonable precautions

Social interactions and school attendance
Most infections transmitted from other people are viral – neutropenia is not a factor in immunity
BUT fever can lead to MD or ER visits and rarely, viral infection can lead to secondary bacterial infection

Bottom line:
Balance small risk against psychosocial and educational benefits
Avoid obviously sick friends & relatives