Diagnostic Coding for Blood Diseases

Audio Seminar/Webinar

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Practical Tools for Seminar Learning

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# Table of Contents

Disclaimer .................................................................................................................... i  
Faculty ....................................................................................................................... ii  
Goals ........................................................................................................................ 1  
Inherent to Any Patient Condition (M.U.S.I.C.) ................................................................. 1  
Outline ....................................................................................................................... 2  
Anemia - Red Cell Regulation.......................................................................................... 2  
Anemia ..................................................................................................................... 3-4  
Categorization of underlying causes of anemia.............................................................. 4  
Category: 790 - Nonspecific findings on examination of blood ........................................... 5  
790.01 Precipitous Drop in Hematocrit ............................................................................ 5  
790.09 Other abnormality of red cells ............................................................................. 6  
290 – Iron Deficiency Anemias ...................................................................................... 6  
Iron Deficiency Anemia................................................................................................... 7  
281 – Other deficiency anemias....................................................................................... 8  
Usual coexisting conditions with macrocytic anemias......................................................... 8  
Hemolytic Anemias...................................................................................................... 9  
282 - Hereditary Hemolytic Anemia ............................................................................ 9  
282.4 - Thalassemias .................................................................................................. 10  
Sickle-Cell Disease - Other hemoglobinopathies ............................................................. 10  
Sickle-Cell Disease .................................................................................................... 11  
Specific Types of Sickle Cell Crisis .............................................................................. 12  
283 – Acquired Hemolytic Anemias ............................................................................. 12  
281.X Non-immune Hemolytic Anemias ........................................................................ 13  
Neonatal Isoimmunization – 773.X .............................................................................. 13  
Constitutional Aplastic Anemia ..................................................................................... 14  
Acquired and Nonspecific Aplastic Anemia ................................................................... 14  
Parvovirus B19 Infection "Fifth Disease"...................................................................... 15  
283.7X – Myelodysplastic disorders .............................................................................. 15  
Myelodysplastic Codes ............................................................................................... 16  
284.2 – Myelophthisis .................................................................................................. 16  
Myelofibrosis w/ or w/o Myeloid Metaplasia .................................................................. 17  
285 – Other anemias .................................................................................................... 17  
285.1 - Acute Blood Loss Anemia ............................................................................... 18  
Polling Question #1 .................................................................................................... 18  
Sequencing Issues ICD-9-CM Guidelines ...................................................................... 19  
Poll Results .............................................................................................................. 20  
284.1 Pancytopenia ..................................................................................................... 20  
Other Sequencing Issues – Myelodysplastic Syndrome .................................................. 21  
Pancytopenia due to Myelosuppression ........................................................................... 21  
289.0 Secondary vs. 238.4 Primary Polycythemia ......................................................... 22  
MS-DRGs Major Hematologic Diagnoses ....................................................................... 22  
White Count .............................................................................................................. 23  

Continued →
# Table of Contents

Leukopenia..................................................................................................................................................23  
Febrile Neutropenia......................................................................................................................................24  
Coding of Pancytopenia and its components...............................................................................................24  
Sequencing Neutropenic Fever ..................................................................................................................25  
MS-DRGs Major Hematologic Diagnoses.....................................................................................................25  
Leukocytosis...............................................................................................................................................26  
286.6X – Elevated White Count ................................................................................................................27  
Sepsis – "Bandemia"....................................................................................................................................27  
Leukemia Codes..........................................................................................................................................28  
Platelet Disorders – Normal Count 150K-450K ........................................................................................29  
Thrombocytopenia Coding Clinic Descriptions .......................................................................................29  
Thrombocytopenia Coding ..........................................................................................................................30  
ICD-9-CM Thrombocytosis ........................................................................................................................30  
Thrombocytopenia vs. Pancytopenia...........................................................................................................31  
Coagulation Primary and Secondary ..........................................................................................................31  
Coagulation Disorders Basic Tests............................................................................................................32  
287.1 – Qualitative Platelet Disorders .........................................................................................................32  
286.0-286.3 Congenital Coagulation Defects ............................................................................................33  
286.3 - Congenital Deficiency of Other Clotting Factors .........................................................................33  
Lab Test Interpretations ..............................................................................................................................34  
Other Coagulation Disorders ....................................................................................................................34  
287 and 286.9 .............................................................................................................................................35  
Thrombotic Disorders ...............................................................................................................................35  
Hypercoagulable Syndrome Association with DVT ..................................................................................36  
Book: Severity DRGs and Reimbursement: An MS-DRG Primer ..............................................................36  
Audience Questions ....................................................................................................................................37  
Audio Seminar Discussion .........................................................................................................................37  
AHIMA Audio Seminars/Webinars ............................................................................................................38  
Upcoming Seminars/Webinars ................................................................................................................38  
Thank you for joining us today ...................................................................................................................39  
Appendix ....................................................................................................................................................40  
CE Certificate Instructions ..........................................................................................................................41
Goals

- Help coders understand the relevance of laboratory studies in supporting diagnosis assignment.
- Determine techniques to best query physicians in these matters.

Inherent to Any Patient Condition (M.U.S.I.C.)

- Manifestation
  - e.g. - Anemia, Bandemia, Thrombocytopenia, Precipitous Drop in Hematocrit, Polycythemia, Thrombocytemia, Angina Pectoris
- Underlying Pathology
  - e.g. – Multiple Myeloma, Metastatic tumor, Myelodysplasia Myelosuppression, Acute or Chronic Blood Loss,
- Severity
  - Severity of Myelodysplasia
  - We need more ICD-9-CM codes for severity of anemia and leukopenia
- Instigating or Precipitating Cause
  - e.g. – ParvoB19 virus infection, Adverse reaction to drugs (e.g. aspirin and Plavix® impairs platelet adhesion)
- Consequences
  - e.g. – Accelerated Angina, Acute Systolic Heart Failure, Neutropenic sepsis, acute GI hemorrhage
Outline

- Cell Counts
  - Red Cells
  - White Cells
    - Including Differential
  - Platelets
- Coagulation
  - Platelet Activity
  - Clotting Factors

Anemia

Red Cell Regulation
Anemia

- Defined as a decreased red cell mass
  - Not a decreased concentration of red cells
    - Hematocrit and Hemoglobin levels are concentrations that can be contracted or diluted
  - Need red cell mass studies for absolute determination.
- Even so, H&H commonly used to determine if patient is anemic
  - Hematocrit less than 35 in men, less than 32 in women
  - A single value carries a probability of being anemic, evidenced on the graph.

Source: *Harrison’s Textbook of Medicine*, 16th edition

Anemia

- History and Physical Examination (includes stool for occult blood)
- Hematocrit, Hemoglobin, Red Cell Volume
- Red Cell Indices (Given with Automatic Cell Counters)
  - Mean Cell Volume – 90 ± 8
    - If low, it is microcytic
    - If high, it is macrocytic
    - If normal, it can be normocytic or mixed.
  - Mean Cell Hemoglobin – 30 ± 3
    - If low, it is hypochromic
    - If high, it is hyperchromic
    - If normal, it is normochromic or mixed
  - Red Cell Distribution Width (RDW)
    - Coefficient of variability (CV) of individual red cell volume. An increase in RDW means there's a higher-than-normal variation in red cell size.
Anemia (continued)

- Reticulocyte Counts (Physicians must order these)
  - Corrected Reticulocyte Count
    - Retic ct x (Hct / nl Hct)
  - Reticulocyte Production Index
    - Corrected Reticulocyte Count / Maturation Time Correction
- Peripheral Smear Evaluations, Bone Marrow Examination, Iron Studies, Chromosome Studies, and other studies

Categorization of underlying causes of anemia based upon the CBC and reticulocyte count

Source: Harrison's Textbook of Medicine
Category: 790 – Nonspecific findings on examination of blood

790.01 Precipitous Drop in Hematocrit

- **Code History**
  - Developed in 2004 at the request of dialysis clinics.
  - Cannot be used when excluded conditions are present
- **No definition of “Precipitous Drop in Hematocrit”**
  - Major Blood Loss is defined as a 20% loss of blood volume
    - Therefore, a drop of the hematocrit of 8 when the baseline is 40 would suffice as a “precipitous drop in hematocrit”
  - ICD-9-CM allows for “Drop in Hematocrit” to suffice
- **A “CC” in MS-DRGs**
  - Some anemias, such as chronic blood loss anemia, are not
  - May be appealing to physicians worried if “postoperative acute blood loss anemia” is “graded” as a “complication”
790.09
Other abnormality of red cells

- Anisocytosis
  - Red cells are of unequal size
- Poikilocytosis
  - Abnormal shapes of red cells
- Code is not used if underlying cause of anemia is coded

---

280 – Iron Deficiency Anemias

- 280 Iron deficiency anemias
  Includes:
  anemia:
  asiderotic
  hypochromic-microcytic
  sideropenic
  Excludes: familial microcytic anemia (282.49)
- 280.0 Secondary to blood loss (chronic)
  - Normocytic anemia due to blood loss
  Excludes: acute posthemorrhagic anemia (285.1)
- 280.1 Secondary to inadequate dietary iron intake
- 280.8 Other specified iron deficiency anemias
  - Paterson-Kelly syndrome
  - Plummer-Vinson syndrome
  - Sideropenic dysphagia
- 280.9 Iron deficiency anemia, unspecified
  - Anemia:
    - achlorhydric
    - chlorotic
    - idiopathic hypochromic
    - iron [Fe] deficiency NOS
Iron Deficiency Anemia

- **Diagnosis:**
  - Anemia
  - Microcytosis
    - Usually MCV less than 80
  - Hypochromia
    - On peripheral smear
  - Elevated RDW
    - May be the first manifestation
  - Iron Studies
    - Iron level is low with a high Total Iron Binding Capacity (TIBC) or transferrin
    - Low serum ferritin
  - Bone Marrow
    - No stainable iron on iron stain

[Image: Hypochromia and Microcytosis on blood smear]

Iron Deficiency Anemia

**MUSIC**

- **Underlying Cause**
  - Increased demand
    - Pregnancy
  - Chronic Blood Loss
    - Cancers, vascular ectasias, peptic ulcers, multiple phlebotomies, menstruation
  - Malabsorption
    - Gastrectomy
    - Pica (starch eaters)
    - Sprue, Crohn’s Disease
    - “Chronic Disease”

- **Instigating Cause**
  - Ibuprofen use
  - Stress ulceration (e.g. sepsis)

- **Consequences**
  - Accelerated Angina Pectoris
  - 280.8 Plummer–Vinson – esophageal webs associated with IDA

[Images: Principal Dx based on Dx approach Rx rendered]
281 – Other deficiency anemias

- **Types**
  - B₁₂
  - Folate
  - Combined B₁₂-Folate
  - Protein-deficiency

- **Etiologies:**
  - “Pernicious Anemia” – autoimmune disease impairing binding of intrinsic factor to B₁₂, causing malabsorption
  - Other B₁₂ deficiencies
  - Folate Deficiency – chronic alcoholism, adverse effect of drugs (e.g. Dilantin, methotrexate)
  - Malnutrition

- **Megaloblastic**
  - High MCV (over 100)
  - Macrocytosis on peripheral smear
  - Hypersegmented polys
  - Low B₁₂ or folate levels
  - High methylmalonic acid level

Usual coexisting conditions with macrocytic anemias

- **B₁₂ deficiency**
  - Dementia
  - Peripheral neuropathy
  - Pancytopenia

- **Folate Deficiency**
  - Chemical Dependency
    - Alcohol causes folate deficiency
  - Seizure Disorder
    - Adverse reaction to Dilantin
  - Chronic Liver Disease
  - Pregnancy

Query opportunity for underlying causes and consequences
**Hemolytic Anemias**

- **Elevated Reticulocyte Count**
  - Shows that the bone marrow is making new red cells
- **Abnormal blood smear – multiple blood fragments**
- **Elevated LDH level**
  - Byproduct of red cell destruction
- **Reduced Haptoglobin**
  - Binds with free hemoglobin released from red cell to promote urinary excretion

**282 – Hereditary Hemolytic Anemia**

- **282.0** – Hereditary spherocytosis
- **282.1** – Hereditary Elliptocystosis
- **282.2** – G-6-PD Deficiency
  - Occurs when patients receive inciting medications (e.g. sulfa drugs)
- **282.3** – Others related to enzyme deficiency
  - PK Deficiency
282.4 – Thalassemias

- Thalassemias – inherited disorders of α or β globulin biosynthesis
  - β-thal
    - microcytosis and hypochromia in heterozygotes
    - Severe anemia & hemolysis in homozygotes
  - α-thal
    - Asymptomatic heterozygotes
    - Microcytosis
    - Hemolytic anemias
- Can occur with sickle cell disease (Sickle-thal)

Sickle-Cell Disease
Other hemoglobinopathies

<table>
<thead>
<tr>
<th>Designation</th>
<th>Population</th>
<th>Main Clinical Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sickle or S</td>
<td>African</td>
<td>Anemia, ischemic infarcts “Sickle Cell Crisis”</td>
</tr>
<tr>
<td>C</td>
<td>African</td>
<td>Mild anemia; interacts with HbS</td>
</tr>
<tr>
<td>E</td>
<td>Southeast Asian</td>
<td>Microcytic anemia, splenomegaly, thalassemic phenotype</td>
</tr>
<tr>
<td>Köln</td>
<td>Sporadic</td>
<td>Hemolytic anemia, Heinz bodies when splenectomized</td>
</tr>
<tr>
<td>Yakima</td>
<td>Sporadic</td>
<td>Polycythemia</td>
</tr>
<tr>
<td>Kansas</td>
<td>Sporadic</td>
<td>Mild anemia</td>
</tr>
<tr>
<td>M. Iwata</td>
<td>Sporadic</td>
<td>Methemoglobinemia</td>
</tr>
</tbody>
</table>

Acute Chest Syndrome
Sickle-Cell Disease

- 282.41 Sickle-cell thalassemia without crisis
  Sickle-cell thalassemia NOS
  Thalassemia Hb-S disease without crisis
- 282.42 Sickle-cell thalassemia with crisis
  • Sickle-cell thalassemia with vaso-occlusive pain
  • Thalassemia Hb-S disease with crisis
- 282.6 Sickle-cell disease
  • Sickle-cell anemia
  Excludes: sickle-cell thalassemia (282.41-282.42) sickle-cell trait (282.5)
- 282.60 Sickle-cell disease, unspecified
  • Sickle-cell anemia NOS
- 282.61 Hb-SS disease without crisis
- 282.62 Hb-SS disease with crisis
  • Hb-SS disease with vaso-occlusive pain
  • Sickle-cell crisis NOS
- 282.63 Sickle-cell/Hb-C disease without crisis
  • Hb-S/Hb-C disease without crisis
- 282.64 Sickle-cell/Hb-C disease with crisis
  • Hb-S/Hb-C disease with crisis
  • Sickle-cell/Hb-C disease with vaso-occlusive pain

Sickle-Cell Disease

- 282.68 Other sickle-cell disease without crisis
  • Hb-S/Hb-D disease without crisis
  • Hb-S/Hb-E disease without crisis
  • Sickle-cell/Hb-D disease without crisis
  • Sickle-cell/Hb-E disease without crisis
- 282.69 Other sickle-cell disease with crisis
  • Hb-S/Hb-D disease with crisis
  • Hb-S/Hb-E disease with crisis
  • Sickle-cell/Hb-D disease with crisis
  • Sickle-cell/Hb-E disease with crisis
  • Other sickle-cell disease with vaso-occlusive pain

For codes “with crisis”
Use additional code for type of crisis, such as:
Acute chest syndrome (517.3)
Splenec sequestration (289.52)
Specific Types of Sickle Cell Crisis

- **Acute Chest Syndrome (517.3)** is a disease that is the leading cause of death and the second most common cause of inpatient admissions for patients with sickle-cell disease. The disease is characterized by pleuritic chest pain, shortness of breath, chills, cough, progressive anemia, hypoxemia and new pulmonary infiltrates on chest x-rays. Acute chest syndrome (ACS) is more common in adolescents and adults than in children. Treatment consists of respiratory therapy, rehydration with hypotonic IV saline to maintain normovolemic state, pain control, and treatment of underlying infection.

- **Splenic Sequestration (289.52)** is caused by intrasplenic trapping of red cells causing spleen enlargement, a precipitous fall in hemoglobin level and the potential for hypovolemic shock. Splenic sequestration can be painful. Symptoms include weakness, irritability, unusual sleepiness, paleness, enlarged spleen, rapid pulse and pain in the left side of the abdomen. Acute splenic sequestration crisis is a leading cause of death in children with sickle-cell disease.

Source: Coding Clinic, 4th Quarter, 2003

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283 – Acquired Hemolytic Anemias

- **283.0 Autoimmune hemolytic anemias (A CC)**
  - Autoimmune hemolytic disease (cold type) (warm type)
  - Chronic cold hemagglutinin disease
  - Cold agglutinin disease or hemoglobinuria
  - Hemolytic anemia:
    - cold type (secondary) (symptomatic)
    - drug-induced
    - warm type (secondary) (symptomatic)
  - Use additional E code to identify cause, if drug-induced
  - Excludes:
    - Evans' syndrome (287.32)
    - hemolytic disease of newborn (773.0-773.5)

- **283.1 Non-autoimmune hemolytic anemias**

- **283.2 Hemoglobinuria due to hemolysis from external causes (Not a CC)**
  - Acute intravascular hemolysis
  - Hemoglobinuria:
    - from exertion
    - march
    - paroxysmal (cold) (nocturnal)
    - due to other hemolysis
  - Marchiafava-Micheli syndrome
  - Use additional E code to identify cause

- **283.9 Acquired hemolytic anemia, unspecified (A CC)**
  - Acquired hemolytic anemia NOS
  - Chronic idiopathic hemolytic anemia

**Immune:**
Positive Coombs Test, Cold Agglutinins, Rx w/ steroids
283.1x
Non-immune Hemolytic Anemias

- 283.10 Non-autoimmune hemolytic anemia, unspecified
- 283.11 Hemolytic-uremic syndrome
- 283.19 Other non-autoimmune hemolytic anemias
  - Hemolytic anemia:
    - mechanical
    - microangiopathic
    - toxic
    - Use additional E code to identify cause
  - Hemolytic-uremic syndrome is characterized by microangiopathic hemolytic anemia, severe thrombocytopenia, elevated LDH, renal failure, and sometimes nervous system involvement. Occurs primarily in children and is associated with E. coli infections
  - Protime/aPTT is normal
  - Analogous to 446.6 – Thrombotic Thrombocytopenic Purpura (TTP) in adults

Neonatal Isoimmunization – 773.X

773.0 Hemolytic disease due to Rh isoimmunization
- Anemia due to RH:
  - antibodies
  - isoimmunization
  - maternal/fetal incompatibility
- Erythroblastosis (fetalis) due to RH:
  - antibodies
  - isoimmunization
  - maternal/fetal incompatibility
- Hemolytic disease (fetus) (newborn) due to RH:
  - antibodies
  - isoimmunization
  - maternal/fetal incompatibility
- Jaundice due to RH:
  - antibodies
  - isoimmunization
  - maternal/fetal incompatibility
  - Rh hemolytic disease
  - Rh isoimmunization
Neonatal Isoimmunization - 773.X

- 773.1 hemolytic disease due to ABO isoimmunization
  - ABO hemolytic disease
  - ABO isoimmunization
  - Anemia due to ABO:
    - Antibodies
    - Isoimmunization
    - Maternal/fetal incompatibility
    - Erythroblastosis (fetalis) due to ABO:
    - Antibodies
    - Isoimmunization
    - Maternal/fetal incompatibility
  - Hemolytic disease (fetus) (newborn) due to ABO:
    - Antibodies
    - Isoimmunization
    - Maternal/fetal incompatibility
  - Jaundice due to ABO:
    - Antibodies
    - Isoimmunization
    - Maternal/fetal incompatibility

- 773.2 hemolytic disease due to other and unspecified isoimmunization
  - Erythroblastosis (fetalis) (neonatorum) NOS
  - Hemolytic disease (fetus) (newborn) NOS
  - Jaundice or anemia due to other and unspecified blood-group incompatibility
### Constitutional Aplastic Anemia

- **284.0 Constitutional aplastic anemia**
  - **284.01 Constitutional red blood cell aplasia**
    - Aplasia, (pure) red cell:
      - congenital
      - of infants
      - primary
      - Blackfan-Diamond syndrome
      - Familial hypoplastic anemia

- **284.09 Other constitutional aplastic anemia**
  - Fanconi’s anemia
  - Pancytopenia with malformations

### Acquired and Nonspecific Aplastic Anemia

- **284.81 Red cell aplasia (acquired) (adult) (with thymoma) - MCC**
  - Red cell aplasia NOS

- **284.89 Other specified aplastic anemias (all three lineages) - MCC**
  - Aplastic anemia (due to):
    - chronic systemic disease
    - drugs
    - infection
    - radiation
    - toxic (paralytic)

- **284.9 Aplastic anemia, unspecified – Only a CC**
  - Anemia:
    - aplastic (idiopathic) NOS
    - aregenerative
    - hypoplastic NOS
    - nonregenerative
    - Medullary hypoplasia

### Classification of Red Cell Aplasia

- Self Limited
  - Transient erythoblastopenia of childhood
  - Acute B19 parvovirus infection

- Fetal RBC aplasia
  - In utero B19 parvovirus

- Hereditary (Diamond-Blackfan)

- Acquired
  - Thymoma or malignancy
  - Connective Tissue Dz (lupus)
  - Virus (B19 Parvovirus, hepatitis, EB virus)

- Pregnancy

- Drugs (Dilantin, INH, azathiaprine)

- Unknown
Parvovirus B19 Infection
"Fifth Disease"

- Children
  - "Fifth Disease" or erythema infectiosum — "slapped cheek"
- Adults
  - Arthritis
  - Lacy "stocking" rash
- Both Children and Adults
  - 284.81 - Pure Red Cell Aplasia — especially in HIV patients

New code 079.83 Parvovirus B19
Human parvovirus
Parvovirus NOS
EXCLUDES: erythema infectiosum [fifth disease] (057.0)

238.7x – Myelodysplastic disorders

Characterized by the slow development of an anemia refractory to standard therapy. Lab examination shows an anemia that may be profound and the patient may have leukopenia with or without thrombocytopenia. Myelodysplastic syndromes are recognized as hematologic malignancies. Treatment of the Myelodysplastic syndrome is primarily directed toward improving the anemia. Blood transfusions are a mainstay of therapy. Should be sequenced first if treatment is for the anemia.

Coding Clinic, 1st Quarter, 1997
### Myelodysplastic Codes

**238.7 Other lymphatic and hematopoietic tissues**

- **238.72 Low grade Myelodysplastic syndrome lesions**
  - Refractory anemia (RA)
  - Refractory anemia with ringed sideroblasts (RARS)
  - Refractory cytopenia with multilineage dysplasia (RCMD)
  - Refractory cytopenia with multilineage dysplasia and ringed sideroblasts (RCMD-RS)

- **238.73 High grade myelodysplastic syndrome lesions**
  - Refractory anemia with excess blasts-1 (RAEB-1)
  - Refractory anemia with excess blasts-2 (RAEB-2)
  - 5q minus syndrome NOS
    - **Excludes:**
      - constitutional 5q deletion (758.39)
      - high grade myelodysplastic syndrome with 5q deletion (238.73)

- **238.74 Myelodysplastic syndrome with 5q deletion**
  - 5q minus syndrome NOS
  - **Excludes:**
    - idiopathic myelofibrosis (238.76)
    - myelofibrosis NOS (289.83)
    - myelofibrosis with myeloid metaplasia (238.76)
    - primary myelofibrosis (238.76)
    - secondary myelofibrosis (289.83)

- **238.75 Myelodysplastic syndrome, unspecified**

**CCs are in the box**

### 284.2 – Myelophthisis

- Leukoerythroblastic anemia
- Myelophthisic anemia
- Code first the underlying disorder, such as:
  - malignant neoplasm of breast (174.0-174.9, 175.0-175.9)
  - tuberculosis (015.0-015.9)
- **Excludes:**
  - idiopathic myelofibrosis (238.76)
  - myelofibrosis NOS (289.83)
  - myelofibrosis with myeloid metaplasia (238.76)
  - primary myelofibrosis (238.76)
  - secondary myelofibrosis (289.83)
- Defined as destruction or displacement of bone marrow precursor cells and their stroma that nurture these cells to maturation. Etiologies include:
  - Metastatic cancer
  - Tuberculosis
  - Lymphomas
  - Gaucher’s disease
  - Other infiltrative diseases
Myelofibrosis 
w/ or w/o Myeloid Metaplasia

- Growth of bone marrow stem cells resulting in overgrowth of fibrous tissue
  - Myeloid Metaplasia – extramedullary hematopoiesis
- Diagnosis:
  - Normochromic normocytic anemia
  - Red cell poikilocytosis on blood film (tear drop RBCs)
  - JAK 2 mutation on Val 617 Phe locus in 50%
  - Raised lactate dehydrogenase
  - Raised neutrophil alkaline phosphatase score
  - Bone marrow biopsy may show increased cellularity and fibrosis
- Associated with other diseases
  - Myeloproliferative disease
  - Polycythemia rubra vera
  - Essential Thrombocytosis

Codes:
- Myelofibrosis NOS (289.83)
- Secondary myelofibrosis (289.83)
- Myelofibrosis with myeloid metaplasia (238.76)

285 – Other anemias

- 648.2x – Anemia - the listed conditions when complicating the pregnant state, aggravated by the pregnancy, or when a main reason for obstetric care plus additional code (280-285)
- 285 Other and unspecified anemias
- 285.0 Sideroblastic anemia
  - Excludes:
    - refractory sideroblastic anemia (238.72)
    - Use additional E code to identify cause, if drug-induced
- 285.1 Acute posthemorrhagic anemia
  - Anemia due to acute blood loss
  - Excludes:
    - anemia due to chronic blood loss (280.0)
    - blood loss anemia NOS (280.0)
- 285.2 Anemia of chronic disease
  - Anemia in chronic illness
  - Anemia in chronic kidney dz
  - Anemia in end-stage renal Dz
  - Erythropoietin-resistant anemia
  - 285.22 Anemia in neoplastic Dz
  - 285.29 Anemia of other chronic disease
  - Anemia in other chronic illness
- 285.8 Other specified anemias
  - Anemia:
    - dyserythropoietic (congenital)
    - dyshematopoietic (congenital)
    - von Jaksh’s
    - Infantile pseudoleukemia
- 285.9 Anemia, unspecified
- 776.5 Congenital anemia
  - Anemia following fetal blood loss
- 776.6 Anemia of prematurity
**285.1 – Acute Blood Loss Anemia**

*Coding Clinic, 1st Quarter, 2007*

**Question:** What is the correct code assignment for postoperative anemia? *Coding Clinic Second Quarter 1992, pages 15-16* stated, "If the physician documents postoperative anemia in the medical record, but does not label the condition as a complication, assign code 285.1, Acute posthemorrhagic anemia." Is this advice still valid?

**Answer:** When postoperative anemia is documented without specification of acute blood loss, code 285.9, Anemia, unspecified, is the default. Code 285.1, Acute posthemorrhagic anemia, should be assigned, when postoperative anemia is due to acute blood loss.

<table>
<thead>
<tr>
<th>MS-DRG Medicare Statistics</th>
<th>UGI Hemorrhage</th>
</tr>
</thead>
<tbody>
<tr>
<td>377 UGI Hem w/MCC</td>
<td>19.2%</td>
</tr>
<tr>
<td>378 UGI Hem w/CC</td>
<td>44.8%</td>
</tr>
<tr>
<td>379 UGI Hem w/o CC</td>
<td>36.0%</td>
</tr>
</tbody>
</table>

**Polling Question #1**

An orthopedic surgeon pins a hip. The preoperative hematocrit is 37 with the postoperative value falling to 26. The EBL is “less than 100 cc”. Described as postoperative anemia, the patient receives one unit of blood. The coder may:

*1 Query for the clinical significance and underlying cause of the preoperative and post operative hematocrit level

*2 Query for the indication for the blood transfusion

*3 Query to determine if this is a complication of the fracture or of the procedure

*4 All of the above.
**Sequencing Issues**  
**ICD-9-CM Guidelines**

- **Treatment directed at the malignancy**  
  - If the treatment is directed at the malignancy, designate the malignancy as the principal diagnosis.

- **Treatment of secondary site**  
  - When a patient is admitted because of a primary neoplasm with metastasis and treatment is directed toward the secondary site only, the secondary neoplasm is designated as the principal diagnosis even though the primary malignancy is still present.

Source: *ICD-9-CM Official Guidelines for Coding and Reporting; Effective October 1, 2007, page 20*

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**Sequencing Issues**  
**ICD-9-CM Guidelines**

- **Anemia associated with malignancy**  
  - When admission/encounter is for management of an anemia associated with the malignancy, and the treatment is only for anemia, the appropriate anemia code (such as code 285.22, Anemia in neoplastic disease) is designated as the principal diagnosis and is followed by the appropriate code(s) for the malignancy.
  - Code 285.22 may also be used as a secondary code if the patient suffers from anemia and is being treated for the malignancy.

- **Anemia associated with chemotherapy, immunotherapy and radiation therapy**  
  - When the admission/encounter is for management of an anemia associated with chemotherapy, immunotherapy or radiotherapy and the only treatment is for the anemia, the anemia is sequenced first followed by code E933.1. The appropriate neoplasm code should be assigned as an additional code.

Source: *ICD-9-CM Official Guidelines for Coding and Reporting; Effective October 1, 2007, page 21*
Poll Results

284.1 Pancytopenia

- **Triad**
  - Anemia
  - Leukopenia
  - Thrombocytopenia

- **If a patient has pancytopenia, the associated component treated may also be coded if not excluded**

  - **284.1 Pancytopenia**
    EXCLUDES: pancytopenia (due to) (with):
    - aplastic anemia NOS (284.9)
    - bone marrow infiltration (284.2)
    - constitutional red blood cell aplasia (284.01)
    - drug induced (284.8)
    - hairy cell leukemia (202.4)
    - human immunodeficiency virus disease (042)
    - leukoerythroblastic anemia (284.2)
    - malformations (284.09)
    - myelodysplastic syndromes (238.72-238.75)
    - myeloproliferative disease (238.79)
    - other constitutional aplastic anemia (284.09)
Other sequencing issues
Myelodysplastic Syndrome

- Coding Clinic, 1st Quarter, 1997
- Coding of Pancytopenia with Myelodysplastic syndrome
- No, pancytopenia is not an integral part of myelodysplastic syndrome. Pancytopenia is a deficiency of all three elements of the blood, which includes anemia (deficiency of red cells), neutropenia (deficiency of white cells), and thrombocytopenia (deficiency of platelets).
  - Assign code 238.7, Neoplasms of uncertain behavior, Other and unspecified sites and tissues, Other lymphatic and hematopoietic tissues, as the principal diagnosis for the myelodysplastic syndrome. Assign code 284.8, Other specified aplastic anemias for the pancytopenia, as an additional diagnosis.
- Myelodysplastic syndromes are characterized by the slow development of an anemia refractory to standard therapy. Laboratory examination shows an anemia that may be profound and the patient may have leukopenia with or without thrombocytopenia. Treatment of the myelodysplastic syndrome is primarily directed toward improving the anemia.
- Blood transfusions are a mainstay of treatment.

Pancytopenia due to Myelosuppression

- Question: How is myelosuppression in chemotherapy patients coded when chemotherapy is not being administered on this admission?
- Answer: Bone marrow toxicity due to chemotherapy causes a myelosuppression (depression) of the bone marrow, 289.9 (with E933.1, antineoplastic drug, to identify the drug). Myelosuppression occurs earlier in the chemotherapy course. Late toxicities of particular types of chemotherapeutic agents may cause leukopenia, 288.50, thrombocytopenia, 287.4, or bone marrow aplasia, 284.8.

Coding Clinic, March-April, 1985
289.0 Secondary vs. 238.4 Primary Polycythemia

**Erythrocytosis**
- Elevated Hct (over 50)
- Elevated red cell mass on radioactive chromium study

**Causes**
- Chronic hypoxia
- Renal disease
- Tumors
- Testosterone Rx
- Polycythemia vera

**1° Polycythemia vera**
- Clonal disorder of multipotent stem cells

**Dx Factor:**
- Elevated red cell mass
- Normal oxygenation
- Splenomegaly
- Leukocytosis and thrombocytosis

**Rx:**
- Phlebotomy
- Chemotherapy

776.4 Polycythemia neonatorum
Plethora of newborn; Polycythemia due to:
donor twin transfusion or maternal-fetal transfusion

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**MS-DRGS Major Hematologic Diagnoses**

<table>
<thead>
<tr>
<th>Non-major</th>
<th>Diagnosis Code</th>
<th>Major Hematological and Immunological Code Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>238.72</td>
<td>734.11</td>
<td>Döhle's syndrome</td>
</tr>
<tr>
<td>238.73</td>
<td>739.12</td>
<td>Waardenburg syndrome</td>
</tr>
<tr>
<td>238.74</td>
<td>739.13</td>
<td>Nezefeld's syndrome</td>
</tr>
<tr>
<td>238.75</td>
<td>739.19</td>
<td>Other deficiency of cell-mediated immunity</td>
</tr>
<tr>
<td>289.0</td>
<td>283.10</td>
<td>Autoimmune hemolytic anemia, unspecified</td>
</tr>
<tr>
<td>283.10</td>
<td>283.11</td>
<td>Non-autoimmune hemolytic anemia, unspecified</td>
</tr>
<tr>
<td>283.19</td>
<td>283.2</td>
<td>Other non-autoimmune hemolytic anemia</td>
</tr>
<tr>
<td>283.2</td>
<td>283.2</td>
<td>Hemolytic anemia due to hemolysis from external causes</td>
</tr>
<tr>
<td>283.9</td>
<td>284.1</td>
<td>Acquired hemolytic anemia, unspecified</td>
</tr>
<tr>
<td>284.1</td>
<td>284.2</td>
<td>Constitutional red blood cell aplasia</td>
</tr>
<tr>
<td>284.2</td>
<td>284.3</td>
<td>Other constitutional aplastic anemia</td>
</tr>
<tr>
<td>284.3</td>
<td>284.4</td>
<td>Other specified aplastic anemia</td>
</tr>
<tr>
<td>284.4</td>
<td>284.5</td>
<td>Aplastic anemia, unspecified</td>
</tr>
<tr>
<td>999.0</td>
<td>266.0*</td>
<td>Neutropenia, unspecified</td>
</tr>
<tr>
<td>999.1</td>
<td>266.0*</td>
<td>Congenital neutropenia</td>
</tr>
<tr>
<td>999.2</td>
<td>266.0*</td>
<td>Cyclic neutropenia</td>
</tr>
<tr>
<td>999.3</td>
<td>266.0*</td>
<td>Drug induced neutropenia</td>
</tr>
<tr>
<td>999.4</td>
<td>266.0*</td>
<td>Neutropenia due to infection</td>
</tr>
<tr>
<td>999.5</td>
<td>266.0*</td>
<td>Other neutropenia</td>
</tr>
<tr>
<td>999.6</td>
<td>266.1</td>
<td>Functional disorders of polymorphonuclear neutrophils</td>
</tr>
<tr>
<td>266.2</td>
<td>266.2</td>
<td>Genetic anomalies of leukocytes</td>
</tr>
<tr>
<td>266.3</td>
<td>266.3</td>
<td>Complications of transplanted bone marrow</td>
</tr>
</tbody>
</table>
White Count

**Multiple Cell Lines**
- Concentration usually 5-10K
- Concentrations
  - Neutrophils – 70%
  - Eosinophils – 2%
  - Basophils – 1%
  - Lymphocytes – 24%
  - Monocytes – 6%
- To determine excess or deficiency, must multiply total by the percentage on the differential count.

Leukopenia

288.0x - Neutropenia

- **Calculation**
  - White count multiplied by percentage of segmented cells, bands, and other earlier cells
- **Severity**
  - Neutropenia = ANC <2000 (slight risk of infection)
  - Mild Neutropenia = ANC >1000 & <1500 (minimal risk of infection)
  - Moderate Neutropenia = ANC >500 & <1000 (moderate risk of infection)
  - Severe Neutropenia = ANC <500 (severe risk of infection)
- **Causes**
  - Side effect of certain medications, such as diuretics or antibiotics
  - Vitamin deficiencies
  - Leukemia
  - Aplastic anemia
  - Radiation therapy or chemotherapy
  - Some viral infections, such as mononucleosis or AIDS
  - Certain bacterial infections, such as tuberculosis
  - Certain autoimmune disorders, such as lupus or rheumatoid arthritis
Febrile Neutropenia

- **288.0 Neutropenia**
  - Decreased Absolute Neutrophil Count (ANC)
  - Use additional code for any associated:
    - fever (780.6)
    - mucositis (478.11, 528.00-528.09, 538, 616.81)
    - neutropenic splenomegaly (289.53)
    - transitory neonatal neutropenia (776.7)
- **288.00 Neutropenia, unspecified**
- **288.01 Congenital neutropenia**
  - Congenital agranulocytosis
  - Infantile genetic agranulocytosis
  - Kostmann’s syndrome
- **288.02 Cyclic neutropenia**
  - Cyclic hematopoiesis
  - Periodic neutropenia
- **288.03 Drug induced neutropenia**
  - Use additional E code to identify drug
- **288.04 Neutropenia due to infection**
  - Agranulocytosis
  - Neutropenia:
    - immune
    - Toxic
- **288.09 Other neutropenia**
  - Transient neonatal neutropenia
  - Isoimmune neutropenia
  - Maternal transfer neutropenia

Causes of neutropenic fever: Infections, fungus, viruses, drug fever

High-risk patients – Presence of any of the following: Pulmonary infiltrates; Mental status changes; New onset renal failure; Hypoxia (a 20 point drop from baseline); Patients with a history of VRE, multi-drug resistant *Pseudomonas* or MRSA

Coding of Pancytopenia and its components

- **CC 1st Quarter, 1991, page 14.**
  - Question: A patient was admitted with diagnoses of neutropenia, thrombocytopenia, and anemia due to chronic disease. The patient also had a diagnosis of pancytopenia. According to our physicians, only the pancytopenia should be coded if the patient had all three. Is this correct?
  - Answer: Yes, assign only the code for pancytopenia, 284.8. Other specified aplastic anemia. The elements of the blood are the white cells, red blood cells, and platelets. Pancytopenia is a deficiency of all three elements and includes anemia (deficiency of red cells), neutropenia (deficiency of white cells), and thrombocytopenia (deficiency of platelets)

- **CC 3rd Quarter, 2005, page 11-12.**
  - Question: The patient is a 69-year-old female with breast cancer receiving weekly Taxol therapy. She developed a high-grade fever at home, presented to the emergency department and was found to have neutropenic fever. The patient was admitted for treatment of neutropenic fever. The physician documented that the patient also had pancytopenia. How should this be coded?
  - Answer: Assign code 288.0, Agranulocytosis, for the neutropenic fever, as the principal diagnosis. Assign code 174.9, Malignant neoplasm of female breast, Breast (female), unspecified, for the breast cancer, code 284.8, Other specified aplastic anemias, for the pancytopenia
Sequencing Neutropenic Fever

- CC – 3rd Quarter, 2005
  - Pancytopenia with neutropenic fever – 288.00 plus 780.6
- CC – 2nd Quarter, 1996
  - Neutropenic sepsis – 038.9 plus appropriate SIRS code
- Fungal Sepsis
  - 117.9 – Other and unspecified mycosis plus appropriate SIRS codes - Fungemia
  - Query for if the patient receives amphotericin, fluconazole, capsofungin, or other systemic antifungal drugs

Bottom Line

Why did the neutropenic patient get antibiotics or what probable organism was targeted by the antibiotics chosen?

<table>
<thead>
<tr>
<th>MS-DRGS</th>
<th>Major Hematologic Diagnoses</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-major</strong></td>
<td><strong>Major</strong></td>
</tr>
<tr>
<td>280.00</td>
<td>Neutropenia, unspecified</td>
</tr>
<tr>
<td>280.02</td>
<td>Cyclical neutropenia</td>
</tr>
<tr>
<td>280.04</td>
<td>Neutropenia due to infection</td>
</tr>
<tr>
<td>280.09</td>
<td>Other hematologic and immunologic disorders of the blood-forming organs and the immune system</td>
</tr>
<tr>
<td>280.1</td>
<td>Genetic anomalies of leukocytes</td>
</tr>
<tr>
<td>280.2</td>
<td></td>
</tr>
</tbody>
</table>
Leukocytosis

- Neutrophils (Bands/Metamyelocytes)
  - "Bandemia" – 288.66
    - Excludes confirmed infection or leukemia
    - Should query for possible SIRS
  - Inflammatory response
  - Steroids (e.g. demargination)
  - Myelogenous Leukemia
  - "Leukemoid Reaction"
    - Over 25,000
- Eosinophils
  - Allergic reactions
  - Parasites
  - Leukemia

Leukocytosis

- Lymphocytes
  - Leukemia
  - Viral infections/TB
- Basophils
  - Allergic reactions
  - Lymphomas
  - Chronic inflammation
  - Bone marrow diseases
  - Hemolytic anemias
**286.6x – Elevated White Count**

- **EXCLUDES EOSINOPHILIA**
  - 288.60 Leukocytosis, unspecified
    - Elevated leukocytes, unspecified
    - Elevated white blood cell count, unspecified
  - 288.61 Lymphocytosis (symptomatic)
    - Elevated lymphocytes
  - 288.62 Leukemoid reaction (WBC over 25,000 – 30,000)
    - Basophilic leukemoid reaction
    - Lymphocytic leukemoid reaction
    - Monocytic leukemoid reaction
    - Myelocytic leukemoid reaction
    - Neutrophilic leukemoid reaction
  - 288.63 Monocytosis (symptomatic)
    - Excludes: infectious mononucleosis (075)
  - 288.64 Plasmacytosis
  - 288.65 Basophilia
  - 288.66 Bandemia
    - Excludes confirmed infection or leukemia
    - Should query for possible SIRS
  - 288.63 Monocytosis (symptomatic)
    - Excludes: infectious mononucleosis (075)
  - 288.64 Plasmacytosis
  - 288.65 Basophilia
  - 288.66 Bandemia
    - Excludes confirmed infection or leukemia
    - Should query for possible SIRS

**Always query for the underlying cause and consequences**

---

**Sepsis – “Bandemia”**

- 1992 Definition: Sepsis is “the systemic inflammatory response to infection, manifested by two or more of the following SIRS conditions”
- 2001 Definition: Similar to 1992 but allowing more variables
- It is **NOT THE INFECTION ITSELF**, but it is the **RESULT** of or the **RESPONSE** to the infection.

Systemic Inflammatory Response Syndrome without organ dysfunction (>2 of the following):
- Temperature > 38 C or < 36 C
- Pulse > 90/min
- Respirations > 20/min
- White Blood Cells >12,000 or <4000
- Or > 10% Bands formed

**WARNING!!**

If the WBC Count is normal AND there is no “left shift” – “bandemia” – it is VERY difficult to substantiate that a patient has sepsis
Leukemia Codes

- 204 Lymphoid leukemia
  - 204.0 Acute
  - 204.1 Chronic
  - 204.2 Subacute
  - 204.8 Other lymphoid leukemia
  - 204.9 Unspecified lymphoid leukemia

- 205 Myeloid leukemia
  - 205.0 Acute
    - Acute promyelocytic leukemia
  - 205.1 Chronic
    - Eosinophilic leukemia
    - Neutrophilic leukemia
  - 205.2 Subacute
  - 205.3 Myeloid sarcoma
    - Chloroma
    - Granulocytic sarcoma
  - 205.8 Other myeloid leukemia
    - Aleukemic leukemia:
      - granulocytic
      - myelogenous
      - myeloid
    - Aleukemic myelosis
  - 205.9 Unspecified myeloid leukemia

The following fifth-digit subclassification is for use with category 204 & 205:

0 without mention of remission
1 in remission

Leukemia Codes

- 206 Monocytic leukemia
  - Includes:
    - leukemia:
      - histiocytic
      - monoblastic
      - monocytoid
  - 206.0 Acute
    - Excludes:
      - acute exacerbation of chronic monocytic leukemia (206.1)
  - 206.1 Chronic
  - 206.2 Subacute
  - 206.8 Other monocytic leukemia
    - Aleukemic:
      - monocytic leukemia
      - monocytoid leukemia
  - 206.9 Unspecified monocytic leukemia

- 207 Other specified leukemia

  Excludes: leukemia reticuloendotheliosis (202.4) plasma cell leukemia (203.1)
  - 207.0 Acute erythremia and erythroleukemia
    - Acute erythremic myelosis
    - Di Guglielmo's disease
    - Erythremic myelosis
  - 207.1 Chronic erythremia
    - Heilmeyer-Schöner disease
  - 207.2 Megakaryocytic leukemia
    - Megakaryocytic myelosis
    - Thrombocytic leukemia
  - 207.8 Other specified leukemia
    - Lymphosarcoma cell leukemia

The following fifth-digit subclassification is for use with category 206 & 207:

0 without mention of remission
1 in remission
Platelet Disorders
Normal Count: 150K-450K

- Thrombocytopenia
  - Less than 150K
- Causes
  - Production Defects
    - Marrow toxicity
    - Marrow infiltration
    - B12 deficiency
  - Splenic sequestration
  - Peripheral Destruction
    - Idiopathic Thrombocytopenic Purpura
    - Disseminated Intravascular Coagulation
    - Sepsis

- Thrombocytosis
  - Over 400K-500K
- Causes
  - Reactive
    - Postsplenectomy
    - Infection
    - Acute Blood Loss Anemia
  - Familial
  - Thrombocytemia

Thrombocytopenia Coding Clinic Descriptions

- Immune thrombocytopenic purpura (ITP): Recognized as an autoimmune disorder, with development of antibodies to one's own platelets. Some cases of ITP are caused by drugs, while others are associated with infection, pregnancy, or immune disorders such as systemic lupus erythematosus. In about half of all cases, the cause is unknown.

- Evans' syndrome: Evans' syndrome involves a hemolytic anemia along with thrombocytopenia, related to an autoimmune process affecting both the red cells and platelets.

- Congenital and hereditary thrombocytopenic purpura: Several rare inherited diseases cause low platelet counts. The severity of the thrombocytopenia varies with the condition and also the individual patient. Examples of congenital and hereditary thrombocytopenias include thrombocytopenia with absent radii (TAR) syndrome, and Wiskott-Aldrich syndrome, which is coded elsewhere.

Coding Clinic, 4th Quarter, 2005
Thrombocytopenia Coding

- **287.3 Primary thrombocytopenia**
  - Excludes
    - thrombotic thrombocytopenic purpura (446.6)
    - transient thrombocytopenia of newborn (776.1)
- **287.30 Primary thrombocytopenia unspecified**
- Megakaryocytic hypoplasia
- **287.31 Immune thrombocytopenic purpura**
  - Idiopathic thrombocytopenic purpura
  - Tidal platelet dysgenesis
- **287.32 Evans’ syndrome**

 CCs

- **287.33 Congenital and hereditary thrombocytopenic purpura**
  - Congenital and hereditary thrombocytopenia
  - Thrombocytopenia with absent radii (TAR) syndrome
- **287.39 Other primary thrombocytopenia**
- **287.4 Secondary thrombocytopenia**
  - Posttransfusion purpura
  - Thrombocytopenia (due to):
    - dilutional
    - drugs
    - extracorporeal circulation of blood
    - massive blood transfusion
    - platelet alloimmunization
    - Use additional E code to identify cause
- **287.5 Thrombocytopenia, unspecified**

ICD-9-CM Thrombocytosis

- **Platelet counts over normal**
  - Hospital dependent – consider if over 400,000
- **238.71 Essential thrombocythemia**
  - Essential hemorrhagic thrombocythemia
  - Essential thrombocytosis
  - Idiopathic (hemorrhagic) thrombocythemia
  - Primary thrombocytosis
- **The index codes “thrombocytosis” to 238.71**
- **Not a CC**
**Thrombocytopenia vs. Pancytopenia**

- If a pancytopenic patient receives platelet transfusions early during the hospital stay and thrombocytopenia was present upon admission, thrombocytopenia (as a component of pancytopenia) can possibly be a principal diagnosis.
- No Coding Clinic advice directly addresses this issue; however analogous to the febrile neutropenia issue in CC 3rd Q, 2005 discussed on previous slide.

**Options for Principal Dx.**
- 287.4 – Secondary Thrombocytopenia or 287.5 Thrombocytopenia NOS (Both not a CC or MCC) – MS-DRG 813
  R.W. 1.34263
- 284.89 – Pancytopenia – MS-DRG 811 w/MCC
  R.W. 1.0006
  MS-DRG 812 w/o MCC
  R.W. 0.7780

---

**Coagulation Primary and Secondary**

When a defect in the blood vessel wall occurs, platelets first aggregate at the defect, then fibrinogen and thrombin form a clot. Defects cause prolonged bleeding.
Coagulation Disorders
Basic Tests

- Primary hemostatic
  - Platelet Count
  - Bleeding Time – tests platelet function
- Plasma Coagulation
  - Fibrinogen levels
  - Thrombin levels
  - Protime (INR)
  - Activated Partial Thromboplastin Time

287.1
Qualitative Platelet Disorders

- Defects of Adhesion
  - 286.4 - Von Willebrand’s disease
    - An exception since coagulation defect also present
  - Bernard-Soulier syndrome
    (absence of the protein GpIb/IX)
- Defects of Aggregation
  - Glanzmann’s thrombasthenia
  - Prolonged Bleeding Times with normal platelet counts

- Defects of platelet release
  - Decreased cyclooxygenase
    - Due to drugs (e.g. aspirin, NSAIDs)
  - Congenital
  - Granule storage pool defects
  - Uremia
  - Platelet coating
- Defect of platelet coagulant activity
  - Scott’s Syndrome

Not a CC
286.0 – 286.3
Congenital Coagulation Defects

286.0 Congenital factor VIII disorder
- Antihemophilic globulin [AHG] deficiency
- Factor VIII (functional) deficiency
- Hemophilia:
  - NOS
  - A
  - classical
  - familial
  - hereditary
- Subhemophilia

286.1 Congenital factor IX disorder
- Christmas disease
- Deficiency:
  - factor IX (functional)
  - plasma thromboplastin component [PTC]
  - Hemophilia B

286.2 Congenital factor XI deficiency
- Hemophilia C
- Plasma thromboplastin antecedent [PTA] deficiency
- Rosenthal’s disease

286.3 – Congenital Deficiency of Other Clotting Factors

- Congenital afibrinogenemia
- Deficiency:
  - AC globulin
  - factor:
    - I [fibrinogen]
    - II [prothrombin]
    - V [labile]
    - VII [stable]
    - X [Stuart-Prower]
    - XII [Hageman]
    - XIII [fibrin stabilizing]
- Laki-Lorand factor
- proaccelerin

286.3 is NOT appropriate for Factor VII use to stop bleeding in thoracic surgery patient. Query the physician for the underlying bleeding mechanism.

Elevated aPTT with normal Protime, platelet count, and fibrinogen levels
**Lab Test Interpretation**

- **Prolonged aPTT**
  - No bleeding – Factor XII, others
  - Mild Bleeding – Factor XI
  - Severe Bleeding – Factor XIII and IX

- **Prolonged Protime**
  - Factor VII deficiency
  - Vitamin K deficiency - early
    - mechanism of warfarin
    - Also caused by antibiotics eliminating Vitamin K producing bacteria

- **Prolonged aPTT AND Protime**
  - Factor II, V, or X Deficiency
  - Heparin works by activating antithrombin III, inhibiting thrombin and Factor X
  - Vitamin K deficiency – late
  - Warfarin ingestion

- **Prolonged Thrombin Time**
  - Mild – Afibrinogenemia
  - Frequent bleeding – dysfibrinogenemia
  - Heparin

**Other Coagulation Disorders**

- **286.5 Hemorrhagic disorder due to intrinsic circulating anticoagulants**
  - Antithrombinemia
  - Antithromboplastinemia
  - Antithromboplastino-genemia
  - Hyperheparinemia
  - Increase in:
    - anti-VIIIa
    - anti-IXa
    - anti-Xa
    - anti-XIa
    - antithrombin

- **Secondary hemophilia**
- **Systemic lupus erythematosus [SLE] inhibitor**

- **286.6 Defibrination syndrome**
  - Afibrinogenemia, acquired
  - Consumption coagulopathy
  - Diffuse or disseminated intravascular coagulation [DIC syndrome]
  - Fibrinolytic hemorrhage, acquired
  - Hemorrhagic fibrinogenolysis
  - Pathologic fibrinolysis
  - Purpura:
    - Fibrinolytic
    - fulminans

**Thrombocytopenia – Prolonged PT/aPTT – Low Fibrinogen**
286.7 and 286.9

- **286.7 Acquired coagulation factor deficiency**
  - Deficiency of coagulation factor due to:
    - liver disease
    - vitamin K deficiency
    - Hypoprothrombinemia, acquired
  - Excludes Vitamin K Deficiency of newborn – 776.0

- **286.9 Other and unspecified coagulation defects**
  - Defective coagulation NOS
  - Deficiency, coagulation factor NOS
  - Delay, coagulation
  - Disorder:
    - coagulation
    - hemostasis

Asymptomatic Coumadin or heparin toxicity codes to 790.92; other adverse reactions code to that reaction + V58.61. 286.7 is not appropriate for Coumadin or heparin since these are their intended effects.

**Thrombotic Disorders**

- **Inherited**
  - Factor V Leiden
  - Antithrombin III Deficiency
  - Protein C deficiency
  - Protein S deficiency
  - Prothrombin gene mutation
  - Dysfibrinogenemia
  - tPA deficiency
  - Homocystinuria

- **Acquired**
  - Lupus anticoagulant – anticardiolipin antibody syndrome
  - Malignancy
  - Thrombotic Thrombocytopenic Purpura
  - Estrogen treatment
  - Hyperlipidemia
  - Diabetes mellitus
  - Nephrotic Syndrome
  - Heart Failure
  - Pregnancy
  - Postoperative States
  - Immobilization
  - Old Age
**Hypercoagulable Syndrome**  
**Association with DVT**

- **Manifestation**
  - Phlegma cerulea dolens
  - Pulmonary Embolus
  - Deep venous Thrombosis

- **Underlying cause**
  - Virchow’s Triad —
    1° or 2° Hypercoagulability; Thrombophlebitis; Stasis
  - Usually present on admission – Estrogen Use, Cancer, Pregnancy
  - Still to be ruled out - Factor V Leiden, Protein C deficiency, Protein S deficiency – As primary hypercoagulability

- **Severity – Acute respiratory failure or shock**

- **Instigating Cause** — recent surgery, pregnancy, underlying cancer, drug use (e.g. hormones)

- **Complications** — postphlebitic syndrome, venous stasis ulcers

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