

Neutropenic Precautions

“Practicing According to Evidence” (??)

ACOI 69th Annual Meeting

Oct. 2009

Tucson, Az

gblackburn@botsford.org

“Neutropenia”

- Mild: ANC < 1000/ml
- Moderate: ANC < 500/ml
 - (~30% increase in risk of infection)
- Profound/Severe: ANC < 100/ml
 - (200% increase)
- Also important: anticipated nadir

The Rationale:

- The most lethal complications of chemotherapy are bleeding and/or infection
- If infection could be better controlled, more aggressive chemotherapy could be given
- More aggressive chemotherapy could improve outcomes

The Rationale:

- Environmental, as well as endogenous organisms, contribute to infection
 - 85 % of infections are from endogenous flora, 1/2 of which are nosocomially acquired

(Mandell et al, 5th Ed.)

- We can **successfully** control exposure to these organisms, thereby allowing more aggressive chemotherapy, followed by better outcomes

Back in the Day...

- Gloves
- Gown
- Surgical caps
- Surgical booties
- Environmental decontamination

Back in the Day...

- GI decontamination
 - TMX, others
- Prophylactic (as well as therapeutic) WBC transfusions
- Various prophylactic antimicrobial/antifungal/antiviral regimens

Back in the Day....

- Private rooms
- Limitation of visitors
- HEPA air filtration
- Laminar air flow
- “Seamless” flooring
- “surveillance” cultures
- “Bubbles”

But....

- Not all neutropenic pts are alike:
 - Degree of neutropenia
 - Mechanism of neutropenia
 - Duration of neutropenia
 - Mechanism/risk of infection may vary

Oops!

- Tremendous expense
- Cumbersome
- Less visitation/care by HCWs
- Less visitation/touching by family
- Effectiveness?
- Better outcome?

Organisms of concern:

- E coli
- Pseudomonas
- Candida sp
- Aspergillosis
- Other
 - Gm +'s
 - Other gm neg's
 - Viruses
 - Other molds
 - GOK what else, including MDR/KPC's

A Sample - Elsewhere General:

- Guideline: Neutropenic guidelines will be initiated for all pts w/ an ANC of < 500 (or below 1000 if febrile)

HUH???

Precautions:

- Private room preferred. Semi-private acceptable, w/ physician approval, if the other pt is free of transmittable disease
 - Who will do this screening?
 - How often?
 - For what?
- Strict adherence to hospital handwashing guidelines by all
- Staff will not care for pts w/ transmittable dx and neutropenic pts concurrently
- Visitors will be screened for transmittable dx

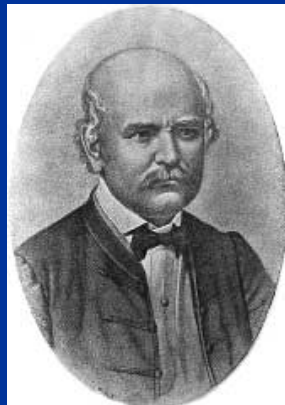
Precautions:

- Vital sign equipment will be secured from Central Processing, and stay at the pt's bedside
- No fresh flowers or plants. Eliminate sources of stagnant water by changing water frequently in the following containers: water cups, denture cup, irrigating containers, respiratory equipment, etc. (Water pitchers are not removed from pt's room)
- No rectal temps or rectal meds

- “Neutropenic diet”:
 - No raw meats, fresh fruits or vegetables
 - No deli foods
 - No uncooked pepper
 - No raw or partially cooked eggs
- Pt must wear mask when out of room
- Continue neutropenic precautions until ANC > 500

Hand Washing:

- Labarraque - 1829
- Oliver Wendell Holmes ~ 1843
- Ignaz Phillipp Semmelweis ~ 1846



I P Semmelweis (1818-1865)

- CDC - 1975: 1st formal guidelines on hand washing
- Garner JS: Infect Control Hosp Epidemiol 1996; 17 (4):214

Problem:

- In order for hand washing to be beneficial, one must actually do it
 - Compliance as low as 30 % has been observed in some instances
 - 40-50% compliance common
 - Our institution's best data: 77%

Private Room:

- Limited data suggesting some benefit of private or semi-private rooms over wards
(personal communication)

- No overlapping care w/ other pts w/ transmittable dx:
 - How is this determined? How often?

- Visitors will be screened for evidence of transmittable dx:
 - By whom? By what criteria?
 - Who screens the employees?
 - Who screens the physicians:
 - “So, who’s going to stop me from seeing my patients if I’m ill?”
 - “Our employees are professionals -- they can self-screen”

- “Vital Sign” equipment:
 - Reasonable, if that is what it takes to assure clean equipment
- Masks if leaving room:
 - No data; N 95 masks probably advisable, at least if around hospital construction areas

Flowers/plants/stagnant water:

- The data/rationale:
 - Aspergillus sp. has been found in the soil of potted cactus plants, as well as on dried and fresh flowers
 - These isolates, at least in some instances, have matched those found in pts
- **BUT.....**
 - No data to link plants/flowers as the **source** of infection in neutropenic pts
 - Aspergillus **commonly** found on cotton clothes, in water systems!!

Neutropenic Diets:

- The rationale:

Raw fruits and vegetables are colonized w/ various bacteria, particularly gm negative enteric organisms, as well as pseudomonas, and fungi

- “typical size” salad: ~5000 cfu pseudomonas,
- highest colony counts w/ tomatoes
- Enteric gm negs, pseudomonas may be normal flora of vegetables

(Remington)

- The data: none to show a benefit from this approach

Problem:

- Most infectious complications of neutropenia are from endogenous organisms.

Even if these were originally acquired from the hospital environment, placing the pt in neutropenic precautions AFTER the WBC has fallen can not be expected to be helpful

A classic that gets repeated over and over again:

- A 47 y.o. pt w/ acute leukemia is in the hospital for chemo, with the expected response dropping his ANC to <100/ml on day 4. “Neutropenic Precautions” ordered after physician called by nursing w/ results of that day’s lab.
- On day 7, he crashes with a temp of 104 and bp of 60 systolic. Respirations are 40 w/ mental status changes as well.
- He is transferred to ICU where “Neutropenic Precautions” are maintained on the door and chart, though it’s business as usual for the most part.

Isn't this a bit late??

- Nauseef and Maki (1981):

“We conclude that protective isolation alone, as practiced in most hospitals, appears not to benefit granulocytopenic patients.”

- sterilized food, prophylactic oral abs not used
- 3X higher rate of bacteremia in isolated pts

- MMWR 2003; 52 (RR-10):

“No published reports support the benefit of placing.....immunocompromised pts in a Protective Environment”

Summary I:

- Not all neutropenic pts are at similar risk
- Much of the (limited) data/recommendations address HSCT pts only
- Huge institutional inconsistencies in this policy
- Many of these approaches are based on tradition and good intentions, rather than firm data. Placing pts in “Neutropenic Precautions” after their WBC has fallen seems illogical.....

Summary II:

“.....however, the one constant in almost every controlled study is that life has not been prolonged, remission induction increased, nor remission duration prolonged.” D. Armstrong AJM April, 1984

(...but Kevin, I still loves ya)

References

- Remington JS, Schimpff SC. Please don't eat the salads. N Engl J Med. 1981; 304:7
- Nauseef WM, Maki DG. A study of the value of simple protective isolation in patients w/ granulocytopenia. N Engl J Med. 1981; 304:448
- CDC: Guidelines for preventing opportunistic infections among hematopoietic stem cell recipients.....
MMWR Rep 49:RR-10, 2000
- Fenton LE. Protective isolation: who needs it? J Hosp Inf 1995; 30: 218-222
- French M, Levy-Milne R, et al. A survey of the use of low microbial diets in pediatric bone marrow transplant programs. J Am Diet Assoc 2001; 101 (10):1194-1198
- Duquette-Peterson et al. The role of protective clothing in infection prevention in pts undergoing autologous bone marrow transplantation. ONS 1999; 26:1319-1324