Patients with cancer often receive treatment that may include both chemotherapy and radiation. These agents primarily can affect the body’s hematopoietic system. The authors designed a teaching poster, in both English and Spanish, to assist in teaching the key concepts of low blood cell counts to pediatric patients and their families. Having a child with cancer often is an overwhelming experience, and most parents and family members need to learn new information in a variety of ways to maximize their understanding and retention. This poster was not designed to be a substitute for patient-family teaching but, rather, to serve as a reinforcement tool.

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The purpose of this teaching poster, located in the inpatient unit and the hematology/oncology clinic, is to serve as an adjunct tool to help patients and families learn what precautions to take when blood cell counts are low. This poster was designed to reinforce the information taught, not to replace formal patient-family teaching. Written educational materials (available in English and Spanish) that address this content also are distributed to patients and families as a part of the discharge planning process. A nurse practitioner graduate student with extensive hematology/oncology nursing experience designed the teaching poster as a special clinical project. This nurse wanted to create an alternative method for teaching or reinforcing important information about low blood cell counts. Several representatives from the departments of nursing, child life, and social work and medical staff had opportunities to provide input before final production. This poster was not targeted to a specific age range or developmental level; it was developed with the intent that all pediatric patients and their families would benefit from the information.

The authors expanded on the written teaching pamphlets in developing this poster knowing that adults, too, often are visual learners. The research available on adult learning indicates that visual aids often reinforce long-term memory. Some memory loss is inevitable, as patients and family members often are overwhelmed with a large amount of information on a daily basis. A key element in helping patients and families retain and use what they learn is to provide memory cues and “crutches” (Broad & Newstrom, 1992, p. 9). These learning aids are invaluable tools to increase retention and emphasize key points.

The poster was designed to be creative, appealing, and large enough to be read easily. Because patients and families often have difficulty understanding how the bone marrow works, the poster uses analogies to maximize understanding and retention of the information presented. For example, the authors used cartoon graphics, such as the white blood cells with boxing gloves, to represent the cells that fight infection. Using visual aids and analogies enhances learning and retention (Silberman & Auerbach, 1990), and these visual aids assist in stressing the key points the authors attempted to convey.

“ABCs of Low Blood Cell Count” emphasizes several key elements for patients at risk for experiencing anemia, thrombocytopenia, or neutropenia. The poster defines the function of red blood cells, white blood cells, and platelets. In addition to describing specific cell functions, the poster also explains what


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parents and families can do when their child has a low blood cell count. Signs and symptoms of low platelet count are reviewed, and appropriate interventions are described. For example, if a nosebleed occurs, the poster provides specific instructions about positioning and applying pressure.

The poster also provides extensive information about neutropenia. It explains the formula to determine the absolute neutrophil count (ANC) and provides an example. ANC is significant in predicting the patient’s risk for developing an infection (e.g., bacterial, fungal, viral, various opportunistic infections such as Pneumocystis carinii pneumonia) (Freifeld, Walsh, & Pizzo, 1997). Children with an ANC of less than 500 are at severe risk for infection. The poster highlights signs and symptoms to immediately report to a physician and reiterates that although infections cannot be completely prevented, parents and children can minimize infection risk. Recommendations to prevent infections and bleeding include avoiding people with illnesses and contagious diseases, avoiding crowds, handwashing before meals and after using the restroom, avoiding the use of rectal thermometers, refraining from giving anything via the rectum (e.g., suppository, enema), preventing straining with bowel movements, and avoiding the use of over-the-counter medications, herbs, and nutritional products unless instructed by a physician.

“ABCs of Low Blood Cell Count” is a constant reminder to families who visit the pediatric oncology unit and clinic to prevent complications that may occur as a result of chemotherapy treatment. The poster is a unique teaching tool that benefits families and healthcare providers involved in the care of pediatric patients with cancer. All families receive information on low blood cell counts in the teaching pamphlets; therefore, distributing reprints of this large poster is not necessary.

After developing this institution-specific teaching tool, the authors recognized that no other posters from the National Cancer Institute or the American Cancer Society that address low blood cell counts in this fashion are available. Furthermore, the authors strongly felt that the information was worth sharing with other oncology centers and have received positive feedback from both patients and family members regarding this teaching tool. Novice and traveling nurses also have found the information, presented in poster form, to be very enlightening. The authors will continue using this method to reinforce teaching for patients undergoing treatment for cancer and their families.

References


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For more information on this topic, visit the following Web sites:

BiotherapyOncoLink FAQ: Blood Counts
http://cancer.med.upenn.edu/support/faq/bloodcount.html

Vanderbilt University: Low Blood Counts/Managing Side Effects
www.mc.vanderbilt.edu/cancer/patients/handbook7a.html

HRPC.org: Low Blood Counts
www.hrpc.org/lowbloodcounts.html

These Web site are provided for information only. Hosts are responsible for their own content and availability. Links can be found using ONS Online at www.ons.org.

The following teaching poster, ABCs of Low Blood Cell Count, is reprinted with permission from Miami Children’s Hospital and can be reproduced by nurses and healthcare providers for noncommercial purposes.
ABCs of Low Blood Cell Count

Chemotherapy and Radiation destroy normal and abnormal cells. It is important that you understand how each cell works, and be able to recognize the different signs and symptoms when the levels are low. By recognizing these symptoms, it will help decrease or prevent many problems.

WHAT ARE RED BLOOD CELLS (RBC)?
RBC’s carry oxygen to all parts of the body to give you energy. If your RBC count is low, you may feel fatigued and weak.

WHAT IS HEMOGLOBIN (HGB)?
The hemoglobin is the RBC that carries the oxygen. If your HGB is very low (8.0 gm or less), your doctor may need to give you a blood transfusion. Normal HGB levels depend on child’s age and sex.

WHAT ARE PLATELETS (PLT)?
Platelets help stop bleeding by clumping the blood. Platelets are white/yellow in color. The normal count is 150,000 or greater. During chemotherapy, your platelets may be low. When the platelet count drops to less than 50,000, you may bleed a lot when you get a cut, bruise or nose bleed. If your platelet count is less than 30,000, you may need a platelet transfusion, because you may bleed spontaneously.

IMPORTANT SIGNS TO KNOW ABOUT LOW PLATELET COUNT:
1. Bruising easily
2. Small red-purple dots on the skin (petechiae).
3. Blood in the urine or stool.
4. Black (looks like tar) or bright red bowel movements.
5. Bleeding from the gums, mouth, nose or rectum.

IF YOU HAVE A NOSE BLEED:
1. Sit up and lean forward.
2. Squeeze your nose tightly.
3. Put ice in a washcloth and place it on your nose.

WHEN YOU ARE ON CHEMOTHERAPY YOU SHOULD NOT:
1. Take aspirin or aspirin products (Advil or Motrin).
2. Play rough sports (contact sports).
3. Take rectal temperatures, enemas or suppositories without permission from your doctor.
4. Fall or hit yourself.

WHAT ARE WHITE BLOOD CELLS (WBC)?
White blood cells fight infection. The normal count is 4,000 – 10,000. While on chemotherapy, your count may be low. The WBC that fights infection best are the neutrophils (Segs). Young neutrophils are called Bands.

WHAT ARE NEUTROPHILS?
Neutrophils (Segs and Bands) help your body fight infection.

WHAT IS AN ABSOLUTE NEUTROPHIL COUNT (ANC)?
The ANC measures the amount of infection-fighting WBC’s. This is important because when the ANC is less than 500 (neutropenia), it’s harder to fight infection.

HOW TO MEASURE THE ABSOLUTE NEUTROPHIL COUNT (ANC):
Example: Segs = 45 Bands = 7 WBC = 3,4
1. Add the segs and the bands together: (45 + 7) = 52
2. Divide the total by 100: (52 x 3.4) = 176.8
3. Multiply your WBC’s by 1000: (176.8 x 1000) = 1,768
4. Subtract the answer in step 3 by the answer in step 2: 1,768 x 1000 = 1,768

WHAT IS NEUTROPENIA?
Is when the white blood cell count (WBC) drops below 4.0, and the absolute neutrophil count (ANC) is below 1500. Severe neutropenia is when the ANC is less than 500.

WHAT HAPPENS WHEN YOU HAVE NEUTROPENIA?
Because you have a low white blood cell count, you are at a higher risk for infection. "The risk of infection increases as the ANC count decreases, because white blood cells help protect you from infections," says oncology nurse, Candi Case.

HOW DO YOU KNOW YOU HAVE AN INFECTION?
If you have neutropenia (low WBC count) your body will not have enough neutrophils to fight infection, so you may not see the usual signs of infection, and you may be unaware of what is happening.

*IMMEDIATELY REPORT THESE SYMPTOMS*
1. Temperature greater than 100F or 38C. (If you have difficulty reading a thermometer, let your nurse or doctor know).
2. Burning, hesitancy, or difficulty emptying your bladder when urinating.
3. Sore throat or difficulty swallowing.
4. Cough with or without sputum (phlegm)
5. Reddened or painful sores with or without pus.
6. Shaking chills or sweating.
7. Burning or pain in your rectum.
8. Soreness or red or white patches in your mouth.
9. Drainage from an eye or ear.
10. Infant may cry, be irritable, sleep a lot, or have decreased appetite. Toddlers and young children may have a change in their behavior, activity, or sleeping habits.
11. Older kids may complain of headaches, fatigue or feeling hot or cold (chills).

ALTHOUGH YOU CAN'T PREVENT INFECTION, YOU CAN MINIMIZE YOUR RISK:
1. Avoid people with colds or contagious illnesses. If it is a family member or any other person, keep at three feet away. Do not share food utensils.
2. Avoid crowds, especially in the winter. Avoid sitting next to someone who appears to have a cold or symptoms of a contagious illness.
3. Wash your hands with soap before preparing or eating food and after using the bathroom.
4. Don't provide direct care for pets. Don't change litter boxes or clean bird cages.
5. Unless told otherwise, drink at least 8-oz of fluid 6 – 8 times daily.
6. Protect your skin from cuts and burns. Wear shoes or slippers to prevent cuts on your feet.
7. Avoid straining for bowel movements. Check with your doctor if you need a stool softener. Don’t use enemas.
8. Take your temperature orally or under the arm. NEVER take a rectal temperature.
9. If you need dental work, consult with your physician to make arrangements with your dentist.
10. Eat a well-balanced diet, wash fruit and vegetables well with warm water.
11. Your cannot receive any live vaccines for at least six months after the end of chemotherapy treatment. Always check with your doctor before taking any medications. Avoid others who have recently received a vaccine from a live virus especially oral polo.
12. Notify your children's school to alert you about any chicken pox breakouts or exposures in the school. Notify your physician immediately if anyone at home is exposed to chicken pox (needs to be notified within 72 hours from exposure).
13. If you have any concerns or questions, please call your doctor.
Información Que Debes De Saber Cuando El Conteo De Sangre Esta Bajo

La quimioterapia y la radiación destruyen las células normales y anormales. Es importante que conozca cómo cada célula de la sangre funciona, y poder reconocer señales y síntomas de cuando los conteos están bajos. Reconocer estos síntomas va ayudar a prevenir o prevenir muchos problemas.

QUE HACEN LAS PLAQUETAS?
Las plaquetas ayudan a coagular la sangre. Son de color blanco-amarillo. El conteo normal es 150,000 o más. Cuando recibes quimioterapia el conteo de plaquetas puede bajar a menos de 100,000. Si el conteo baja menos de 50,000 puedes sangrar mucho si la cortas la piel, si tienes un corte o a sangrar por la nariz. Si el conteo de plaquetas baja a menos de 30,000, el médico te mandará una antitoxina.

SEÑALES IMPORTANTES CUANDO LAS PLAQUETAS Bajan MUY BAJO:
1. Morados en la piel
2. Purpuras rojas en la piel (petequias)
3. Sangre en la orina o en el vómito
4. Si la dependencia son de color negro o roja
5. Sangramiento de la nariz o la boca

SI TE SANGRA LA NARIZ:
1. Siéntate con la cabeza inclinada para el frente
2. Aprieta la nariz firmemente
3. Aplica hilo local a la nariz

DURANTE EL TRATAMIENTO DE QUIMIO no DEBES:
1. Tomar aspirina, o ibuprofeno (Advil o Motrin)
2. Jugar deportes de contacto
3. Tomar la temperatura rectal
4. Usar ropa o zapatos que no estén limpios
5. Evitar osos o gatos

CUAL ES LA funcion DE LAS CELULAS BLANCAS?
Las células blancas combaten la infección. El conteo normal es 4,000 - 10,000. Cuando recibes quimioterapia el conteo de puede bajar a menos de 1,000. El tipo de célula blanca que combaten la infección y bacterias son los neutrófilos (Segmentados y Bandas)

QUE ES EL CONTEO ABSOLUTO DE NEUTROFILOS (CAN)
Este conteo mide la cantidad de células que pueden combatir la infección. Es muy importante porque cuando es menos de (CAN) 500 (neutropenia), la frecuencia de estas infecciones aumenta considerablemente.

CÓMO SE HACE EL CAN?
Ejemplo: Segs = 45  Bandas = 9  WBC = 5.4
1. Sume el número de segmentados con las bandas... \(45 + 9 = 54\)
2. Múltiplica ese número por los 100,... \(54 \times 1.7 = 92.8\)
3. Divide el número obtenido por 100... \(92.8 \div 100 = 0.928\)
4. Múltiplica ese número por 1000... \(0.928 \times 1000 = 928\)

QUE ES NEUTROPIENIA?
Es cuando el conteo de células blancas es menor de 400, o si el conteo absoluto (CAN) es menor de 1,000. Neutropenia severa es cuando está (CAN) menor de 500.

CÓMO YO SE QUE TENGO UNA INFECCION?
Cuando los neutrófilos están bajos y tiene temperaturas de 100°F o más allá puede que tenga una infección que se puede complicar. Debes llamar a tu médico inmediatamente.

REPORTA ESTAS SEÑALES INMEDIATAMETE*
1. Fiebre de 100°F o 38°C
2. Si te es dificil orinar o tienes dolor
3. Dolor de garganta o dificultad al tragar
4. Tóis seca o con frialdad
5. Lesiones de la piel
6. Escalfosfo o si sudas mucho
7. Dolor o ardor en el recto
8. Lesiones blancas o rojas en la boca
9. Si los ojos están rojos
10. Si un bebé está llorando, o al moverse mucho, o tiene poco apetito

AUNQUE NO PUEDES PREVENIR UNA INFECCIÓN PUEDES DESMINIR TUS RIESGOS
1. Evita estar con personas que tienen estornudos o enfermedades contagiosas
2. No vayas a un lugar que haya muchas personas
3. Lávate las manos con jabón antes de preparar la comida o de comer, y después de ir al baño
4. No cuides de los animales, es preferible no tener animales en la casa
5. Cambia las jaulas de los perros
6. Si el doctor te lo permita toma por lo menos 8 onzas de líquido 6 - 8 veces al día
7. Proteja tu piel de cortadas y quemaduras, usa zapatos para prevenir cortadas en los pies
8. Trata de ir al bañito de forma regular
9. Nunca te tomes la temperatura rectal
10. Si necesitas ir al dentista, consultalo con tu médico primero
11. Evita el consumo de cualquier medicamento
12. Lava tus manos y frutas y verduras con agua fría

*No puedes recibir vacunas cuando te estás cuidando, hasta 6 meses que terminas el tratamiento. Siempre habla con tu médico antes de recibir cualquier medicina. No puedes estar con nadie que haya recibido vacuna de virus vivos, especialmente la vacuna oral del polio.

NOTA: A la escuela te digan a alguien en la escuela tiene la Virecilia (chicken pox). Notifica al médico inmediatamente en caso de que ha estado expuesto a la Virecilia (tiene que ser notificado antes de 72 horas).

Sí tienes alguna pregunta o algo que te preocupa llama a tu doctor.