Stay up-to-date with new treatment and management options related to hematology oncology and blood and marrow transplant. In this comprehensive and coordinated overview, you’ll use case-based reviews incorporating the latest research and perspectives from multiple disciplines to facilitate discussion among your peers.

**Target Audience:** Bone Marrow Transplant Nurses, Registered Nurses

**Level of Content:** Advanced

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**Full Disclosure:**
Speaker for Celgene and Novartis

**Objectives:**
At the end of this session, participants will be able to:
1. Understand treatment options for chronic lymphocytic leukemia (CLL) and the complications of bone marrow transplants.
2. Increase knowledge of nursing measures for CLL and bone marrow transplants.

**Bibliography:**


Hematology

Tumor Board

Tracy Krimmel, AOCN, APRN-BC
Nurse Manager, Adult Clinic Staff

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CLL introduction

- Most common leukemia in western countries with 15,000 new cases per year and 4500 deaths
- Median age 67-72
- Approximately 6% normal elderly population will develop monoclonal B cells which can develop into CLL
- Survival ranges 1-15 years

Smoski, Witkowska, & Wolowiec, 2013

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CLL pathology

- Immunophenotype of CLL expresses CD19, CD22, and CD 23 with coexpression of CD5, and CD20
- Pathogenesis of CLL have antiapoptotic features with BCL -2 expression
- BCL-2 is oncogene important in inducing apoptosis

Smoski, Witkowska, & Wolowiec, 2013

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Common CLL Chromosomal changes

<table>
<thead>
<tr>
<th>Chromosomal Change</th>
<th>Prognosis</th>
</tr>
</thead>
</table>
| 17p 13 mutation    | Prevalence 7%  
Median survival 32 months |
| 11q 22-23 deletion | Prevalence 18%  
Median survival 79 months |
| Trisomy 12         | Prevalence 16%  
Median survival 114 months |
| Normal chromosomes | Prevalence 18%  
Median survival 111 months |
| 13q14 mutation     | Prevalence 55%  
Median survival 133 months |

Tefferi & Hallek, 2013

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CLL staging

Rai
- Stage 0 Lymphocytosis only
- Stage I Lymphocytosis with lymphadenopathy
- Stage II Lymphocytosis with hepatomegaly or splenomegaly
- Stage III Lymphocytosis with anemia
- Stage IV Lymphocytosis with thrombocytopenia

Binet
- Clinical stage A CLL is characterized by no anemia or thrombocytopenia and fewer than three areas of lymphoid involvement (Rai stages 0, I, and II).
- Clinical stage B CLL is characterized by no anemia or thrombocytopenia with three or more areas of lymphoid involvement (Rai stages I and II).
- Clinical stage C CLL is characterized by anemia and/or thrombocytopenia regardless of the number of areas of lymphoid enlargement (Rai stages III and IV).

Tefferi & Hallek, 2013

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CLL work up

- Peripheral blood or bone marrow biopsy with flow cytometry and FISH for CLL panel
- If diagnosis not established by blood need lymph node biopsy
- Blood work: CBC, LDH, immunoglobulins, chem panel, beta 2 microglobulinemia, hepatitis panel
- CT scan of neck, chest, abdomen and pelvis

Tefferi & Hallek, 2013
CLL Case Study

S. M. is a 58 year old Caucasian male with no past medical history except anxiety. He works in finance for a academic hospital for the past 25 years. He presented 6 months ago to his PMD for routine follow up on exam it was noted that he had several shotty lymph nodes in the neck. His blood work was drawn and revealed elevated total white count of 18.9 with absolute lymphocytes of 4500. He had otherwise normal counts. He is now referred to your institution for further work up.

Treatment options

• Observation treatment is made base on the following:
  – Lymph nodes < 1.5 cm
  – No anemia noted
  – No platelets abnormality noted
  – Absolute B cell count < 5000

Path results

• Flow cytometry-showed monoclonal B cell population with CD19+, CD 20, CD5+, CD23+, CD22−
• FISH-Normal

Case study Continues

• Observation was decided on plan for this patient
• He will be followed several times per year for physical examination and labs
• S. M. has stable blood work for the most part except his WBC rises to 22,000 over the course of 18 months
• Patient becomes very anxious regarding the diagnosis and not being treated
• He regularly calls nursing triage line and wants to have labs done every month

Case study #2

R. L is a 72 year old male with past medical history of heart disease, atrial fib, hypertension, and COPD. He also has longstanding history of CLL for 10 years and has been treated with 3 therapies. He has recurrent pneumonias at least twice per year for the past several years. He WBC has doubled over past few months and his platelets have dropped to 20,000. A bone marrow biopsy was ordered and is being reviewed by pathology.

Treatments for CLL

• First Line
• Second
• Third and beyond
• Novel therapies
Nursing implications in CLL
- Monitoring of infection
- Teaching patient understanding of disease
- Encourage patient to seek evaluation for anxiety
- Reassure patient on status of disease

Bone Marrow Transplant
- First successful transplant in 1968
- Increased survival and number of transplants
- 30,000 transplant per year world wide in 2011
- Estimates 500,000 transplant survivors in the year 2020
- Long Term Survivors of transplant (greater than 2 years) has 85% survival at 10 years

Acute Complication of Allogeneic BMT
- Acute GVHD (aGVHD)
- Infections-CMV, BK virus, bacteremia
- Pulmonary toxicities
- Hepatic toxicities
- Renal

Acute GVHD
- Definition: Early form of GVHD that generally occurs within the first 100 days
- Risk factors
  - Donor type
  - Female/male
  - Type of GVHD prophylaxis
  - Conditioning regimen
  - Age donor

<table>
<thead>
<tr>
<th>Stage</th>
<th>Skin</th>
<th>Liver (bilirubin)</th>
<th>Gut (stool output/day)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>No GVHD rash</td>
<td>&lt;2 mg/dl</td>
<td>&lt;500 ml/day or persistent nausea.</td>
</tr>
<tr>
<td>1</td>
<td>Maculopapular rash ≤25% BSA</td>
<td>2–3 mg/dl</td>
<td>500–999 ml/day</td>
</tr>
<tr>
<td>2</td>
<td>Maculopapular rash 25–50% BSA</td>
<td>3.1–6 mg/dl</td>
<td>1000–1500 ml/day</td>
</tr>
<tr>
<td>3</td>
<td>Maculopapular rash &gt;50% BSA</td>
<td>6.1–15 mg/dl</td>
<td>Adult: &gt;1500 ml/day</td>
</tr>
<tr>
<td>4</td>
<td>Generalized erythroderma plus bullous formation</td>
<td>&gt;15 mg/dl</td>
<td>Severe abdominal pain with or without ileus</td>
</tr>
</tbody>
</table>

Grade
- Stage 1–2: None
- Stage 3 or 4: Stage 1 or Stage 4

Treatment aGVHD
- Steroid is mainstay!!
- PUVA
- Local treatments
- Photopheresis
- 3 and 4th line treatments
Long Term Effects of Allogeneic Transplant

- Chronic Graft Versus Host Disease (cGVHD)
- Secondary Malignancies
- Late Infection
- Pulmonary
- Cardiac
- Thyroid
- Bone/Endocrine
- Social issues/QOL

Chronic GVHD

- Immune mediated disorder that occurs 30-70% of adult and children
- Can have extensive morbidity and morality & QOL impact
- Median onset 4 months; median use of immunosuppression 2-3 years
- 50% have 3 or more organs involved
- Chronic GVHD remains major cause of late onset death

Lee & Flowers 2008

Site of GVHD

- Skin
- Mouth
- Liver
- Eyes
- GI tract
- Lung
- GU
- Joint

Common Symptom

- Rash
- Ulcerations/pain
- LFT abnormalities
- Dry, irritated (sicca)
- Malabsorption
- Wheezing/SOB
- Vaginal–ulcerations
- Myalgias, ROM
- Pain, dryness

Lee & Flowers 2008

Chronic GVHD Limited

- Oral with positive biopsy of skin or lip
- Mild LFT changes, Bili<1.6, AP-ALT<2-3X
- <6 PS plaques, lichenoid or MP rash<20% BSA, dyspigmentation <20% BSA, erythema <50% BSA
- Ocular sicca with minimal symptoms
- Vaginal or vulvar abnormalities
- All of these must have +biopsy of skin or lip and be the only manifestation of cGVHD

Chronic GVHD Extensive

- Involvement of 2 or more organs
- PS <60%, >15% weight loss and recurrent opportunistic infections not otherwise explained
- Extensive skin involvement, scleroderma or morphea
- Onycholysis or onychodystrophy
- Decreased range of motion from fasciitis or contractures
- Bronchiolitis obliterans
- Severe LFT changes
- Fasciitis or serositis
- Positive upper or lower GI biopsy

Treatment cGVHD

- Steroids with calcineurin inhibitors
- Local treatments
- Photopheresis
- TKI
- Monoclonal antibodies
- IMIDS

Lee & Flowers 2008
### Advances in Allo transplant
- Conditioning Regimens
- HLA typing
- Treatment of CMV
- Improvements of GVHD
- PT selection
- Fungal prophylaxis

### Pathophysiology of GVHD
- Chronic is poorly understood
- Immune reaction between donor T cells and host tissues

### Survival in cGVHD
- Thrombocytopenia
- Extensive skin/oral involvement
- Progressive – type onset
- Karnofsky performance
- Weight loss
- Diarrhea
- Can be separated into 3 distinct prognostic categories

### Case study: BMT
- B. M. is a 42 year old male with no past medical history. He presents with Acute Myelogenous Leukemia with FLT-3 tandem internal duplication. He is induced with Idarubicin/Cytarabine (7+3) with only neutropenia as complication. He goes to receive high dose ARA-C consolidation without incident. He found to have an no sibling donors and has a matched unrelated female donor. He presents today at day +33 with complaints of diarrhea and rash on his upper trunk which is red and itchy.

### Allogeneic BMT Case study
- B.M.is found to have aGVHD of skin and gut after have colonoscopy and skin biopsy. He is place on high dose steroids after this diagnosis. He seems to improve with the diarrhea.
- Although diarrhea is improving he starts having notable drop in his blood counts and high PCR CMV level. He is going to begin gancyclovir IV at home and you are the clinic nurse following this patient.

### Case continues
- B. M. improves his blood counts and CMV level declines
- At 16 months, his red rash and gut symptoms are gone as well as CMV but he starts to complaining of tightness in back of his neck and dryness in his eyes and mouth
- Skin biopsy shows sclerotic features GVHD
- He is referred to dermatology and starts steroids again as well as local treatments
Late Manifestations

- cGVHD
- Late infection
- Musculoskeletal
- Endocrine
- Renal
- Ocular
- Dental
- Dermatologic

Case study continued

- B.M. had response to steroids but is flaring during taper and now is on photopheresis
- He has developed some osteoporosis and cataracts due to long term steroid use
- He has returned to work and loves spending time with his children

Nursing implication in transplant care

- Patient education
- Assessment of infection/risks
- Monitoring treatment toxicity
- Blood work review
- Emotional support
- Comprehensive follow up

Conclusion

- CLL is most common chronic leukemia
- Treatments vary from observation to chemotherapy
- In CLL, it is important distinguish between acute and chronic as treatment widely differ
- Important to educate patients on CLL and transplant related toxicity
- Transplant patient have both acute and chronic complication and require astute nursing care and education
- Emotional support in hematologic malignancies is important