E. Complications
   1. Increased risk for splenic rupture (Fig. 6.3); patients are generally advised to avoid contact sports for one year.
   2. Rash if exposed to ampicillin
   3. Dormancy of virus in B cells leads to increased risk for both recurrence and B-cell lymphoma, especially if immunodeficiency (e.g., HIV) develops.

ACUTE LEUKEMIA

I. BASIC PRINCIPLES

A. Neoplastic proliferation of blasts; defined as the accumulation of > 20% blasts in the bone marrow.
B. Increased blasts "crowd-out" normal hematopoiesis, resulting in an "acute" presentation with anemia (fatigue), thrombocytopenia (bleeding), or neutropenia (infection).
C. Blasts usually enter the blood stream, resulting in a high WBC count.
   1. Blasts are large, immature cells, often with punched out nucleoli (Fig. 6.4).
D. Acute leukemia is subdivided into acute lymphoblastic leukemia (ALL) or acute myelogenous leukemia (AML) based on the phenotype of the blasts.

II. ACUTE LYMPHOBLASTIC LEUKEMIA

A. Neoplastic accumulation of lymphoblasts (> 20%) in the bone marrow
   1. Lymphoblasts are characterized by positive nuclear staining for TdT, a DNA polymerase.
   2. TdT is absent in myeloid blasts and mature lymphocytes.
B. Most commonly arises in children; associated with Down syndrome (usually arises *after* the age of 5 years)
C. Subclassified into B-ALL and T-ALL based on surface markers
D. B-ALL is the most common type of ALL.
   1. Usually characterized by lymphoblasts (TdT+) that express CD10, CD19, and CD20.
   2. Excellent response to chemotherapy; requires prophylaxis to scrotum and CSF (Fig. 6.5)
   3. Prognosis is based on cytogenetic abnormalities.
      i. t(12;21) has a good prognosis; more commonly seen in children
      ii. t(9;22) has a poor prognosis; more commonly seen in adults (Philadelphia+ ALL)
E. T-ALL is characterized by lymphoblasts (TdT+) that express markers ranging from CD2 to CD8 (e.g., CD3, CD4, CD7). The blasts do not express CD10.

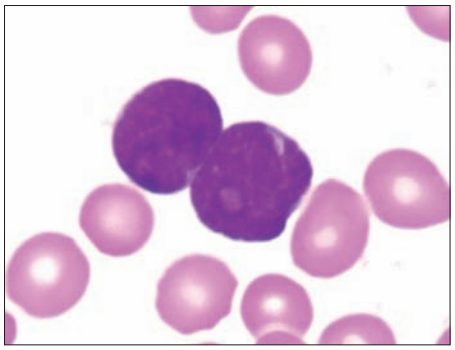

Fig. 6.4 Blasts of acute leukemia.

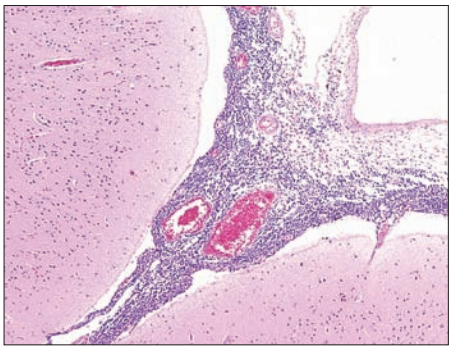

Fig. 6.5 Acute lymphoblastic leukemia involving meninges.

1. Usually presents in teenagers as a mediastinal (thymic) mass (called acute lymphoblastic lymph*oma* because the malignant cells form a mass)

III. ACUTE MYELOID LEUKEMIA

A. Neoplastic accumulation of myeloblasts (> 20%) in the bone marrow
B. Myeloblasts are usually characterized by positive cytoplasmic staining for myeloperoxidase (MPO).
   1. Crystal aggregates of MPO may be seen as Auer rods (Fig. 6.6).
C. Most commonly arises in older adults (average age is 50–60 years)
D. Subclassified based on cytogenetic abnormalities, lineage of myeloblasts, and surface markers. High-yield subtypes include
   1. Acute promyelocytic leukemia (APL)
      i. Characterized by t(15;17), which involves translocation of the retinoic acid receptor (RAR) on chromosome 17 to chromosome 15; RAR disruption blocks maturation and promyelocytes (blasts) accumulate.
      ii. Abnormal promyelocytes contain numerous primary granules that increase the risk for DIC.
      iii. Treatment is with all-*trans*-retinoic acid (ATRA, a vitamin A derivative), which binds the altered receptor and causes the blasts to mature (and eventually die).
   2. Acute monocytic leukemia
      i. Proliferation of monoblasts; usually lack MPO
      ii. Blasts characteristically infiltrate gums (Fig. 6.7).
   3. Acute megakaryoblastic leukemia
      i. Proliferation of megakaryoblasts; lack MPO
      ii. Associated with Down syndrome (usually arises *before* the age of 5)
E. AML may also arise from pre-existing dysplasia (myelodysplastic syndromes), especially with prior exposure to alkylating agents or radiotherapy.
   1. Myelodysplastic syndromes usually present with cytopenias, hypercellular bone marrow, abnormal maturation of cells, and increased blasts (< 20%).
   2. Most patients die from infection or bleeding, though some progress to acute leukemia.

CHRONIC LEUKEMIA

I. BASIC PRINCIPLES

A. Neoplastic proliferation of mature circulating lymphocytes; characterized by a high WBC count
B. Usually insidious in onset and seen in older adults

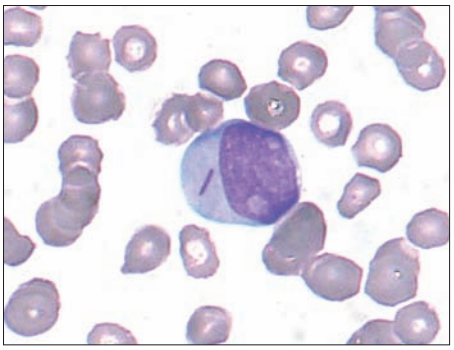

Fig. 6.6 Acute myelogenous leukemia with Auer rod. (Courtesy of Paulo Mourao, MD)

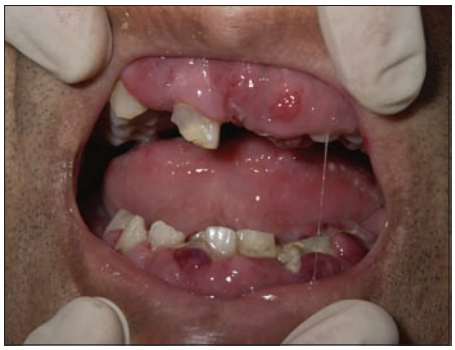

Fig. 6.7 Acute monocytic leukemia. (Courtesy of Drs. H. Fred and H. van Dijk, *Images of Memorable Cases*)

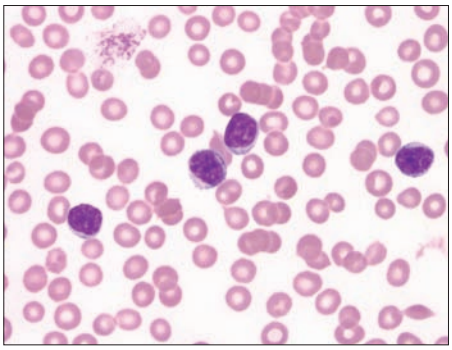

Fig. 6.8 Chronic lymphocytic leukemia.

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