What are the differences between Leukemia and Lymphoma
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Hematopoiesis

**Myeloid**
- Origin: Bone Marrow
- Granulocytes
- White blood cells
  - Neutrophil
  - Eosinophil
  - Macrophages
  - Basophils
  - Megakaryocyte
- Red Blood cells

**Lymphoid**
- Origin: Bone Marrow
- Lymphocytes
- T-Cells
  - Mature through thymus “teaching”
  - Cell Mediated Immunity
- B-Cells
  - Mature in the Bone Marrow
  - Humoral immune response
Chronic vs. Acute

- **Acute**
  - Symptoms appear and worsen rapidly over time
    - Increase in Blast cells ➔ Non-functional

- **Chronic**
  - Symptoms develop and worsen over an extended period of time (usually)
    - Later stage stem cell differentiation

- **Both**
  - ↑ White Blood cells
  - ↓ Red Blood cells (Leads to Anemia)
  - ↓ Platelets (Bruising/Hemorrhages)
AML and CML

- Acute Myelogenous Leukemia
  - Most common type of Leukemia
  - Fast growing cancer of the blood and bone marrow
  - Characterized by
    - Leukemia cells in the Bone Marrow
    - Blast cells- increased proliferation

- Chronic Myelogenous Leukemia
  - Slow growing cancer of white blood cells
  - 3 Phases
    - Chronic
    - Accelerated
    - Blast Phase (Sometimes referred to as ALL)
  - Characterized by
    - Too many white blood cells
    - Philadelphia chromosome
      - t(9;22)
      - bcr/abl gene
      - Makes tyrosine kinase
ALL and CLL

- **Acute Lymphocytic Leukemia**
  - Greatest risk for ALL is in the first 5 years of life
  - Fast growing cancer of the blood and bone marrow
  - Characterized by
    - Uncontrollable and exaggerated growth of lymphoblasts
      - Also non-functional
    - Blockade of normal marrow cells

- **Chronic Lymphocytic Leukemia**
  - Risk associated with CLL increases rapidly after age 40.
    - 90% Diagnosed over 50
  - Can be a very stable disease, some may not received treatment directly after the diagnosis
  - Characterized by
    - Staging system (Rai or Binet)
      - # of lymphocytes in blood and marrow
      - Spleen size
      - Lymph node distribution
Lymphomas

- A type of Cancer that begins with a malignant change in a lymphocyte, lymph node cell or lymphatic tissue of the marrow.

- **Two Main categories**
  - **Hodgkins**
    - 12% of Lymphoma
    - One of the most curable
    - Presence of Reed-Sternberg cell
      - Distinctive B-lymphocytes
  - **Non-Hodgkins**
    - Majority of lymphoma cases
      - 14 types of B-cell
      - Other types are T-cell and NK cell
    - Spreads through the lymphatic system in a less orderly way
Conclusion

• Both Lymphocytic Leukemia and Lymphoma are the result of a malignant transformation of a cell destined to be a lymphocyte.
  – Distinction(s)
    • The disease started from a lymphocytic cell in a lymph node or other part of the Lymphatic System (LS)
      – Lymphoma
    • The disease started from a lymphocytic cell in Bone marrow (BM)
      – Leukemia
  – In either case, the malignant cells can migrate from their source (BM or LS) and be found in the other.
Conclusion cont.

• Reporting concerns for Forms Net 2.0
  – AML from MDS or MPS
    • Complete entire MDS section on Disease Classification and also complete entire AML section
  – B cell/Small Lymphocytic Lymphoma is reported under CLL
  – CML in Blast Crisis is sometimes referred to as Acute Lymphoblastic Leukemia
    • This is not the case and the disease still should be reported as CML

• Generally the Pre-TED follows World Health Organization (W.H.O.) classifications.
ACUTE LEUKEMIAS

Select most specific W.H.O. classification:

Acute Myelogenous Leukemia (AML)
- AML with recurrent genetic abnormalities
  - AML with t(8;21)(q22;q22), (AML1/ETO) (281)
  - AML with abnormal BM eosinophils and
    inv(16)(p13q22) or t(16;16)(p13;q22),
    (CBFβ/MYH11) (282)
  - APL with t(15;17)(q22;q12), (PML/RARα)
    and variants/{M3} (283)
  - AML with 11q23 (MLL) abnormalities (284)
  - AML with multilineage dysplasia (285)

AML, not otherwise categorized/{NOS}
- AML, minimally differentiated/{M0} (286)
- AML without maturation/{M1} (287)
- AML with maturation/{M2} (288)
- Acute Myelomonocytic Leukemia/{M4} (289)
- Acute Monoblastic/Acute Monocytic
  Leukemia/{M5} (290)
- Acute Erythroid Leukemia (erythroid/
  myeloid and pure erythroleukemia)/{M6} (291)
- Acute Megakaryoblastic Leukemia/{M7} (292)
- Acute Basophilic Leukemia (293)
- Acute Panmyelosis with Myelofibrosis (294)
- Myeloid Sarcoma (295)
- AML, NOS (280)

Acute Lymphoblastic Leukemia (ALL)
- Precursor B-cell ALL {L1/L2} (191)
  If known, indicate subtype:
    - t(9;22)(q34;q11), BCR/ABL+ (192)
    - t(v;11q23); MLL rearranged (193)
    - t(1;19)(q23;p13) E2A/PBX1 (194)
    - t(12;21)(p12;q22) ETV/CFB-α (195)
  - Precursor T-cell ALL (196)
  - ALL, NOS (190)

Acute Leukemias of ambiguous lineage
- Acute undifferentiated leukemia (31)
- Biphenotypic, bilineage or hybrid
  leukemia (32)
- Acute mast cell leukemia (33)
- Other acute leukemia, (89)
  specify: ____________________________

SAMPLE
SAMPLE

CHRONIC MYELOGENOUS LEUKEMIA (CML)
Philadelphia chromosome+, Ph+, t(9;22)(q34;q11), or variant OR bcr/abl+

Did recipient receive treatment prior to this HSCT?  □ Yes  □ No
(check all that apply) **Mandatory for CIBMTR Research Teams:**

- Ph+/bcr+ (41)
- Ph+/bcr- (42)
- Ph+/bcr unknown (43)
- Ph-/bcr+ (44)
- Ph unknown/bcr+ (47)
- Combination chemotherapy
- Dasatinib (Sprycel)
- Hydroxyurea (HU)
- Imatinib mesylate (Gleevec, Glivec)
- Interferon
- Nilotinib (Tasigna)
- Other, specify:

**Classification:**
Atypical chronic myeloid leukemia {CML, NOS}

- Ph-/bcr/abl- (45)
- Ph-/bcr unknown (46)
- Ph unknown/bcr- (48)
- Ph unknown/bcr unknown (49)

- Chronic Lymphocytic Leukemia (CLL), NOS (34)
- Chronic Lymphocytic Leukemia (CLL), B-cell/
  Small Lymphocytic Lymphoma (SLL) (71)
- CLL, T-cell (72)
- Hairy Cell Leukemia (35)
- Prolymphocytic Leukemia (PLL), NOS (37)
  - PLL, B-cell (73)
  - PLL, T-cell (74)
- Other leukemia (39),
  specify:__________________________

**Status at Transplantation:**

- Never treated
- Complete Remission (CR)
- nodular Partial Remission (nPR)
- Partial Remission (PR)
- No Response/Stable (NR/SD)
- Progression
- Relapse (untreated)
LYMPHOMAS

Classification:

Hodgkin Lymphoma

- Nodular lymphocyte predominant Hodgkin lymphoma (155)
- Lymphocyte-rich (151)
- Nodular sclerosis (152)
- Mixed cellularity (153)
- Lymphoma depleted (154)
- Hodgkin lymphoma, NOS (150)

B-cell Neoplasms

- Burkitt's lymphoma/Burkitt cell leukemia (ALL L3) (111)
- High-grade B-cell lymphoma, Burkitt-like (provisional entity) (135)

- Diffuse large B-cell lymphoma (107)
  - If known, indicate subtype:
  - Intravascular large B-cell lymphoma (136)
  - Mediastinal large B-cell lymphoma (125)
  - Primary effusion lymphoma (138)
  - Extranodal marginal zone B-cell lymphoma of MALT type (122)

- Follicular lymphoma (includes variants)
- Lymphoplasmacytic lymphoma (121)
- Mantle cell lymphoma (115)
- Nodal marginal zone B-cell lymphoma (+/- monocytoid B cells) (123)
- Primary CNS lymphoma (118)
- Splenic marginal zone B-cell lymphoma (124)
- Waldenstrom macroglobulinemia (173)
- Other B-cell lymphoma (129)
  - specify:__________________________

Non-Hodgkin's Lymphoma

T-cell and NK-cell Neoplasms

- Adult T-cell lymphoma/leukemia (HTLV1+) (134)
- Aggressive NK-cell leukemia (27)
- Anaplastic large-cell lymphoma, T/null cell, primary cutaneous type (147)
- Anaplastic large-cell lymphoma, T/null cell, primary systemic type (148)
- Angioimmunoblastic T-cell lymphoma (AILD) (131)
- Enteropathy-type T-cell lymphoma (133)
- Extranodal NK/T-cell lymphoma, nasal type (137)
- Hepatosplenic gamma-delta T-cell lymphoma (145)
- Mycosis fungoides (141)
- Peripheral T-cell lymphoma {NOS} (130)
- Subcutaneous panniculitis-like T-cell lymphoma (146)
- Sezary syndrome (142)
- Large T-cell granular lymphocytic leukemia (126)
- Other T/NK cell lymphoma (139)
  - specify:__________________________

Status at Transplantation:

- Never treated