v a d e m e c u m

Whose Disease?

Eponymous Pathology

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Dedication

To my children, Fiona, Niall, Brian and Eva.

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Eponymous pathology : Whose disease?

There are a very large number of diseases in medicine that are named after the individual who first described them. This practice confers a sort of immortality on the original describer of the disease but sometimes leads to confusion in the minds of medical students (and others too!) who may not recall easily the pathological entity that lies behind the eponymous title. Some diseases that bear their discoverer's name are so well known that they are commonly recognized even among the "laity". Hodgkin's disease comes to mind. Others are so specialized that they are recognized by only a few initiates in highly specialized fields of medical science. There are a great many of these. In general terms the best known diseases were all described many years ago and the individuals who described them may be considered lucky to have been around at a time when medical science was in it's infancy and competition was not so fierce. In more recent times, as all of the "good" diseases have been snapped up, it is the lot of medical detectives to seek their recognition (and immortality) in less common diseases. Medical men have given their names not only to specific disease states, sometimes they have donated their appellations to specific signs of disease or to a particular test that the investigator developed or even to a particular histological appearance that is seen in a specific disease. Many of these will also be found in the following pages. Finally, not all diseases that have a "name" attached are named after the person who first discovered them. There are examples where the name of the first patient or family to be described with a disease has become associated with the disorder, Christmas disease is one such disorder, indeed on occasion only the patient's initials are used—as in the naming of the JC virus.

The objective in assembling this alphabetical list of unrelated disorders is to provide in one place a quick reference source for students who come across a name with which they are unfamiliar and who wish to find out something about the related disorder. Each name is accompanied by a brief description of the disease, sign, test etc, which is intended to provide a "quick-reference" amount of information. For some of the more important diseases the amount of information provided is obviously very limited and students will recognize the need to refer to another source for information. For many of the more esoteric entities included in this book however, the amount of information provided may well be sufficient for the requirements of an average student. To facilitate recognition of important entities a "star" system is used. Entities that are very important have three stars, those of lesser importance have two and relative rarities have only one. Deciding the relative importance of different entry is obviously highly subjective and the degree of importance attached

to a particular entry may not reflect it's importance as an affliction of mankind or it's frequency of occurrence in medical practice. Importance occasionally derives from the scientific interest of a particular disorder, or even from it's propensity to appear as a question in major licensing examinations!

This book is intended as a source for medical students who are studying pathology. You will encounter all of the names in this book during your course. These names will continue to crop up during your rotations and indeed for the rest of your medical career. Sooner or later you will become familiar almost all of them. It is hoped that if you use this book that this will happen sooner rather than later. How to approach this book? Well obviously reading from A to Z is not recommended. Perhaps it's best usage is as a mini-reference book to be consulted on occasions to bring to memory a particular entity. This is particularly important when you are just beginning to encounter these disorders early in your pathology course. As your knowledge of pathology increases you might use the book as a learning tool. One suggestion is to randomly let the book fall open where it may and check out whatever name appears before you. If you haven't encountered it yet during your course then pass on to another entry. It is not a good idea to read too many entries at the one sitting, especially if they are unfamiliar, but rather tackle one or two at a time and that way build up a knowledge base. Which entries should one access first? Entries that have three stars are highly important and should be familiar to all students. Most students will also be keen to tackle the "two star" entries, leaving the "one star" entries until last. The book can also be used as a reference source for a "game of skill" among two or more students, let each student act as quizmaster to his/her colleague(s) in turn awarding points for correct answers.

Medicine carries it's own large vocabulary. All medical students learn this during their years in medical school and in the hospitals. The eponymous disorders listed in this book are among the medical vocabulary that students and doctors carry around with them. Each name in this book is shorthand for a disease, a test, a pathological entity and knowledge of the relevant background will give you an increased confidence in your preparations for your licensing examinations and later in your dealings with your colleagues on the wards.

A

Addison ***

Addisons disease

Hypoadremalism due to destruction of >90% of adrenal gland.

Etiology

Autoimmunity (commonest etiology in U.S.)
Secondary carcinoma
Tuberculosis

Clinical features

Insidious onset with vague symptoms
Generalized weakness
Gastrointestinal symptoms
Skin pigmentation
Hypotension

Pathology

That of primary disease
Autoimmunity
Glands are small
Lymphocytic infiltration of cortex of adrenal
Few viable cortical cells remaining at time of diagnosis

Laboratory tests

ACTH levels high
Hyponatremia, leading to volume depletion, Hyperkalemia,

Addisonian crisis

Sudden increase in severity of symptoms in patients who have Addisons disease.

Etiology

Sudden onset of stress creating demand for adrenocortical hormones
Infections, surgery, trauma

Clinical features

Severe vomiting
Hypotension with vascular collapse
Coma

Prognosis

Death unless treated aggressively and quickly

Addisons gastritis : Addisonian anemia

A

Autoimmune gastritis associated with destruction of parietal cells.

Eventually leads to deficiency of Intrinsic Factor and megaloblastic anemia

Pernicious anemia was known as Addisons anemia

Albers – Schonberg **

Albers-Schonberg disease : Osteopetrosis : Marble bone disease

Hereditary defect in *osteoclast* function

Dense, brittle bones.

Etiology

Various, mostly unknown

Inability of osteoclasts to generate carbonic anhydrase in some patients

Inability of osteoclasts to make superoxide anions in others.

Clinical features

Varying severity depending on exact cause

Malignant variety (Autosomal recessive)

Multiple fractures in utero

Nerve trapping, hydrocephaly

Anemia due to marrow space obliteration

Hepatosplenomegaly (extramedullary hematopoiesis)

Frequent severe infections

Benign form (Autosomal dominant)

May present in adolescence with fractures

Patients have mild anemia and cranial nerve deficits.

Prognosis

Early death with malignant form

Bone marrow transplantation can replace defective osteoclast precursors

Albright **

Albright's Hereditary Osteodystrophy

Hypocalcemia due to end organ insensitivity to PTH (Pseudohypoparathyroidism)

Etiology

Genetic defect in hormonal signaling due to abnormality of the G protein that couples hormone receptors to adenylyl cyclase production.

Genetic mutation on 20q

Clinical features

Short, obese patients

Mental deficiency

Subcutaneous calcification

Short metacarpal and metatarsal bones.

Pathogenesis

Impaired production of cAMP in renal tubules in response to PTH
Increased urinary calcium loss

Alexander *

Alexanders disease

Failure of myelin producing oligodendroglial cells to align with neurons

Pathology

Absent myelination in CNS (normal in PNS)
"Myelin" production occurs in abnormal extracellular foci - adjacent to blood vessels and underneath the pia
Proteolipids produced by myelin producing cells assume beaded, irregular morphology
These are *Rosenthal fibers*
Rosenthal fibers have staining characteristics of myelin
Some Rosenthal fibers are seen inside glial cells.

Clinical features

Onset of symptoms in early infancy
Psychomotor retardation, dementia and early death.

Allison – Ghormley *

Allison-Ghormley bodies

These are lymphoid follicles in synovial membrane in Rheumatoid arthritis.
Lymphoid follicles with germinal centers are usually only found in lymphoid tissues but are also frequently found in chronic inflammatory sites and at sites of autoimmune damage.

Alport **

Alports syndrome

Hereditary disorder (usually X linked) characterized by
a. Glomerulonephritis,
b. Deafness,
c. Eye abnormalities (cataracts, lens dislocation etc)

Etiology

Defective collagen type IV gene (defect is in the α_5 chain)

Pathogenesis

Impaired synthesis of other collagen chains also (α_4 and α_3)
α_3 is the target antigen for anti-GBM antibodies in Goodpastures
Antibodies from Goodpasture patients don't react with GBM from patients with Alport's syndrome.

Pathology

Early: Mesangial hypercellularity with increased amount of matrix
Later: Focal and diffuse glomerular sclerosis

Tubular atrophy, interstitial fibrosis

Electron Microscopy

Characteristic thickening of GBM

Splitting of lamina densa to enclose electron lucent material.

A

Alzheimer ***

Alzheimers disease

Progressive loss of higher cortical functions due to death of neurons

Unknown etiology, incidence inversely related to level of education.

Clinical features

Onset usually after 50 years, increasing incidence with age.

<5% of individuals who are <65 years

50% of individuals at > age 85

Alterations in mood and behaviour

Progressive loss of memory

Progression to severe incapacity over many years.

Pathology

Gross appearance: Brain is shrunken

Vantricles appear enlarged.

Histology

Neuritic plaques with amyloid deposition

Foci of disorganized neuritic processes

Amyloid present in center of plaque

Neurofibrillary tangles

Filaments in cytoplasm of neurons around nucleus

Granulovacuolar degeneration

Small vacuoles in neurons (also seen in aging)

Ames ***

The Ames test

Assesses mutagenicity of chemical agents

Procedure

S typhimurium is used as the test organism

Chemicals that induce mutations in *S typhimurium* are highly likely to be mutagenic in man.

Anitschkow ***

The Anitschkow cell

Present in *Aschoff body*.

Nucleus contains a central band of chromatin.

In cross section they appear like “owls eyes”

In longitudinal section they appear banded (“caterpillar” nuclei)

Multinucleated Anitschkow cells are named “Anitschkow myocytes”

Andersen *

Andersen disease : Type IV Glycogenosis

Congenital deficiency of branching enzyme that is necessary for glycogen synthesis

Non-branched, amylopectin molecules are produced instead which are toxic to cells.

Pathology

Amylopectin found in liver, muscle, heart and brain

Abnormal molecules lead to liver cell necrosis.

Prognosis

Death from liver cirrhosis within 4 years

See also

Glycogenosis type I	*Von Gierke disease*
Glycogenosis type II	*Pompe disease*
Glycogenosis type III	*Cori disease*
Glycogenosis type V	*McArdle disease*

Angelman **

Angelman syndrome : Happy Puppet syndrome

Deletion of band q 12 on chromosome 15 – (q11-q13).

Pathogenesis

Angelman syndrome occurs when the chromosome carrying the deletion has been inherited from the mother. (See *Prader – Willi* syndrome)

The corresponding "normal" paternal gene is inactivated by *Imprinting*

The "abnormal" maternal gene is therefore the only one expressed.

Mechanism of imprinting

Differential methylation of genes during meiosis in mother and father may result in inactivation of some genes in the gametes of one or other parent prior to fertilization.

Clinical features

Mental retardation

Hyperactivity

Ataxic gait and innappropriate laughter (happy puppet)

Seizures

Antoni *

Antoni type A and B patterns of growth of Schwannomas

Type A

Highly cellular tumors

Spindle cells align to form whorling arrangement

Little background matrix

Elongated nuclei may form *Verocay bodies*

Type B
Less cellular
Spindle cells are present in a myxoid matrix
See *Schwannoma* and *Verocay bodies*

A

Argyll-Robertson ***

Argyll-Robertson pupil
Pupils irregular in shape, unequal in size
React to accommodation but not to light
Associations
Neurosyphilis
Diabetes mellitus.

Arias-Stella *

Arias-Stella reaction
Histological appearance of emdometrial glands during pregnancy
Cell nuclei are enlarged (double DNA content – prior to division)
The nuclei protrude into the gland lumen
Association
HCG stimulation
Normal and ectopic pregnancy
Trophoblast disease
Should not be confused with neoplastic change.
Similar appearance may be seen in ovarian clear cell carcinoma

Arnold-Chiari ***

Arnold-Chiari malformation
Small posterior fossa
The caudal aspect of cerebellar vermis is displaced through foramen magnum
Foramen magnum is enlarged.
Cerebellar vermis appears overlying the dorsal aspect of cervical cord.
Associations
Hydrocephalus
Lumbar myelomeningocele

Arthus **

The Arthus reaction
An in-vivo type III immunological reaction between antibody and antigen.
a. A high concentration of antibody is present in the subject.
b. Antigen is injected subcutaneously
c. Antigen diffuses through the walls of blood vessels towards the antibody
d. A “zone of equivalence” develops in the vessel wall
e. Antigen antibody complexes form

f. Complement is activated and PMNs are attracted causing inflammation at the site.

Clinical significance

This type of reaction is seen in human diseases such as Farmers lung, in which antigens from spores of thermophilic actinomycetes are inhaled and react with pre-formed antibodies in the walls of small bronchi in the host.

Aschoff ***

The Achoff Body

This lesion is the hallmark of rheumatic carditis.

Pathogenesis

Immunological reaction with cardiac antigens leading to perivascular granuloma formation.

Pathology

The Aschoff nodules are found in all parts of the heart, endocardium, myocardium and pericardium, in acute rheumatic carditis. They contain

1. a central area of fibrinoid necrosis is surrounded by
2. lymphocytes,
3. plasma cells and
4. cells of the macrophage family (*Anitschkow* cells and Giant cells)

Prognosis

Lesions heal by fibrosis. Repeated attacks lead to cumulative damage

The most serious damage occurs to the heart valves.

Askenazy **

Askenazy cells—Hurthle cells.

Metaplasia of thyroid follicular cells seen in Hashimoto's disease

Histology

Cells lining follicles have eosinophilic granular cytoplasm

May also be seen singly within thyroid gland.

The cell cytoplasm contains numerous mitochondria

Nuclear atypia often present

See also

Hurthle cells

Auer ***

Auer rods

These are structures found in cell cytoplasm in *Acute Myelogenous Leukemia*

They stain blue and appear as needle like bodies in the cytoplasm.

They are abnormal cytoplasmic granules and contain peroxidase.

Auer rods are especially numerous in M3 type (Acute promyelocytic leukemia)

Associations

Disseminated intravascular coagulopathy may occur
Auer rods are potent activators of coagulation.

A

Auerbach **

Auerbachs plexus

Nerve plexus that is located between the two muscle layers of the intestinal wall
Connected to Meissner plexus in the submucosa
Congenital absence in *Hirschsprung's disease*

Auspitz **

The Auspitz sign

A clinical sign found in *Psoriasis*
Several punctate bleeding spots are exposed if scales are removed from lesions.

Azzopardi *

The Azzopardi effect

Seen in small cell carcinoma of the lung
DNA from necrotic cells is present in blood vessel walls
Results in basophilic staining (Hematoxylin)

B

Barr ***

Barr body

Irreversible inactivation of second (or more) X chromosomes that occurs early in embryogenesis.

(*Lyon* hypothesis)

Random inactivation of either paternal or maternal X chromosome in females.

Inactivation is permanent and is passed on to all progeny.

Every organ will have a mosaic of cells, some with maternal and some with paternal X inactivation

Demonstration

Barr bodies are visible as dark bodies attached to nuclear membrane

Easily seen in buccal mucosal cells

Functional aspects

Some genes on "inactivated" X chromosome are active during life

"Inactive" X chromosome becomes "active" in preparation for gametogenesis

Extra X chromosomes ("Superfemales") become extra Barr bodies.

Bartholin **

Bartholin gland cyst

Obstruction to gland duct leads to accumulation of mucoid material

Cysts located laterally just inside vaginal introitus.

Associations

May become infected : Bartholin gland abscess

Barrett ***

Barrett esophagus

Metaplasia of lower end or the esophagus from squamous to columnar epithelium

Etiology

Gastro-esophageal reflux

Other etiological factors

Males > females, smoking

Associations
Thirty-fold risk of adenocarcinoma
Risk related to extent of involvement of esophagus by metaplasia

Bechet *

Bechets syndrome
Vasculitis associated with oral and genital ulceration.
Etiology
Unknown, possible immunological etiology
Association with some MHC alleles.
Pathology
Fibrinoid necrosis of walls of medium and large arteries.
Thrombosis, aneurysm formation, hemorrhages.
Associations
Involvement of other organs, Eyes, CNS, GIT, CVS.

Becker **

Becker muscular dystrophy
Genetic abnormality of the dystrophin gene (21p)
Dystrophin molecules *are* produced but are shorter than normal
Immunochemical staining for dystrophin is reduced but present.
Clinical features
Similar to *Duchenne* muscular dystrophy *except*
Later in onset
Milder (>90% patients survive past 20 years)
Not associated with mental deficiency

Beckwith–Wiedermann *

Beckwith-Wiedermann syndrome
Genetic disorder associated with increased incidence of Wilms tumor
Clinical features
Enlarged body organs, hemihypertrophy, renal cysts, adrenal cytomegaly.
Etiology
Genetic abnormality chromosome 11 (near Wilms tumor gene WT-1)
Associations
Wilms tumor
Tumors of other organs (liver, adrenal, muscle, pancreas)

Bence-Jones ***

Bence Jones protein
Free, monoclonal, light chains of immunoglobulin molecules
22 kD molecular weight, therefore escape into urine.

Heat test

Originally described by Bence Jones
Urine becomes turbid as it is heated to 70^0 C
Urine becomes clear again when heated above 90^0 C
Not as sensitive as electrophoresis – monoclonal band evident

Associations

Multiple myeloma (90%of patients will have BJ protein)
(20% have BJ protein *only* – *without* serum monoclonal protein)
Waldenstrom's Macroglobulinemia
Amyloidosis (type AL)

Complications

Precipitation in renal tubules leading to tubular necrosis and renal failure.

Bernard – Soulier ***

Bernard-Soulier syndrome : Giant platlet syndrome

Autosomal recessive disorder : defective platlet adhesion to collagen

Etiology

Defective platlet receptor for vonWillebrand factor
(Glycoprotein Ib-IX)

Clinical features

Bleeding into skin, mucous membranes. Usually mild

Pathology

Thrombocytopenia with giant platlets on blood film

Birbeck **

Birbeck Granules

Microscopic structures evident on electron microscopy in Langerhans cells.
They are rod shaped, expanded at one end with the appearance of a tennis racket.
Langerhans cell marker – CD1a

Associations

Langerhans cell histiocytosis—Histiocytosis X
Eosinophilic granuloma
Hand – Schuller – Christian disease
Letterer – Siwe disease

Bitot *

Bitot spots

Associated with Vitamin A deficiency

Pathology

Regions of keratin accumulation on anterior aspect of cornea

Associations

May lead to corneal ulceration and blindness eventually.

Bloom *

Bloom syndrome

Autosomal recessive disorder

Patients have a predisposition to chromosomal breakage

Sensitive to ionizing radiation

Clinical features

Patients may have other developmental defects

Telangiectasia, dwarfism.

Associations

Leukemia, other tumors.

Related to *Fanconi syndrome* and *Ataxia Telangiectasia*

Boeck ***

Boecks Sarcoid

Sarcoidosis was originally described by Boeck.

Boerhaave ***

Boerhaave syndrome

Rupture of esophagus caused by severe retching

cf Mallory – Weiss syndrome

Access of contents of esophagus to mediastinum

Grave prognosis

Bourneville *

Bournville disease : Tuberous sclerosis

Autosomal dominant condition characterized by

Hamartomas in CNS, "tubers" in cortex (neurons and "neuro- glial" cells)

sub-ependymal astrocytic nodules

Benign tumors : Kidney (angiomyolipoma), heart, lungs, skin.

Cysts : Liver, kidney, pancreas

Etiology

Two genetic defects – same syndrome

TSC1, chromosome 9q – Encodes hamartin (function unknown)

TSC2, chromosome 16p – encodes tuberin – GTP-ase activator

Clinical features

Seizures, mental retardation.

Association

Subependymal glial hamartomas may develop into giant cell astrocytoma.

Bowen ***

Bowen disease

Carcinoma in situ on shaft of penis in men over 35 years of age and on the vulva of older women.

Etiology

HPV 16 (usually) and 18

Clinical features

Demarcated erythematous or white single lesion on skin

Pathology

Typical carcinoma in situ, cellular atypia, mitoses.

Basement membrane is intact.

Associations

Increased incidence of visceral cancer

Erythroplasia of Querat is a related disorder that affects the glans penis

Bowenoid Papulosis

Benign papular lesions affecting shaft of penis in younger men

Etiology

HPV 16 and HPV 18

Clinical features

Multiple red or brown papules on skin

Pathology

Indistunguishable from that of Bowen disease – may resemble carcinoma in situ

Prognosis

Benign lesions – do not progress to carcinoma.

Brenner **

Brenner tumor

Ovarian tumor that arises from celomic epithelium

Histology

Nests of transitional cells within fibrous stroma

May have mucin secreting cells forming glands in center of cell nest

Prognosis

Most tumors are benign

Brill–Zinsser *

Brill-Zinsser disease

Reactivation infection by *R. prowazakii* (Typhus)

May occur many years after initial infection in some patients.

Milder course than primary infection.

Brodie *

Brodie abscess

Associated with osteomyelitis

Focus of infection within bone, surrounded by new bone formed by periosteum and endosteum.

*Brunn**

Brunns buds

Budding of urinary tract epithelium into lamina propria

The buds remain in contact with the overlying epithelium

Brunns nests

Groups of epithelial cells located in the lamina propria of the urinary tract

They are not connected to the overlying epithelium

Associations

Chronic inflammatory conditions of the urinary tract

Brushfield *

Brushfield spots

Speckling of the iris in patients with Down syndrome

Bruton ***

Brutons disease

Described the first immunodeficiency disease – hypogammaglobulinemia in a young boy who had recurrent bacterial infections.

Etiology

Genetic defect in btk gene (Bruton's thyrosine kinase)

Failure of development of cells of B lineage

Failure to produce normal amounts of all classes of antibodies

Clinical presentation

Onset 6 months (maternal Ig protects until then)

Severe recurrent bacterial infections

Sinuses, Ears, Respiratory tract especially

Difficult to clear with routine antibiotic therapy

Pathology

Absence of B lymphocytes and plasma cells

Tonsils small

Serum Immunoglobulin levels low for all classes (not totally absent)

Prognosis

Good when treated with gamma globulins.

Budd – Chiari ***

Budd-Chiari syndrome

Thrombosis of hepatic veins and tributaries

Etiology

Polycythemia rubra vera
Pregnancy and post partum
Oral contraceptive use
Carcinomas (esp hepatocellular carcinoma)
Idiopathic (30%)

Clinical features

Acute and chronic types
Abdominal pain
Ascites
Hepatomegaly

Prognosis

High mortality unless surgically treated.

Burkitt ***

Burkitts lymphoma

B lymphocyte tumor that has a characteristic histological appearance

Types

Endemic African type
Sporadic Burkitt's lymphoma occurring elsewhere, including US
Associated with HIV

Etiology

EBV infection in African type
Association with malaria infection
EBV in 25% of Sporadic type

Clinical presentation

Usually presents in childhood
African type
Tumor of jaws, Abdominal organs (ovary, kidney, adrenal)
Sporadic
Tumor involvement of ileum and cecum

Pathology

"Starry sky" pattern
Diffuse sheet of intermediate size lymphoid cells
Phenotypically these are B cells (IgM, CD 19, 20)
Interspersed normal macrophages
(these are the "stars" in the starry sky)

Prognosis

High mitotic index
Large cell turnover – the macrophages are phagocytosing cell debris

Rapidly fatal if untreated
Excellent response to chemotherapy

Byler *

Byler syndrome

Defective secretion of bile salts and phospholipids with cholestasis
Autosomal recessive disorder (original description in Amish)
Leads to cirrhosis

Clinical features

Progression to cirrhosis within two years

Associations

Retinitis pigmentosa
Mental retardation

C

Call–Exner **

Call-Exner bodies

These are a histological feature of Granulosa cell tumors of the ovary.

Morphology

Cells of the tumor become arranged around a central necrotic region.
Resemble immature follicles
Nuclei tend to "palisade" pointing inwards towards center.

Caplan ***

Caplan syndrome

Association of Rheumatoid arthritis with a pneumoconiosis
Coal workers pneumoconiosis, Silicosis, Asbestosis,

Pathology

Nodular lesions especially at periphery of lung
Histologically similar to rheumatoid nodule
Central area of necrosis
Surrounded by epithelioid cells and fibroblasts.

Caroli *

Caroli disease

Multiple dilatations of intrahepatic part of biliary tree

Association

Predispose to infection (cholangiitis)
Intrahepatic cholelithiasis

Chaga **

Chagas disease

Infection by *Trypanosome cruzi*

Clinical features

Acute infection
usually mild cardiac damage
Chronic Chagas disease
>5 years after initial infection

Cardiac and intestinal manifestations

Mechanism of damage in chronic Chagas disease

Autoimmune damage to heart muscle and nerves

Complications

Dilated cardiac failure

Damage to myocardium and conductance pathways

Mega esophagus

Mega colon

Both due to damage to myenteric plexus

C

Charcot **

Charcot joints

Mechanical damage to joints in patients who have sensory loss due to tabes dorsalis

Charcots triad

Biliary colic, spiking fevers and chills, and jaundice

Significance

Associated with cholangiitis

Charcot–Bouchard ***

Charcot-Bouchard aneurysms

Small aneurysms that occur in small cerebral arteries in hypertensive patients

Occur in vessels that are less than 300 um in diameter

Clinical significance

Rupture may occur – usually > 60 years.

Commonest cause of intracerebral hemorrhage.

Pathology

Found in basal ganglia, thalamus, cerebral hemispheres.

Charcot–Leyden ***

Charcot-Leyden crystals

Formed by aggregation of eosinophil membranes extracellularly

Crystals are needle shaped.

Association

Seen in bronchial secretions in Asthma patients

Charcot–Marie–Tooth **

Charcot-Marie-Tooth disease

Most common hereditary peripheral neuropathy

Etiology

There are several familial gene defects reported (chromosomes 17q, and 1)

The affected genes encode myelin-related proteins.

There is demyelination of peripheral nerves

Clinical features

Onset in childhood

Peripheral muscle atrophy (calf muscles especially)

Muscle weakness.

Pathology

Demyelination present in peripheral nerves.

Cycles of remyelination lead to development of *"onion bulb"* appearance

(Layers of Schwann cells surrounding peripheral axons)

Chediak–Higashi **

Chediak-Higashi syndrome

Autosomal recessive disorder characterized by inability of lysosomal membranes to fuse with other membranes.

Patients have impaired enzyme release from lysosomes – into other organelles or extracellularly.

Etiology

Lysosomal membrane protein involved in "docking" with other organelles is defective.

Pathology

Affected cells have *giant cytoplasmic granules*

PMNs, lymphocytes, melanocytes, nerve cells, platlets

Clinical features

Recurrent infections – especially skin and mucus membranes

(PMN and cytotoxic T cell abnormalities)

Nerve defects, bleeding disorders, albinism.

Christmas ***

Christmas disease : Hemophilia B

X linked recessive disorder – several different types of gene defect described

Absent or non-functional Christmas factor (Factor IX.)

Clinical features

Patients may be asymptomatic or may have a bleeding tendency

Symptoms similar to hemophilia A but milder.

Laboratory tests

Prolonged PTT

Normal PT test.

Factor IX assay shows low levels or non-functioning molecule.

Churg-Strauss **

Churg-Strauss syndrome

Association of asthma, eosinophilia and vasculitis.

Etiology

unknown

Clinical features

Early : Asthmatic symptoms with eosinophilia, pneumonia

Later : Systemic vasculitis involving especially lung, heart, peripheral nerves

End stage : Hypertension and cardiac failure contributed to by coronary arteritis and myocarditis

Pathology of vasculitis

Pleomorphic infiltrate of inflammatory cells

Eosinophils, PMNs, lymphocytes, macrophages, giant cells.

C

Chvostek **

Chvosteks sign

Induction of muscular contraction of ipsilateral facial muscles by tapping on facial nerve – due to neuromuscular irritability

Association

Hypocalcemia.—hypoparathyroidism

Codman **

Codmans triangle

This is a radiological feature of osteosarcoma. It is seen where the periosteum has been lifted from the bone by the tumor.

Associations

Radiological : Sunburst pattern of new bone formation by periosteum

Histological : Osteoid deposition by tumor cells

Colles **

Colles Fracture

Impaction fracture of lower end of the radius.

Caused by falling on outstretched hand.

Association

Osteoporosis

Conn ***

Conns syndrome

Excessive secretion of Aldosterone by adrenal gland

Usually affects women (3 : 1) age 30 – 50 years

Etiology

Almost always caused by adenoma of adrenal cortex

Less commonly, hyperplasia of adrenal cortex

Clinical features

Patients often come to attention because of their hypertension.

They may complain of muscle weakness and parasthesias (hypokalemia)

Polyuria and polydipsia may be present

Laboratory tests

Elevated aldosterone levels.
Low renin
Sodium high, potassium low.

Cooley **

Cooley anemia

Homozygous beta- thalassemia

Etiology

Two defective genes for hemoglobin β chain

Clinical presentation

Severe anemia
Hepato – Splenomegaly (extramedullary hematopoiesis)
May have hypersplenism – destruction of WBCs and platlets.
Distorsion of cranial bones (due to excessive hematopoiesis)

Pathogenesis

α chains produced normally, precipitate in RBCs
Lead to destruction of mature RBCs and precursors in spleen
Contributes to splenomegaly
Erythropoietin is produced in response to the severe anemia and this causes intense stimulation of bone marrow and extramedullary hematopoiesis

Pathology

Hypochromic, microcytic anemia with Anisocytosis and Poikilocytosis,
Target cells present
Primitive RBC precursor cells also present
(especially if spleen is removed)

Prognosis

Better with use of Iron chelators.

Coombs **

The Coombs test

Used to diagnose autoimmune hemolytic anemia

Principle

a. The patient's red cells are coated by autoantibodies in vivo
b. Add an antibody to patient's cells that is specific for Human IgG
c. If autoantibodies are bound to the surface of the RBCs, this second antibody will cause the cells to agglutinate.

Cori *

Cori disease : Glycogenosis type III

Autosomal recessive deficiency of debranching enzyme.

Clinical features

Accumulation of substrate in liver and muscle
Hepatomegaly, growth retardation, myopathy

Pathology

EM shows glycogen granules in affected cells.

See also

Glycogenosis type I	Von Gierke disease
Glycogenosis type II	Pompe disease
Glycogenosis type IV	Andersen disease
Glycogenosis type V	McArdle disease

Councilman ***

Councilman body

It is a liver cell that has undergone apoptosis

Appearance

Acidophilic, round body, nucleus has undergone autolysis
Present in sinusoids.

Etiology

Viral infection, autoimmune attack by T cells.

Courvoisier *

Courvoisiers law

A palpable gallbladder (*Courvoisiers sign*) in patients who have obstructive jaundice indicates that the cause of the obstruction is carcinoma of the head of the pancreas If the gallbladder is not enlarged then the likely cause of the obstructive jaundice is a gallstone

Rationale

Gallstones are associated with chronic cholecystitis
The wall of the gallbladder is likely to be fibrosed and therefore cannot expand when intraluminal pressure increases.
Patients who have carcinoma of the head of the pancreas are unlikely to have a fibrosed gallbladder.

Cowdry *

Cowdry type A inclusions

Intranuclear inclusion bodies associated with viral infections
Adenovirus : inclusions are present in bronchial cells.
Herpes simplex : inclusions present in cells in skin or mucous membrane lesions.

Creutsfeldt–Jacob ***

Creutsfelt-Jacob disease

Spongiform degeneration of brain caused by prion

Types of CJD

Hereditary
Sporadic forms (onset at 65 years)
Iatrogenic (eg growth hormone preparations—now uncommon)
New-variant CJD (onset at 25 years)

Pathogenesis of sporadic form

PrP (chromosome 20p) is a normal cell membrane glycoprotein
Especially found in neurons.
Normal PrP^{c} (cellular) identical to PrP^{sc} (scrapie variant) in amino acid sequence.
Post translational change enables PrP^{sc} to assume beta-pleated sheet configuration—resistant to proteolysis—accumulates and kills neurons. .
PrP^{sc} can induce PrP^{c} to become PrP^{sc} – autocatalytic process.

Clinical presentation

Sporadic type : Rapidly progressive dementia (< 12 months), myoclonus
vCJD : Behavioural and sensory disturbances, longer time course.

Pathology

Vacuolation in grey matter – loss of neurons.
Astrocytosis
Absence of inflammatory response

Crigler–Najjar ***

Crigler-Najjar syndrome

Congenital deficiency of bilirubin UGT in liver.
Type I : Complete absence of bilirubin-UGT
Fatal within 12 – 18 months – Kernicterus
Type II : Some bilirubin-UGT is present
Severe jaundice but otherwise patients are normal.
Some may develop neurological symptoms.

Pathology

Liver histology is normal in both types.
Bile is pale in Type I

Crohn ***

Crohns disease

Inflammatory bowel disease affecting entire thickness of the wall

Etiology

Immunologically mediated damage
Microorganism?

Clinical presentation

Abdominal pain (right lower quadrant), diarrhea, blood in stools.
May mimic acute appendicitis

Pathology

Involves any part of GIT but especially terminal ileum and colon

Skip lesions
Lumenal narrowing (due to edema in early stage, fibrosis later)
Linear fissuring on mucosa (cobblestone appearance)
Tendency to *fistula* formation – to other bowel loop, elsewhere.
Histology—acute phase
Edema of wall
Chronic inflammatory cell infiltrate (lymphocytes, plasma cells)
Granulomata – non caseating (<50% patients)
Ulceration and fissuring

Associations and complications
Extra-intestinal manifestations
Cholangiitis, iridocyclitis,
Malabsorption
Intestinal obstruction – String sign
Cancer (slightly increased risk)

Crooke **

Crookes hyaline degeneration
Affects basophils in the pituitary gland.
Associated with Cushing's syndrome.
Etiology
High levels of corticosteroids
Pathology
Hyalinization of corticotrophs in pituitary
Caused by accumulation of keratin-positive intermediate filaments

Curling **

Curling Ulcers
Etilogy
Acute ulceration of gastric mucosa in patients who have extensive burns.
Ulcers may also be present in the duodenum
Pathology
The ulcers are usually shallow but may be deep enough to perforate.

Curschmann ***

Curschmann spirals
Shedding of epithelium of bronchi and bronchioles into the mucus filled lumen in asthmatic patients. Detectable in sputum.
They assume a whorled appearance.

Cushing ***

Cushing disease

Corticotroph adenoma of the pituitary causing adrenal cortical hypersecretion.
Responsible for 50% of cases of hyper-cortisolism
Affects females > males (5 : 1)

Pathogenesis

Excess production of ACTH over-stimulates adrenal cortex
Adrenal cortical hyperplasia
Elevated ACTH levels and elevated Cortisol

Cushing syndrome

Increased secretion of cortisol by the adrenal cortex

Etiology

Hyperplasia, adenoma or carcinoma of adrenal gland
Iatrogenic administration of corticosteroids (commonest cause)
Ectopic production of ACTH by tumor

Clinical features

Protein catabolism, thin arms and legs, osteoporosis
Truncal obesity (buffalo hump)
Moon face (face appears red due to visibility of blood vessels under thin skin)
Diabetes mellitus, peptic ulceration, increased incidence of infections.
Poor wound healing, abdominal striae, purpura, amenorrhea, hypertension.
Emotional and psychiatric disturbances.

Diagnosis

24 hours free urinary cortisol excretion.
Loss of diurnal pattern of cortisol secretion
Dexamethasone suppression test
Reduction of cortisol secretion if caused by pituitary ACTH secretion
No change if the cause is of adrenal origin
No change if ACTH is produced ectopically by tumor.

Cushing ulcers

Etiology

Acute ulceration of gastric mucosa in patients who have CNS trauma
Also seen in patients undergoing brain surgery
Caused by increased vagal activity

Pathology

Ulcers are often deep and tend to perforate
They may be located in esophagus or duodenum also.

D

Dane **

The Dane particle

The complete Hepatitis B virus visualized by electron microscopy.

Appearance

Central dark core

Surrounded by viral envelope (site of HBs antigen)

Darier *

Darier disease

Autosomal dominant defect in intercellular adhesion of keratinocytes

Clinical features

Appearance of warty growths (1—4 mm diameter) during childhood

Mainly on the trunk and head

Darier sign

Development of a wheal when affected skin is rubbed in patients who have mastocytosis.

Denys–Drash *

Denys-Drash syndrome

Genetic disorder characterized by gonadal dysgenesis and nephropathy

Gene defect on 11p (WT-1 gene)

Association

Most patients develop *Wilms tumor*

Descemet *

Descemet's membrane

Site of deposition of copper in Wilson's disease to form Kayser-Fleisher rings

Location

In the basement membrane of the epithelium of the cornea

De Quervain ***

DeQuervains thyroiditis : Subacute thyroiditis : Granulomatous thyroiditis

Inflammatory thyroid disorder in middle aged women.

Etiology

Onset often occurs after recent viral infection of respiratory tract.
Adenovirus, echovirus, coxsachie, mumps.

MHC association (B35) suggesting possible immunological factor.

Clinical features

Gradual onset of painful enlargement of thyroid gland.

Fever

Symptoms of hyperthyroidism in acute stage (release of stored hormones)

Pathology

Focal infiltration of thyroid gland by aggregates of macrophages (granulomata)

Macrophages are phagocytosing necrotic thyroid cells and thyroglobulin.

Multinucleate giant cells also present.

Outcome

Resolution over several weeks.

Diamond–Blackfan *

Diamond-Blackfan anemia

Defect in precursor cells for RBCs

Clinical presentation

Patients present with anemia in first year of life

Pathology

Fewer red cell CFUs in marrow

Precursor cells do not respond to erythropoietin

Outcome

Some response to Steroids (suggesting possible immune pathogenesis)

DiGeorge ***

DiGeorge syndrome

Congenital maldevelopment of third and fourth branchial pouches.

Etiolgy

Deletion on 22q in most patients

Clinical presentation

Abnormalities of structures that develop from affected branchial pouches

Facial abnormalities : Wide set eyes, low set ears, “fish mouth”

Congenital cardiac abnormalities

Absence of parathyroids : Tetany soon after birth

Absence of thymus : Severe T cell immunodeficiency

Treatment

Management of calcium homeostasis
Thymic transplant

Partial DiGeorge syndrome

Some thymic tissue present
T cell function may become normal without treatment.

Di Guglielmo *

DiGugielmo syndrome

Variant of acute myelogenous leukemia (M6b)

Features

Marrow replaced by erythroblasts
Multinucleate forms, with multipolar mitotic figures

Dohle *

Dohle body

Large blue cytoplasmic inclusion in PMNs
These are residual endoplasmic reticulum with attached ribosomes.
They are seen in PMNs in leukemoid or reactive processes.

Down ***

Down syndrome : Trisomy 21

Commonest chromosomal abnormality
Commonest cause of mental retardation

Clinical features

Typical facies, epicanthal folds, flattening of nasal bridge
Simian palmar crease
Mental retardation – IQ < 70, decreases with advancing years.

Associations

Congenital cardiac abnormaities
Duodenal atresia
Congenital megacolon
Acute lymphoblastic leukemia (15 fold risk)
Features of Alzheimer's disease in all patients by 40 years
Increased susceptibility to infection

Prognosis

Depends on cardiac status
25% of patients with cardiac abnormalities die in childhood
Others survive to mid 50s

Dressler *

Dressler syndrome

Etiology

Autoimmune reaction to heart muscle
Occurs post myocardial infraction (2 weeks – 2 months)
May occur post operatively after cardiac surgery

Clinical presentation

Chest pain due to pericarditis.
Responds to steroid therapy.

Dubin–Johnson ***

Dubin-Johnson syndrome

Inability to secrete conjugated bilirubin into biliary tract

Etiology

Genetic abnormality of secretory mechanism for bilirubin-diglucuronide

Clinical features

Intermittent jaundice, otherwise patients are usually clinically unaffected
Association with pregnancy, oral contraceptives

Pathology

Liver darkly pigmented ("black")

Histology

Accumulation of brown pigment in hepatocytes and kupffer cells
Centrilobular distribution.

Urinary findings

Excretion of conjugated bilirubin – dark urine
Coproporphyrin I excretion increased.

Duchenne ***

Duchenne muscular dystrophy

Progressive disorder of skeletal muscle with progressive necrosis of myocytes

Etiology

Deletion affecting Dystrophin gene on X chromosome
Absence of dystrophin molecule (normally located under sarcolemma)
Absence of dystrophin predisposes to membrane damage during muscular contraction
Progressive necrosis of muscle cells during life

Incidence

1 : 10,000 males.

Clinical features

Onset after the first year
Progressive debility during childhood
Patients are wheelchair bound by 10 – 12 years
Death usually in second decade from cardiac or respiratory failure

Mental deficiency also present. (Dystrophin important for neuronal function)

Pathology

Muscles may appear normal or to have increased mass

"Pseudohypertrophy" – is initially due to increase in size of individual muscle fibers and later, as muscle cells die, is caused by fat infiltration

Lab tests

Dystrophin not present under cell membrane

- muscle biopsy cytochemical assay

Elevated levels of creatine kinase

Duncan *

D

Duncan disease: X linked lymphoproliferative syndrome

X linked T cell defect

Inability to respond adequately to Epstein Barr virus infections

Clinical features

Normal response to childhood infections.

Patients develop severe infectious mononucleosis if exposed to EBV

Common cause of death

Others develop *hypogammaglobulinemia* or *lymphoproliferation*

Lymphoproliferation is initially polycolonal

Later monoclonal B cell neoplasms arise.

Dupuytren *

Dupuytren contracture: Palmar fibromatosis

Fibrous cords and nodules in palmar fascia, older persons (>65 years)

Results in flexion contracture of fingers, bilateral in 50% of cases

Etiology

Trauma

Associations

Diabetes, Alcoholism

Duret **

Duret hemorrhages

Hemorrhages in midbrain and pons caused by transtentorial herniation.

Midline location of linear hemorrhages.

Dutcher *

Dutcher bodies

Intranuclear eosinophilc inclusion bodies in plasma cells

Contains immunoglobulin molecules.

Pathogenesis

Invagination of portion of cytoplasm which contains *Russell body* into nucleus

Associations

Immune reactivity and immunocyte neoplasms (multiple myeloma)

See *Russell bodies*

E

Eaton–Lambert ***

The Eaton Lambert syndrome

A syndrome of muscular weakness, similar to myasthenia gravis.

Etiology

Autoimmune reaction to calcium channels prevents release of Acetylcholine from motor end plates in neuromuscular junction

Association

Small cell carcinoma of the lung

Clinical presentation

Muscle weakness, not relieved by anti-cholinesterase treatment.

Ebstein *

Ebstein malformation

Downward displacement of tricuspid valve into right ventricle
Upper part of right ventricle becomes part of the right atrium
Lower part of ventricle retains ventricular function

Clinical features

Lower part of ventricle undergoes dilatation
Eventually leads to heart failure
Sudden death may occur (arrythmias)

Edwards *

Edwards syndrome: Trisomy 18

Incidence 1 : 8,000

Etiology

Non-dysjunction during meiosis.

Clinical findings

Females affected four times as often as males.

1. Mental retardation
2. Abnormal facies
3. Congenital cardiac defects
4. Renal abnormalities
5. Overlapping fingers

6. Rocker bottom feet.

Prognosis

Death in early infancy.

Ehlers–Danlos ***

Ehlers-Danlos syndrome

A group of 10 genetic disorders characterized by defective collagen synthesis.

Inheritance patterns

Autosomal recessive : enzyme defects – lysyl hydroxylase (type 6)
Autosomal dominant : structural defects in collagen
X linked recessive : copper metabolism abnormality
copper is required for lysyl oxidase activity

Clinical features

Hyper-extensibility of skin, joints.
EDS 4 Tendency to rupture arteries and bowel (Type 3 collagen)
EDS 6 Rupture of aorta and eye, retinal detachment (Type1 collagen)
EDS 8 Severe periodontal disease
EDS 9 X linked recessive trait – copper metabolism defect.

Eisenmenger **

Eisenmenger complex: Eisenmenger syndrome

Late onset cyanosis in patients who have congenital heart disease.

Etiology

Patients initially have left – right shunts (ASD, VSD, PDA)
Increased blood flow through lungs damages pulmonary vasculature
Pulmonary hypertension supervenes
The direction of blood flow reverses at this time
Patients present with cyanosis (Tardive cyanosis)

Epstein-Barr ***

Epstein-Barr virus

Ubiquitous herpesvirus, spreads from person to person.

EBV receptor

Complement receptor – 2 (CD21)
Present on B lymphocytes and nasopharyngeal cells.

Clinical associations

Asymptomatic infection
Infectious mononucleosis
Burkitt's lymphoma and B cell lymphomas in imunosuppressed persons.
Nasopharyngeal carcinoma

*Erlenmeyer **

Erlenmeyer flask deformity

Radiological appearance of lower femur in *osteopetrosis*
Widening of metaphysis and diaphysis of bone
Similar in shape to the standard laboratory flask.

*Ewing ****

Ewings sarcoma

A small cell tumor of bone derived from primitive neuroectodermal cells.

Etiology

Genetic : Translocation 11 – 22
Chimeric gene (EWS1 – FLI-1) encodes for a transcription factor

Clincal features

Occurs in childhood and adolescence, boys >girls.
Painful, enlarging mass in humerus, tibia, femur or pelvis
Lesion is warm to touch, systemic symptoms common
X ray : Lytic lesion
Layers of reactive periosteal bone formation ("onion skinning")

Pathology

Grey- white tumor starts in medullary cavity but erodes through to cortex
Regions of necrosis and hemorrhage

Histology

Uniform, small round cells, Glycogen rich cytoplasm.
Homer-Wright rosettes
Cells form in a circle around fine fibrillary processes.

Prognosis

50% long term cures with modern treatment.

F

Fabry *

Fabry disease

Glycosphingolipid accumulation in endothelial and smooth muscle cells

X linked recessive disorder

Enzyme defect: α-Galactosidase A

Substrate—Ceramide Trihexose

Accumulates in lysosomes in endothelial and smooth muscles cells

Clinical features

Angiokeratomas (bathing trunk distribution)

Hypohidrosis.

Acroparasthesias – attacks of severe pain in hands and feet.

Ischemia of heart, kidneys, brain responsible for long term debility

Prognosis

Mean survival 40 years.

Fallot ***

Tetralogy of Fallot

Most common congenital heart disease comprising four elements

1. Stenosis of pulmonary outflow tract
2. Ventricular septal defect
3. Aorta is moved to right so that it over-rides the VSD
4. Hypertrophy of right ventricle

Pathogenesis

Right to left shunt – early cyanosis

Clinical features

Dyspnea and cyanosis

Retarded physical development

Polycythemia

Complications

Thrombosis (secondary to polycythemia)

Cardiac failure

Prognosis

Excellent if surgically treated.

Fanconi **

Fanconi anemia

Autosomal recessive aplastic anemia

Etiology

Several different gene defects may occur

The most frequent is a defect in Fanconi Anemia Complementation group C gene *(FACC)*

Associations

Congenital malformations

Short stature, *truncated thumbs, absent radii*, pigmentation of skin (café au lait spots), renal anomalies.

DNA instability—susceptibility to damage by radiation or chemicals. predisposition to malignancy

Fanconi syndrome

Proximal renal tubular disorder

Etiology

Genetic : Autosomal recessive, dominant and X linked inheritance

Associated with other genetic disorders

Cystinosis, galactosemia, Wilson's disease, tyrosinemia.

Features

Generalized impairment of tubular reabsorption of

Potassium, sodium, bicarbonate, amino acids, glucose, uric acid, phosphates, mild proteinuria (up to 2 gm / day)

Clinical features

Polyuria, metabolic acidosis, hypokalemia,

Associations

Rickets, osteomalacia

Felty *

Feltys syndrome

A variant of Rheumatoid arthritis characterized by splenomegaly and neutropenia

Associations

Especially seen in patients who have long-standing RA.

Predisposition to bacterial infection

Fenton *

The Fenton reaction

This is an iron-catalysed reaction in phagocytic cells. The reaction leads to the production of hydroxyl radicals which are required for bacterial killing.

*Flexner–Wintersteiner **

Flexner-Wintersteiner rosettes

Cellular arrangements that are found in *retinoblastomas*

Features

Cuboidal or columnar cells surround central lumen
Nuclei are located away from the lumenal side of the cell
Fine processes may be present in the lumen.

*Friedreich **

Friedreich ataxia

Most common inherited ataxia
Autosomal recessive inheritance pattern

Etiology

Gene defect in *frataxin* gene on chromosome 9q13
A *triplet repeat mutation* (GAA) is present in the first intron

Pathogenesis

Frataxin is involved in iron transport into mitochondria
The gene is especially expressed in heart muscle and spinal cord.

Clinical features

Onset earlier and more severe disease if GAA repeats are more numerous
Usual onset in childhood, progressive motor incoordination
Kyphoscoloisis and pes cavis are also present

Pathology

Neuronal loss from Brain stem, cerebellum and spinal cord
Axonal loss from posterior columns of spinal cord, gliosis
Myocardial cell necrosis with inflammation and fibrosis
Cardiac enlargement.

Prognosis

Patients are confined to wheelchair within 5 years
Death is usually from pneumonia or cardiac complications.

G

Gardner **

Gardner syndrome

Familial polyposis of the colon, osteomas and soft tissue tumors of skin.

Etiology

Hereditary—autosomal dominant inheritance

Defect involves FAP gene

Clinical features

Adenomatous polyps in colon

Osteomas in mandible, skull, long bones

Soft tissue tumors : fibromas, epidermal cysts.

Gartner *

Gartner duct cysts

Found in wall of vagina

Derived from remnants of Wolffian duct.

Pathology

Located submucosally

Fluid filled

Gaucher **

Gauchers disease

Accumulation or glucosylceramide in macrophage lysosomes.

Etiology

Several different defects

All involve the glucocerebrosidase gene encoding for β-glucosidase

Clinical features

Incidence 1 : 1,000 – 1 : 2,000 among Askenazy jews.

Accumulation of substrate in macrophages throughout body

Brain involved in one uncommon variant only.

Splenomegaly is always present

Hepatomegaly also common

Involvement of bone marrow leads to anemia etc.

Pathology
Accumulation of Gaucher cells in all affected organs (see below)
Prognosis
Variable expression
If brain is not involved: normal life expectancy almost
If brain is involved: death within one year

Gaucher cell
Macrophage with accumulation of glucosylceramide in lysosomes.
Features
Large cell (20 – 100 microns in diameter)
Eccentric nucleus
Cytoplasm filled with fibrillary material
"wrinkled tissue paper appearance"
Cells are strongly PAS positive
EM – parallel layers of tubular structures in lysosomes.

Gerstmann–Straussler – Wiedermann *

G

Gerstmann-Straussler-Wiedermann syndrome
Slowly progressive, familial, spongiform degeneration of brain
Etiology
Mutation in PRNP gene on chromosome 20 that encodes PrP^c
Clinical features
Present initially with ataxia
Onset of dementia late in the disease
Pathology
Spongiform findings in cerebrum, cerebellum, brain stem
Amyloid plaques
Prognosis
Prolonged course over several years.

Ghon ***

Ghon focus
TB lesion found in primary infections
Pathology
Localized granuloma at periphery of lung in response to TB infection
Typical TB granuloma
Usually located at upper part of lower lobe or lower part of upper lobe.

Ghon complex
Ghon focus with accompanying granulomata in hilar lymph nodes
Also seen only in primary infections

Gilbert **

Gilberts syndrome

Hyperbilirubinemia due to decreased production of UDP-glucuronyl transferase

Occurs in 5% of normal people – males more often affected than females.

Etiology

Recessive gene defect in promotor region of UDPG gene

Reduced production of the normal enzyme (<30%)

Clinical presentation

Usually detected around puberty

Episodic jaundice, may be associated with stress

Familial

Prognosis

Normal life expectancy.

Gitter **

Gitter cells

These are *astrocytes* that have phagocytosed lipid debris

Pathology

Astrocytes with intracytoplasmic lipid droplets appear "foamy".

Association

Tissue necrosis in CNS

Glanzmann **

Glanzmann Thrombasthenia

Autosomal recessive bleeding disorder

Etiology

Defective platlet receptor for vonWillebrand factor and Fibrinogen (Glycoprotein IIb/ IIIa)

Pathogenesis

Impaired platlet aggregation

Impaired activation of platlet cytoskeleton, which normally leads to clot contraction

Pathology

Platlet count normal

Symptoms relieved by platlet transfusion

Goldblatt *

Goldblatt kidney

Experimental procedure in which one renal artery is narrowed

Pathogenesis

The affected kidney produces renin leading to hypertension

The opposite kidney develops hypertensive changes
The "experimental" kidney is protected from the hypertensive effects because of the narrowing of the renal artery.

Clinical relevance

Similar findings seen in patient who have unilateral renal artery stenosis
Fibromuscular dysplasia of renal artery
Atherosclerosis involving renal artery.

Goodpasture ***

Goodpasture syndrome

Association of hemoptysis and acute glomerulonephritis

Etiology

Autoantibody to non-collagenous part of α_3 chain of collagen type IV
Binds to basement membranes in lung and glomerulus
Initiates type II immune reaction
Association with smoking
MHC association (DR alleles)

Clinical presentation

Usually presents in young males
Initially present with pulmonary hemorrhages
Later onset of rapidly progressive glomerulonephritis.

Prognosis

Improved by plasmapheresis to remove autoantibodies.

Graves ***

Graves disease

Hyperthyroidism caused by autoantibody to TSH receptor
Thyroid stimulating immunoglobulin (TSI)

Etiology

Autoimmunity : (females, 20 – 40 years, family history)

Clinical features

Hyperthyroidism, increased metabolic rate, heat intolerance
Weight loss, tremors, nervousness etc

Pathology

Evidence of hyperstimulation of gland
Thyroid gland enlarged, meaty.
Follicular cells become columnar and hyperplastic (papillary ingrowths into follicle lumen)
Thyroglobulin is removed from follicles
(Scalloping of edge of thyroglobulin by follicular cells)
Focal lymphocytic infiltration into gland

Associations

Exophthalmos

Pre-tibial myxedema
Family members may have other autoimmune diseases

Grotton *

Grotton lesions
Skin rash that occurs in dermatomyositis patients
Location
Knuckles, knees, elbows.
Appearance
Scaling erythematous rash.

Guillain–Barre **

Guillain-Barre syndrome
Commonest form of peripheral neuropathy
Etiology
Immunological damage to myelin
Clinical features
Onset occurs after viral or mycoplasma infections
Weakness of distal arms and legs
Weakness progresses towards trunk to involve proximal muscles
Sensory and autonomic symptoms in some cases
Pathology
Segmental demyelination of PNS
Perivascular infiltration by lymphocytes, macrophages, plasma cells
Associations
Occurs in HIV patients, and in some cancer patients
Prognosis
Usually full recovery within a month

H

Hand–Schuller-Christian *

Hand-Schuller-Christian disease

One of the clinical entities that comprise *Langerhans cell histiocytosis*

It is a clonal proliferation of antigen-presenting Langerhans cells

Clinical features

Occurs in young children (2—5 years)

Multifocal lesions

Bony lesions

Involvement of endocrine glands

Pathology

Langerhans cells

>15 microns diameter

Abundant eosinophilic cytoplasm

Birbeck granules

CD1a molecule on membranes

Intermixed inflammatory cells

Eosinophils, plasma cells, PMNs

Prognosis

Indolent, benign disorder usually

Hand-Schuller-Christian triad

Defects in calvarium, proptosis, diabetes insipidus.

Occurs in 15% of patients with the disease.

Hansen *

Hansen disease: Leprosy

Infection by *M. leprae*, first isolated by Hansen

Clinical features

Tuberculoid leprosy

Associated with good immune response

Focal lesions of skin – usually small

Bacilli are few in number in lesions

Granulomatous inflammation

Nerve involvement leads to focal loss of sensation.

Lepromatous leprosy
Associated with poor immune response
Diffuse lesions : usually large, disfiguring
Numerous bacilli inside foamy macrophages in the lesions
Lesions tend to fuse and to ulcerate

Pathology

M leprae grows best at cooler temperatures – body surfaces

Hamman–Rich ***

Hamman-Rich syndrome: Usual interstitial pneumonitis (UIP)

Inflammation and fibrosis of lung interstitium

Etiology

Immunological (20% have other autoimmune disease)
Viral (history of flu-like disease in some patients)

Clinical features

Insidious development of dyspnea
Dry cough
Progressive over 10 years
Restrictive pattern in pulmonary function tests

Pathology

Lungs are small and firm

Histology

Inflammatory infiltration in alveolar walls inearly stages
Fibrosis later with collapse of alveoli
Dilatation of bronchioles—cystic

Harrison *

Harrison groove

Indentation at lower part of rib cage in children suffering from Rickets
Induced by diaphragmatic contraction acting on softened ribs

Hashimoto ***

Hashimotos thyroiditis: Struma lymphomatosa

Inflammatory destruction of thyroid gland, goiter and hypothyroidism

Etiology

Autoimmunity : Autoantibodies to thyroid cells, thyroglobulin

Clinical features

Early stages : goiter
Later : hypothyroidism

Pathology

Enlargement of gland, which is firm and white on cross section.
Extensive inflammatory infiltration by lymphocytes
Lymphoid follicles also present

Destruction of thyroid follicles
Thyroid cells may undergo metaplastic change : *Hurtle* cells.
Associations
Other autoimmune disorders in members of family
Especially pernicious anemia but also others.
Autoantibodies to gastric parietal cells
B cell lymphoma may develop in the gland.

Heberden ***

Heberden nodes
Osteophytic lesions at the sides of the distal interphalangeal joints
Association
Osteoarthritis in women

Heinz ***

Heinz bodies
Precipitation of insoluble globin molecules in cytoplasm of red cells.
Associations
Hemoglobinopathies
Glucose-6-phosphate dehydrogenase deficiency
Effects
Removal of Heinz bodies occurs in the spleen
Shortening of RBC life expectancy

Hirano **

Hirano bodies
Inclusion bodies found in hippocampal pyramidal cells in Alzheimers disease
Appearance
Elongated eosinophilic bodies, consisting of beaded filaments
Actin present in filaments.
Associations
Also found in aging brains but to a lesser extent than in Alzheimer's

Hirschsprung ***

Hirschsprungs disease
Failure of innervation of part of colon during development
Ganglion cells absent from *Auerbach* and *Meissner* plexuses
Aganglionic segment extends from rectum upwards
Clinical features
Incidence—1 in 5,000 live births, males > females (4 : 1)
Failure to pass meconium after birth
Constipation
Abdominal distention

Infections may supervene
May progress to perforation

Pathology
Affected segment is contracted
Colon is dilated proximal to affected region
Ganglion cells absent from affected segment

Cytochemistry
Acetylcholinesterase accumulation in affected segment

Associations
Ten-fold increased in incidence in Down syndrome patients

Hodgkin ***

Hodgkins disease
Neoplastic disorder of Reed-Sternberg cells (see later)

Etiology
Epstein Barr virus? possibly other infectious agents?

Clinical features
Bimodal age distribution – 20 years and 50 years
Painless cervical lymphadenopathy as initial symptom usually
Spread to contiguous nodes

Pathology
Four histological subtypes

Lymphocyte predominant	(< 5%)
Lymphocyte depleted	(< 5%)
Mixed cellularity	(25%)
Nodular sclerosing type	(70%)

Associations
Systemic manifestation (<50%)
Fever, (*Pel-Epstein fever*), night sweats, weight loss
Skin anergy
Pain in affected nodes if alcohol is taken in <10%of patients

Homan **

Homans sign
Diagnostic clinical test for deep venous thrombosis in the leg.
The patient complains of pain when the foot is forcibly dorsiflexed.

Homer–Wright **

Homer-Wright rosettes
Histological structures seen in Retinoblastomas and in Ewings sarcoma.
Radially arranged tumor cells surrounding central tangle of fibrils

Horner **

Horner syndrome
Comrises four features
Enophthalmos (eye sunken in socket)
Ptosis (upper lid drooping)
Miosis (constriction of pupil)
Anhydrosis
Findings are unilateral
Associations
Apical cancers of the lung (Pancoast tumors)

Howslip *

Howslips lacunae
Areas of bone that have been recently resorbed by osteoclasts
Appearance
Scalloping of the edge of the bone trabecula at site of osteoclastic resorption.
Associations
Especially prominent in hyperparathyroidism

Hunner **

Hunner ulcers
Chronic ulceration of urinary bladder mucosa in interstitial cystitis.
Etiology
Autoimmune
Association with other autoimmune disorders—SLE
Clinical presentation
Symptoms of cystitis – dysuria, frequency etc
Sterile urine
Pathology
Chronic inflammation and fibrosis throughout wall of bladder
Mast cells especially notable
Acute inflammation and ulceration of mucosa
Granulation tissue also present

Hunter **

Hunter syndrome: Mucopolysaccharidosis II (MPS II)
X linked genetic disorder (all other MPS are autosomal recessive)
Mucopolysaccharide accumulates in lysosomes of cells of the body.
Macrophages, endothelial cells, smooth muscle cells.
Clinical features
Hepatomegaly during first year of life
Varying degrees of severity

May be associated with mental deficiency
Corneal clouding is NOT present (it is present in Hurler's syndrome)

Prognosis

Death usually during teenage years

Huntington ***

Huntingtons chorea

Autosomal dominant disorder, gene on chromosome 4.
Characterized by movement disorders and dementia

Etiology

This is one of the triplet repeat mutation disorders
CAG repeats present in coding region – polyglutamine regions.
Abnormal protein produced—named Huntingtin,
This is toxic to neurons

Clinical features

Onset of involuntary movements and progressive dementia after age 30
Onset earlier in patients who have more "repeats".
Anticipation—disease worse in succeeding generations.

Prognosis

Progressive over several years
Death usually occurs from intercurrent infections.

Hurler **

Hurler syndrome: Mucopolysaccharidosis I (MPS I)

Autosomal recessive disorder
Accumulation of mucopolysaccharides in various cells

Etiology

Deficiency of α-1 iduronidase
Accumulation of glycosaminoglycans in lysosomes

Clinical features

Hepatosplenomegaly within 1 – 2 years
Stunting of growth,
Corneal clouding present
Coarse features

Hutchinson *

Hutchinsons teeth

Notching of permanent incisors, found in congenital syphilis

Hutchinsons freckle : Lentigo Maligna Melanoma

Subtype of Malignant melanoma

Etiology

Sun exposure

Pathology
Macular lesion with melanoma cells located in basal layer
Invasion not prominent during the radial growth phase

Hurthle *

Hurthle cells
Altered thyroid follicular cells with eosinophilic cytoplasm.
Cytoplasm contains numerous mitochondria
Nuclear atypia may be present
Association
Hashimoto's thyroiditis
See also
Askenazy cells

Hurthle cell tumor
Rare benign tumor of thyroid gland composed of Hurthle cells

I

Ito *

Ito cells

Situated in the space of Disse, between hepatocytes and sinusoidal epithelial cells

Normally store Vitamin A

Clinical significance

They may transform into myofibroblast cells if stimulated

Stimulants include inflammatory cytokines and toxins

Inflammatory cytokines can be produced by Kupffer cells

Ito cells are responsible for deposition of collagen in cirrhosis.

J

Jones ***

Jones criteria for the diagnosis of Rheumatic Fever

This is a list of clinical findings, some designated "Major" others "Minor"
2 major or 1 major and two minor criteria are required for diagnosis.

Major criteria

Carditis
Migratory polyarthritis
Sydenham's chorea
Subcutaneous nodules
Erythema marginatum

Minor criteria

Include Fever, Arthralgia, Raised ESR, CRP, Prolonged PR interval

Plus

Evidence of recent infection by Group A streptococcus
Positive culture for the organism or increasing antibody titers. (ASOT)

JC ***

JC virus

Etiologic agent of Progressive Multifocal Leukoencephalopathy (PML)
It is a papova virus related to SV 40
Infects oligodendroglial cells leading to demyelination

Clinical features

Insidious onset of neurological symptoms
Weakness, dementia, ataxia, blindness.
Rapid downhill course over 6-8 months.

Pathology

Affects white matter of CNS—especially cerebrum and brain stem
Multiple areas of demyelination
Ranging from small to massive lesions
Intranuclear virus particles are present in adjacent oligodendroglial cells.
Pronounced astrocytosis – with some pleomorphism

Associations
Immunosuppression
Occurs in up to 3% of AIDS patients
Astrocytomas may develop

Job *

Job syndrome : Hyper IgE syndrome
Inherited immunodeficiency syndrome
Characterized by recurrent infections by S. aureus
Etiology
Impaired PMN motility in some patients.
Clinical features
Recurrent skin and sino-pulmonary infections
Inadequate inflammatory response
Patients clinical condition appears good in relation to extent of infection
"Cold abscesses"—infections with minimal inflammation
Associations
Very high IgE levels

K

Kallman *

Kallmann syndrome

Hypogondism and anosmia

Etiology

X linked recessive disorder affecting KAL gene

Abnormal neuronal migration of neurons from olfactory anlage to hypothalamus

Pathogenesis

Absence of secretion of gonadotrophin-releasing hormone (GnRH)

Clinical features

Failure of secondary sexual characteristics to develop at puberty.

Associations

Cleft palate

Kaposi ***

Kaposi Sarcoma

Malignant tumor of endothelial cells

Etiology

HHV 8

Clinical features

Four types

Classical type:	Older men, eastern Europe
Lymphadenopathic:	Young children, Africa
Transplant associated:	Related to immunosuppresive therapy
AIDS associated:	Homosexual men

Pathology

Typically red – blue nodular skin lesions, lower extremities

Hstology

Vascular channels in a *spindle cell stroma*

Kartagener ***

Kartagener syndrome

Bronchiectasis, Sinusitis, Dextrocardia (Situs inversus sometimes)

Etiology
Abnormality of *Dynein*
Ciliary immotility
Associations
Infertility : defective ciliary function in vas deferens and fallopian tubes.

Kawasaki **

Kawasaki syndrome: Mucocutaneous lymph node syndrome
Arteritis in young children
Etiology
Infection: parvovirus B19
Epidemics occur in Japan
Inappropriate immune response
Clinical features
Involvement of blood vessels throughout body
Coronary arteries especially involved
May lead to aneurysm / thrombosis
Death in 1% of patients
Pathology
PMN infiltration of vessel walls
Fibrinoid necrosis in severe cases
Prognosis
Self-limiting unless cardiac complications supervene
Most common cause of death from acquired heart disease in children

Kayser–Fleisher ***

Kayser-Fleischer rings
Deposits of copper in Descemet's membrane in cornea in Wilson's disease
Golden colored pigmentation
Associations
Indicate that copper is also being deposited in the brain.

Kennedy *

Kennedy Syndrome: Bulbospinal atrophy
Neurologic disorder involving distal muscles and bulbar nuclei
X linked
Etiology
Triplet repeat mutation in androgen receptor (CAG – polyglutamine)
Clinical features
Onset in adult life
Atrophy of muscles
Dysphagia
Tongue fasciculations

Associations
- Azoospermia
- Testicular atrophy
- Gynecomastia

Kerley *

Kerley B lines
- Radiological finding in lower lobes of patients with early pulmonary edema
- Linear shadows caused by edema fluid in lobular septae

Etiology
- Left heart failure
- Fluid overload

Clinical features
- Patient may be asymptomatic at this stage
- Usually progresses to development of intra-alveolar edema

Kernig *

Kernig's sign
- Flexion of hip causing pain in the leg

Association
- Meningeal irritation

Kikuchi *

Kikuchi disease
- Necrotizing cervical lymphadenitis
- Immunoblasts and macrophages infiltrate nodes.
- Affects younger women

Etiology
- Unknown: Virus suspected

Outcome
- Resolution within 6 months

Kimmelstiel–Wilson ***

Kimmelstiel-Wilson disease: nodular glomerulosclerosis
- Eosinophilic nodules in periphery of glomeruli in diabetic patients

Etiology
- Non-enzymatic glycosylation of proteins

Pathology
- Two patterns
  1. Nodular (K-W nodules)
  2. Diffuse thickening of basement membranes

Prognosis
- Progression to renal failure over many years in 20 – 50% of patients

Require renal transplantation.

Associations

May develop nephrotic syndrome

Klatskin **

Klatskin tumor

Cholangiocarcinoma occurring at junction of right and left hepatic ducts

Clinical features

Jaundice, hepatomegaly, gall bladder normal size

Pathology

The tumor is an adenocarcinoma

There is a prominent fibroblastic response

Prognosis

Better than with other cholangiocarcinomas.

Slowly growing

Metastasizes less frequently

Kleinefelter ***

Kleinefelters syndrome

Genetic disorder characterized by XXY genotype

Etiology

Nondysjunction during meiosis

Clinical features

Tall thin boys with long legs

Normal pubertal changes do not occur

Small testis, poor masculinization, gynecomastia

High pitched voice, female hair distribution

Infertility

Slightly reduced intelligence

Pathology

Atrophy of seminiferous tubules

Laboratory tests

Elevated FSH

Low testosterone levels

Elevated estradiol levels

Associations

Extra X chromosomes may be present

Associated with more profound abnormalities

Knudson ***

Knudson "two-hit" hypothesis of oncogenesis

Defects in both alleles of a tumor suppressor gene are required for cancer to develop

Hereditary cancer patients are born with one defective gene
Examples : Retinoblastoma, *Li Fraumeni syndrome*
If the single normal gene is damaged during life (second "hit") cancer can arise
In normal individuals both alleles have to be damaged during life to cause cancer

Koch **

Kochs bacillus
Original name for *M. tuberculosis*

Kochs postulates
Requirements to confirm that a particular organism causes a specific disease.
1. Organism must be isolated from all cases of the disease
2. Organism must be cause disease in experimental animal
3. Organims must be isolated from the experimental animal
4. It must be capable of causing the same disease in another animal

Koebner *

Koebner phenomenon
Development of Psoriatic lesions at site of previous trauma in psoriasis patients
Proposed pathogenesis
Trauma unmasks skin antigens against which an immune response is mounted

Kohn **

Pores of Kohn
Intercommunicating pores in alveolar walls that allow direct access from one alveolus to the next.
Clinical significance
Allow infectious organisms to spread to adjacent alveoli
Especially in Lobar pneumonia.

Koplik *

Kopliks spots
White spots against a background of an inflamed, buccal mucosa.
Indicative of *measles* infection

Korsakoff ***

Korsakoff psychosis
Retrograde amnesia with confabulation (imaginary memories)
Associated with chronic alcoholism but also seen in other mental disorders

Krabbe *

Krabbe Disease

Autosomal recessive leukodystrophy

Etiology

Absence of *galactocerebroside β-galactosidase*

Galactocerebroside converted to galactosphingosine via alternate pathway

Galactosphingosine is toxic to oligodendroglial cells.

Clinical features

Motor dysfunction within 3 months of birth

Pathology

Absence of myelin in CNS and peripheral nerves

Globoid cells – multinucleate macrophages surrounding blood vessels

Prognosis

Death within two years

Krukenberg ***

Krukenberg tumor

Secondary adenocarcinoma of the ovary – Primary tumor in the stomach

Pathogenesis

Transcelomic spread of tumor cells

Pathology

Tumor contains signet ring cells

Kveim *

The Kveim test

Used in the diagnosis of Sarcoidosis.

Methodology

Kveim "antigen" is obtained from spleen of a patient who has sarcoidosis

Antigen is injected to perform a DTH type skin test similar to Mantoux

Injection site is biopsied several weeks later

Macrophages are present if the test is positive

This test is of *historical interest only* and is no longer used

L

Laennec **

Laennec cirrhosis: Alcoholic cirrhosis
Laennec also invented the stethoscope

Lambl *

Lambl excrescences
Organized thrombi on aortic and mitral valves
Clinical features
Seen in older people
Of no clinical significance
Pathology
Small nodules on *lines of closure* of affected valves

Langerhans ***

Langerhans cells
Cells of the monocyte-macrophage series
They are located as a network within the epidermis and elsewhere
They present antigen to immune system
Identification
Express MHC class I and class II nolecules
Receptors for Fc IgG and C3.
Express CD1a antigen and S-100 protein
Contain *Birbeck granules* in cytoplasm

Langerhans cell histiocytosis : Histiocytosis X
Tumor of Langerhans cells
There are three related disorders included under this heading
Hand-Schuller-Christian disease
Letterer-Siwe disease
Eosinophilic granuloma

Langhan **

Langhans giant cells
Associated with granulomas.
Formed by fusion of epithelioid cells.
Multiple nuclei are arranged peripherally as distinct from *Foreign Body* giant cells where the nuclei are arranged in the center of the cell.

Langhans cells
Term used for cytotrophoblast cells.

Lambert–Eaton ***

Lambert-Eaton syndrome
See "Eaton-Lambert syndrome"

Leigh *

Leigh disease
Abnormal *mitochondrial enzyme*
Impaired ATP production
Autosomal recessive disorder
Clinical features
Lactic acidemia
Various neurological deficits
Pathology
Random regions of necrosis of brain tissue
Prognosis
Death within 2 years.

Leishman-Donovan *

Leishman-Donovan bodies
Multiple cytoplasmic dots in macrophages
Associated with cutaneous Leishmaniasis
Pathology
Each "dot" represents an amastigote of the organism.

Lesch–Nyhan ***

Lesch-Nyhan syndrome
Deficiency of HGPRT (hypoxanthine-guanine-phosphobirosyl transferase)
Impaired purine salvage leads to increased purine synthesis
Increased uric acid production
X linked inheritance
Clinical features
Hyperuricemia

Neurological defects
Mental retardation, *self mutilation*
Gout (after age 20 and not in all patients)

Letterer–Siwe *

Letterer-Siwe disease
One of the clinical syndromes that comprise Histiocytosis X
Tumor of Langerhans cells
Clinical features
Occurs in infants and adults
Skin rash—especially scalp, face and trunk
Lymphadenopathy
Visceral involvement
Pulmonary eosinophilia
Osteolytic bone lesions
Pathology
Langerhans cells present
Variable accompanying cellular infiltration
Prognosis
Infancy—aggressive behaviour
Adults—more benign

Lewis *

Lewis triple response
Sequence of events that occurs when skin is firmly stroked by blunt object (pen)
White line – vasoconstriction
Red line – vasodilatation
Wheal—edema
Significance
First demonstration of humoral control of inflammation
Vasodilataion and increased vascular permeability are caused by release of histamine from traumatized mast cells

Lewy ***

Lewy body
Cytoplasmic inclusion bodies found in neurons in Parkinsons disease
Appearance
Central round eosinophilic body
Surrounded by "halo" (less dense eosinophilic material)
Electron microscopy
Densely packed fine filaments (looser packing at rim)

Composition
Ubiquitin and *α-synuclein* present
Immunocytochemical demonstration.

Leydig **

Leydig cell tumor
Tumors of testicular stromal cells
Can produce androgens, estrogens or glucocorticoids
Clinical features
Childhood (uncommon tumor in childhood)
Sexual precocity due to hormonal effects
Adults (20 – 60 years)
Testicular mass
Pathology
Small brown tumors
Histology
Large cells with central nucleus
Eosinophilic cytoplasm
Cytoplasmic lipid droplets
Crystaloids of Reinke
Prognosis
Usually benign, 10% malignant

Libman–Sacks **

Libman-Sacks endocarditis
Endocarditis associated with Systemic Lupus Erythematosis
Features
Small vegetations (<5 mm diameter)
On valve *surfaces*, including *undersurface*
Mitral and aortic valves
Pathogenesis
Thrombotic lesions
Associations
Anti-phospholipid syndrome
Clinical significance
May lead to regurgitation if severe

Liddle *

Liddle syndrome
Hereditary hypertension syndrome
Autosomal dominant gene defect—chromosome 16
Defective sodium receptor in renal tubules.
Etiology

Renal tubular absorption of sodium is increased
The abnormal sodium receptor is *permanently activated*

Clinical features

Hypertension
Hypokalemic alkalosis

Pathology

Low renin and aldosterone levels (feedback)

Lindau **

Lindau syndrome

Hereditary *hemangioblastoma* of the cerebellum
Unassociated with any other lesions
Also see *Von Hippel-Lindau*

Lisch **

Lisch nodules

These are hamartomas found in the *iris* in Neurofibromatosis type I
They are pigmented nodules composed of melanocytes.

Li–Fraumeni ***

Li Fraumeni syndrome

Inherited genetic mutation of one copy of p53 gene
Mutation in second copy of this tumor suppressor gene predisposes to cancer

Clinical features

Twenty five-fold chance of developing malignancy before age 50
Patients develop tumors of several organs
Breast cancer, sarcomas, leukemias, adrenal cortex.
The tumor cells have mutations of both p53 genes.

Loeffler *

Loeffler syndrome

A self-limiting mild pneumonia characterized by eosinophilic infiltration of lungs

Etiology

Unknown

Clinical features

X rays show patchy infiltrates in lung
Minimal clinical symptomatology

Pathology

Eosinophils in alveolar space and in interstitium
Eosinophilia on peripheral blood film

Prognosis

Self- limiting over period of a few weeks

Loeffler Endocarditis

Inflammatory condition affecting sub-endocardium and endocardium
Affects males, 40 – 50 years.

Etiology

Unknown
Patients have eosinophilia (usually quite marked)
Toxic constituents of eosinophil granules damage myocardium

Pathology

Eosinophilic infiltration in subendocardial region – necrosis of cells.
Superimposed mural thrombi in heart chambers (may embolize)
Eventually repair by deposition of dense collagen in endocardium
Affects cardiac movement

Prognosis

Progressive condition leading eventually to heart failure.

Lutembacher **

Lutembacher Syndrome

Presence of Atrial septal defect and mitral stenosis
Mitral stenosis may be congenital or acquired (rheumatic fever)

Pathogenesis

Stenotic mitral valve and increased LA pressure contributes to maintenance of patency of the septal defect

Lynch ***

Lynch syndrome

Hereditary non-polyposis colorectal carcinoma

Etiology

Genetic defect in DNA mismatch repair gene
One defective gene is inherited by an individual in an affected family
The second gene functions normally
A mutation of the second gene eventually may occur leading to cancer
(1,000 – fold increased risk of colon cancer)

See also

Knudson

Lyon ***

The Lyon effect

Random inactivation of X chromosomes in excess of 1.
Occurs at 16th week of embryogenesis
Appear as Barr body in nuclei of cells (see *Barr*)

M

MacCallum **

MacCallums patch

Irregularly thickened plaque on posterior (usually) wall of Left Atrium

Present in patients who have mitral stenosis secondary to rheumatic fever

Pathogenesis

Regurgitation of jet of blood during systole impinges on atrial endocardium and induces thickening.

Maffucci *

Maffucci syndrome

Association of multiple enchondromas (see *Ollier disease*) with cavernous hemangioma of skin.

Association

Chondrosarcoma develops in 50% of patients.

Other tumors also may develop

Gliomas, ovarian tumors

Mallory ***

Mallory bodies: Alcoholic hyalin

Eosinophilic body in the cytoplasm of hepatocytes

Usually located close to nucleus in damaged cell.

Association

Alcohol ingestion

Structure of Mallory body

Keratin intermediate filaments.

Mallory–Weiss ***

Mallory-Weiss syndrome

Longitudinal tears of the mucosa in the lower esophagus

Etiology

Severe retching

Clinical presentation

Hematemesis

Location of lesions
Lower esophagus, cardia of stomach.
Association
Chronic alcoholism
Boerhaave syndrome
Rupture of esophagus

Marek *

Marek disease of chickens
Herpesvirus that induces lymphoid neoplasm in chickens.
Clinical relevance
The virus also induces atherosclerotic lesions
Provides suggestive evidence for a viral etiology for human atherosclerosis
Herpesviral genomic sequences have been found in human atherosclerotic plaques

Marfan ***

Marfans syndrome
Hereditary connective tissue disorder
Etiology
Marfan's syndrome is an autosomal dominant disorder.
There is a mutation in the Fibrillin gene (fbn) on chromosome 15q
Fibrillin normally serves as scaffolding for elastin assembly
Abnormal fibrillin results in defective elastin organization.
Clinical features
Incidence 1 : 15,000
Typical phenotype—Tall, thin, individuals with arachnodactyly
Lesions affect
Skeletal system : Skeletal deformities
Pectus excavatum or carinatum, skull bossing
Laxity of tendons and ligaments.
Eye : Lens dislocation, retinal detachment, myopia.
Vasculature : Aortic dilatationand mitral valve prolapse.
Prognosis
Death in fifth decade unless treated (valve replacement etc)

Marie–Strumpell ***

Marie-Strumpell disease: Ankylosing spondylitis
Seronegative arthritis affecting sacroiliac and spinal joints especially
Etiology
Autoimmunity
Association with B27 in >90% cases

Clinical features
- Onset in adolescence
- Low back pain
- Progressive, death from respiratory failure usually

Pathology
- Chronic inflammatory process leading to destruction of affected joint
  - Sacroiliac and apophyseal joints of spine
- Bony ankylosis
  - "poker spine"

Associations
- Uveitis
- Aortitis
- Amyloidosis

McArdle **

McArdle disease: Type V glycogenosis
- Absence of phosphorylase from muscle cells
- Muscle cells are unable to break down glycogen to provide gucose for energy

Clinical features
- Pain and cramping on exercise

Pathology
- Muscle appears normal unless over-worked
  - (over-use results in muscle cell necrosis)
- Lactate levels remain normal even after exercise

Prognosis
- Good if subject avoids severe exercise.

See also

Glycogenosis type I	Von Gierke disease
Glycogenosis type II	Pompe disease
Glycogenosis type III	Cori disease
Glycogenosis type IV	Andersen disease

McCune–Albright **

McCune-Albright syndrome
- Polyostotic fibrous dysplasia, café au lait spots and endocrine dysfunction

Etiology
- *Somatic* mutation during embryogenesis
- Gene defect involves Guanine nucleotide-binding protein.
- Excessive production of cyclic AMP

Clinical features
- Fibrous dysplasia affecting many bones – *often unilateral*
- Skin pigmentation – *also usually unilateral*
- Hypersecretion of endocrine glands

Precocious sexual development
Hypersecretion of thyroid, pituitary, adrenals.

Meckel ***

Meckels diverticulum
Persistence of vitelline duct at point of attachment to terminal ileum
This is a *true* diverticulum (all layers of bowel present)
Rule of "twos"
Two feet from ileocecal valve
Two inches long
Occurs in *two* percent of population.
Most patients present before *two* years of age.
Clinical associations
Most are asymptomatic
Ectopic gastric mucosa present in 50%
Ulceration of ileum and *hemorrhage*, *perforation.*
Intestinal *obstruction*
Volvulus, intussesception
Inflammation—similar to appendicitis clinically.

Meigs ***

Meigs syndrome
Association of *fibroma of ovary* with *ascites* and *right sided hydrothorax.*
Pathogenesis unknown.

Meissner **

Meissner plexus
Submucosal nerve plexus in gastrointestinal tract
Focally absent in *Hirschsprungs* disease
Plexus is damaged in Chagas disease resulting in acquired megacolon.

Menetrier ***

Menetrier disease
Hyperplasia of mucus producing cells in gastric mucosa
Greatly enlarged rugae, contributing to a large increase in weight of stomach.
Similar in appearance to brain—"cerebriform"
Etiology
Childhood : CMV infection (self limiting)
Adults : Overproduction of TGF-α
Clinical features
Males > Females (4 : 1), 30-50 years
Often asymptomatic
Upper intestinal symptomatology—discomfort

Weight loss
Protein losing enteropathy – hypoalbuminemia, edema.

Pathology

Greatly enlarged rugae
Mainly mucin secreting cells in glands—few chief or parietal cells.

Associations

Persistant condition may need gastrectomy
May be pre-cancerous—monitor.

Merkel *

Merkel cells

Specialized epidermal cells with possible neurosecretory function
Contain membrane bound *dense-core granules.*
May have tactile function

Merkel cell carcinoma

Tumor contains small cells with neurosecretory granules
Similar to small cell carcinoma of lung, or small cell lymphoma

Michaelis-Guttmann *

Michaelis-Guttmann bodies

Laminated, calcified bodies found inside macrophages in malakoplakia lesions

Pathology of malakoplakia

These are raised, soft, lesions found especially in the bladder in women
Associated with bladder infection—*E coli*

Histology

Lesions contain PAS positive macrophages
Phagosomes contain bacterial remnants
Michaelis-Gutmann bodies represent calcified bacterial debris.

Mikulicz **

Mikulicz syndrome

Destruction of salivary and lachrymal glands

Etiology

Sarcoidosis, lymphoma, other tumors

Clinical features

Dry mouth and dry eyes
(xerostomia and keratoconjunctivitis sicca)

Milroy **

Milroys disease

Hereditary lymphedema

Present at birth, usually affecting only one limb.

Etiology

Defective development of lymphatic channels

Pathology

Affected region has greatly dilated lymphatic channels

Monckeberg ***

Monckebergs medial calcific sclerosis

Calcification of the media of medium sized arteries—arms and legs.

Affects persons over 50 years old.

Pathology

Affected arteries are hard

Calcification is concentric, may lead to nodularity of vessels.

Lesions may undergo ossification.

No decrease in lumen diameter

Significance

No clinical significance

Munroe *

Munroe microabscesses

Collections of PMNs in epidermis and stratum corneum in Psoriasis

N

Negri ***

Negri body

Inclusion body which is pathognomonic for rabies.

Features

Circular eosinophilic, intracytoplasmic, inclusion bodies.
Resemble a red cell
Seen in pyramidal cells of the hippocampus, brain stem and Purkinje cells.
Rabies virus is present in the Negri body.

Nelson **

Nelsons syndrome

Rapidly growing pituitary corticotroph tumor seen after adrenalectomy.

Pathogenesis

The original tumor was receiving feedback suppression from the high level of glucocorticoids which were produced by the adrenal gland.
When the adrenal gland was removed this feedback ceased.
The pituitary tumor increases in size more rapidly.

Clinical features

The tumor first comes to attention a few years following adrenalectomy
Presents as pituitary mass, may be invasive
This syndrome is not seen now as pituitary tumors are treated when the patient first presents.

Pathological features

Tumor cells do not demonstrate Crookes hyaline degeneration
Suggests that this feature requires a high level of corticosteroids

Nezelhof *

Nezelhof syndrome

Congenital T cell immunodeficiency syndrome

Niemann–Pick **

Niemann-Pick disease

Sphingomyelin accumulation in macrophages, hepatocytes and neurons

Etiology
- Several different mutations of *sphingomyelinase gene* on chromosome 11p
  - Prevalent in Askenazy Jews.

Clinical features
- Two clinical patterns type A (80% of cases) and Type B
- Type A
  - Presents in infancy
  - Hepatosplenomegaly
  - Impaired mental development
  - Death within 3 years
- Type B
  - CNS not involved
  - Survival into adult life

Pathology
- Widespread distribution of "foam cells" in most organs
  - These are enlarged macrophages
  - Sphingomyelin accumulation in lysosomes
  - The inclusions have a laminated structure on electron microscopy
    - Zebra bodies

Association
- Cherry red spot on macula (in 50% patients)
  - Also seen in Tay-Sachs disease

O

Ollier **

Ollier disease

Multiple enchondromas especially in bones of hand and feet.

Symmetric distribution, result in deformation of bones.

Association

Tendency to give rise to chondrosarcoma.

See *Maffucci* syndrome

Enchondromas with cavernous hemangioma of skin.

Osler–Weber–Rendu *

Osler-Weber-Rendu syndrome : hereditary hemorrhagic telangiectasia

Arteriovenous fistulae in skin of the face and extremities, GIT and elsewhere.

Autosomal dominant inheritance

Clinical features

Development of telangiectasia in adolescence

Patients present with epistaxis and GIT bleeding.

Associations

A-V shunting in internal organs – lung, liver

P

Paget ***

Pagets disease of bone : Osteitis deformans

Irregular bone destruction and formation

Etiology

Paramyxoviral infection of osteoclasts and osteoblasts

Pathogenesis

Three stages

Increased osteoclastic activity

Increased osteoblastic activity

Quiescent stage

Clinical features

May affect single bone (monostotic) or many bones (polyostotic)

May be asymptomatic – detected during X ray examination

May cause bone pain and deformity leading to trapping of nerves

May present as fracture.

Pathology

Thickened regions of bone

Histology : Mosaic pattern of lameller bone

Associations

Heart failure due to high vascularity of lesions (A-V fistula)

Osteosarcoma and other tumors (5% of patients)

Pagets cell

Tumor cells that are found within the epidermis of nipple or vulva

Histological appearance

Arranged singly or in groups

They are large cells with clear cytoplasm

Cytoplasm contains mucin

The cells appear to be separated from surrounding skin cells by a space.

Pagets disease of the nipple

Eczematous, oozing, ulcerated lesions on the skin of the areola and nipple

Pathology

Infiltration of *Paget cells* into epidermis from underlying tumor

Association
Underlying ductal carcinoma – in-situ or invasive.

Extramammary Pagets disease
Refers to the finding of Paget cells in the skin of vulva or perianal region.
Usually are *not associated* with deeper lesions
Indolent course usually

Pancoast ***

Pancoast syndrome
Invasion of cervical nerves (C8 and T1) by apical lung cancer
Usually a squamous carcinoma
Clinical features
Shoulder pain radiating along ulnar side of the arm.
Association
Pancoast tumors may also cause *Horners syndrome*

Parkinson ***

Parkinsons disease
Degeneration of dopaminergic neurons in substantia nigra
Clinical features
Stooped posture
Slow movement with shortened steps
Rigid facial expression
"Pill-rolling" tremor in hands
Dementia at late stage in 15% of patients
Pathology
Loss of pigmentation of the substantia nigra and locus ceruleus

Patau **

Patau's syndrome: Trisomy 13
Etilogy
Non dysjunction during meiosis usually
Clinical features
Microcephaly, cleft lip and palate
Congenital defects in heart and kidneys
Polydactly and "rocker-bottom" feet
Prognosis
Death usually occurs within a year due to severe malformations.

Patterson–Kelly ***

Patterson-Kelly syndrome
Triad of clinical findings

Iron deficiency anemia
Glossitis
Dysphagia (esophageal webs)
Association with esophageal carcinoma
Also known as the *Plummer-Vinson syndrome*

Paul Bunnell ***

The Paul Bunnell test
Detects antibodies that react with sheep red blood cells in patients who have infectious mononucleosis
As these antibodies react across species they are called "heterophil" antibodies.

Pautrier *

Pautrier microabscesses
Collections of T lymphocytes within epidermis in Mycosis Fungoides.

Pel-Ebstein **

Pel-Ebstein fever
Recurring fever that lasts for 3-10 days and disappears for a similar time
Associated with *Hodgkins disease* and other lymphomas

Pelger–Huet *

Pelger-Huet anomaly
Abnormal PMNs that have bilobed nuclei, dense chromatin and fine granules
Associations
Found as a benign inherited dominant trait
May be seen in AML

Peutz–Jeghers ***

Peutz-Jeghers syndrome
Autosomal dominant syndrome (19p) characterized by
Benign hamartomatous polyps are present throughout the intestinal tract
Especially numerous in small intestine
Melanin pigmentation of oral mucosa, lips, hands, genitalia
Clinical presentation
May present with obstruction, intussusception due to polyps
May present as acute upper GIT bleeding
Anemia may develop due to chronic bleeding.
Associations
Increased incidence of cancers of *breast, pancreas, ovary, testis*

The hamartomatous intestinal polyps are *not premalignant*

Peyronie *

Peyronies disease of the penis

Abnormal deposition of fibrous tissue in shaft of penis

Usually dorsal surface

Clinical features

Contraction of fibrous tissue may lead to deformity or urethral obstruction

Associations

This disorder is related to palmar fibromatosis (*Dupuytren contracture*)

Pick *

Pick disease: lobar atrophy: lobar sclerosis

Severe atrophy of frontal and parietal lobes

Clinical features

Presents as a progressive dementia in 30s and 40s

Pathology

Severe reduction in size of affected lobes

Assymetric involvement

Gyri may be very thin "*knife edge* gyri"

Histology

Severe neuronal depletion

Residual cells are swollen *(Pick cells)*

May contain *"Pick bodies"*

Intracytoplasmic bodies, silver staining.

Other parts of the brain may also be atrophic (caudate, putamen)

Prognosis

Downhill course over 4-10 years.

Pickwick **

Pickwickian syndrome

Hypoventilation due to limitation of thoracic expansion by extreme obesity

Clinical features

Somnolence

Sleep apnea

Polycythemia

Right heart failure

Plummer-Vinson ***

Plummer-Vinson syndrome

Triad of clinical findings

Iron deficiency anemia

Glossitis

Dysphagia (esophageal webs)
Also known as the *Patterson-Kelly* syndrome

Pompe *

Pompe disease: Glycogenosis type II
Absence of acid maltase from lysosomes
Etiology
Different genetic mutations responsible in infant and adult types.
Clinical features
Infantile form
Cardiomegaly and death within 2 years
Adult form
Onset between 10 and 70 years
Myopathy, proximal muscles.
Slowly progressive
Pathology
Lysosomal accumulation of glycogen in affected cells
See also

Glycogenosis type I	*Von Gierke disease*
Glycogenosis type III	*Cori disease*
Glycogenosis type IV	*Andersen disease*
Glycogenosis type V	*McArdle disease*

Pott **

Pott disease: Potts caries
Tuberculous infection of vertebral bodies causing destruction
Complications
Compression fracture leading to *kyphosis*
Erosion of necrotic material into surrounding tissues
Necrotic material tracks along the psoas muscle to groin
"Cold abscess" in groin where material reaches the surface

Potter *

Potter complex
Seen in neonates who develop in-utero in the presence of *oligohydramnios*
Etiology of oligohydramnios
Maternal causes
Placental insufficiency
Chronic leakage from amniotic membrane
Fetal cause
Renal agenesis (urine not formed)
Clinical features
Lack of amniotic fluid leads to *compression of the fetus* which results in

Flattened facies
Abnormal position of hands and feet
Pulmonary hypoplasia

Prader–Willi **

Prader-Willi syndrome
Deletion of paternally derived chromosome 15q
Example of genetic imprinting
Clinical features
Unusual facies
Obesity and hypotonia
Hypogonadism, mental retardation
Association
Deletion at same locus in maternally derived chromosme 15 results in *Angelman syndrome*

Q

Querat *

Erythroplasia of Querat
Carcinoma in-situ of the penis
Etiology
HPV (Usually type 16)
Clinical features
Lesions located on glans penis
Appear as red, shiny plaques.
Pathology
Typical carcinoma in-situ

R

Raynaud ***

Raynaud disease

Irregular attacks of intense vasospasm in small arteries and arterioles

Etiology

Increased sensitivity to external stimuli – cold

Clinical features

Affects young healthy women

The skin of the extremity changes color in the following sequence

White—intense vasospasm

Blue—cyanosis in affected region

Red—hyperemia in tissue as blood supply returns.

Pathology

There are no pathological changes in arteries or arterioles

Raynaud phenomenon

Similar sequence of events to that seen in Raynaud's disease

Secondary to some other organic disorder

Etiologies

Arteritis : SLE, Systemic sclerosis, Buergers disease

Atherosclerosis

Reed–Sternberg ***

Reed-Sternberg cell

Is considered to be the malignant cell in Hodgkin's disease.

Description

Large cell (> 15 microns diameter)

Cytoplasm

Abundant cytoplasm

Nucleus

Classically binucleate or bilobed

May be multinucleate

Nuclei are bean shaped

Often oppose each other (mirror image)

Nucleolus
Prominent nucleolus
Surrounded by clear area ("halo")
"Owls eye" appearance

Variants
Lacunar type : in nodular sclerosing Hodgkins disease
Nucleus appears within an "empty" space
Popcorn type : in lymphocyte-predominent Hodgkins disease
Nuclei resemble popcorn

Reid ***

Reid index
Histological measurement of bronchial wall
Expressed as ratio of the thickness of the mucous glands to the thickness of the bronchial wall

Association
Mucous gland hyperplasia is typically seen in chronic bronchitis.

Reidel **

Reidels thyroiditis: Woody thyroiditis
Fibrosing disorder of the thyroid gland.

Clinical features
Usually due to pressure symptoms on surrounding structures
Dysphagia, dyspnea

Pathology
Dense fibrosis, difficult to cut through (ligneus—woody)

Associations
Related to other fibrosing disorders
Retroperitoneal fibrosis
Mediastinal fibrosis

Reinke *

Crystaloids of Reinke
Rectangular shaped, eosinophilic, crystalloids in the cytoplasm of Leydig cells
Nature unknown

Reiter ***

Reiter syndrome
Comprises *Arthritis, Urethritis and Conjunctivitis*

Etiology
Autoimmune reaction triggered by GIT or urinary tract infection

Clinical features

Infection precedes other symptoms by a few weeks.
Patients present with lower back pain and joint stiffness
Knees, ankles and feet especially
Asymmetric involvement
Extra-articular involvement
Conjunctivitis
Associations
High frequency of HLA—B27 in patients
Prognosis
Highly variable course
Recurrent attacks in >50% of patients.

Rendu–Osler–Weber *

See *Osler-Weber-Rendu* syndrome

Reye ***

Reyes syndrome
Liver failure and encephalopathy in children associated with aspirin ingestion
Etiology
Prior viral infection and aspirin administration blamed
Clinical features
Sudden hepatic failure
Hyperammonemia
Encephalopathy.
Pathology
Liver
Microvesicular fat accumulation in liver cells
Abnormal appearance of mitochondria in liver and brain
They are larger than normal, with budding or branching.
Decrease in mitochondrial enzyme content
Brain
Fat infiltration and edema

Richter **

Richter syndrome
Development of a large cell B lymphoma in patients who initially had small cell tumors—
CLL or small cell lymphoma
Clinical features
Sudden deterioration in clinical condition
Fever, enlarging lymph nodes, abdominal pain.
Significance
This is a terminal event in 10% of patients who have small cell tumors
Prognosis

Survival limited to a few months

Roger **

Roger disease: ventricular septal defect

Commonest congenital heart abnormality in clinical practice

Clinical features

Large defect

Left to right shunting of blood
Pulmonary hypertension
Right ventricular hypertrophy
Reversal of flow (Eisemnenger complex)

Small defect

May be asymptomatic
May close spontaneously

Rokitansky–Aschoff **

Rokitansky-Aschoff sinuses

Glandular epithelial nests found in the muscle coat of the gallbladder in chronic cholecystitis

Etiology

Herniations of mucosa into inflamed bladder wall

Rosenthal *

Rosenthal fibers

Abnormal proteolipid structures found in CNS in *Alexander's disease*

Pathogenesis

Glial cells fail to align with neurons during development
They align with other structures – pia and blood vessels by default
"Myelin" produced in this situation forms defective structures

Histology

Irregular beaded, proteolipid structures
Sub-pial location and around blood vessels.
Also in cerebellum and spinal cord
Located extracellularly
Small fibers may be seen inside glial cells.

Roth *

Roth spots

Focal retinal hemorrhages caused by microembolism
Associated with infectious endocarditis – now uncommon

Rotor ***

Rotor syndrome

One of the hereditary hyperbilirubinemias

Autosomal recessive inheritance pattern

Etiology

Several defects in hepatocytes including

Defective uptake of bilirubin

Defective intracellular conjugation of bilirubin

Clinical features

Benign disorder

Pathology

The liver is not pigmented in this disorder (cf *Dubin-Johnson* syndrome)

Russell **

Russell bodies

Cytoplasmic, refractile, eosinophilic inclusion bodies in plasma cells

Stain positively with PAS

Composition

Immunoglobulins

Associations

May be present in plasma cells during normal immune reaponse

Also seen in neoplastic plasma cells – Myeloma.

Analogous to *Dutcher bodies* in Nucleus.

S

Sandhoff *

Sandhoff disease

Variant of *Tay-Sachs* disease

Autosomal recessive inheritance pattern, gene on chromosome 5

Etiology

Defective gene that encodes β subunit of Hexoseaminidase A and B

Accumulation of GM_2 ganglioside in all organs

Clinical features

See *Tay-Sachs disease*

Schatzki **

Schatzki rings

Protrusion of mucosa into lumen of esophagus at gastro-esophageal junction.

Clinical features

Commonly causes dysphagia

Histology

Upper surface of Skatzki ring is lined by esophageal epithelium

Lower surface is lined by gastric mucosa

Schaumann **

Schaumann bodies

Laminated, calcified inclusion bodies in macrophages

Characteristically seen in granulomata in Sarcoidosis

(*Asteroid bodies* also present in Sarcoidosis)

Schmidt *

Schmidt syndrome

Polyglandular endocrine disorder (type II)

Etiology

Familial in 50% of instances

Autoimmune destructive reaction to involved glands

Clinical features

Adrenal gland is always involved associated with

S

Autoimmune thyroid disease (Hashimotos or Gravess disease)
IDDM
Ovarian dysfunction

Schwann **

Schwannoma: Neurilemmimoma

Benign tumor of Schwann cells on peripheral or cranial nerves

Clinical features

Intracranial Schwannomas
- Usually involve acoustic nerve (Acoustic neuroma)
- Usually unilateral
- Present with hearing loss and tinnitus
- They are bilateral in Neurofibromatosis Type II

Peripheral Schwannomas
- Commonly affect dorsal nerve roots
- Head and neck region
- Present with pain

Pathology

Proliferation of Schwann cells in two patterns

Antoni type A
- Whorling, spindle cell with elongated nuclei
- Highly cellular
- *Verocay bodies* may be present

Antoni type B
- Less cellular
- Spindle cells present in myxoid background

Sertoli–Leydig *

Sertoli-Leydig cell tumor : Androblastoma

Tumor of ovarian stroma that produce weakly active androgens

Clinical features

Occurs in younger women (20 – 40 years)

Virilization in 50% of patients (those with larger tumors)
- Breast atrophy, amenorrhea

Pathology

Large Leydig cells with eosinophilic cytoplasm
- Central nucleus with prominent nucleolus

Cords and tubules of Sertoli cells

Prognosis

Usually benign, full recovery when tumor is removed.

Sezary **

Sezary-Lutzner cells

T helper cells present in epidermis in Mycosis Fungoides patients (Cutaneous T-Cell lymphoma)

Histological appearance

Convoluted nucleus (cerebriform)

May aggregate in epidermis to form *"Pautrier microabscesses"*

They appear in the peripheral blood in *Sezary syndrome*.

Sezary syndrome

Cutaneous T cell lymphoma —a variant of Mycosis Fungoides

Clinical features

Age distribution 30—60

Infiltration of skin with clonal T cells

Extensive *exfoliative erythroderma*

Lymphadenopathy

Pathology

Sezary cells circulate in peripheral blood

Prognosis

Prolonged indolent course over 10 years.

Sezary cells

Circulating cells resemble those in the cutaneous lesions of Mycosis Fungoides

CD4 antigen present (T helper cells)

Cerebriform nucleus (highly convoluted)

Perinuclear rim of PAS positive granules

Sheehan ***

Sheehan syndrome

Ischemic necrosis of pituitary gland during the postpartum period.

Pathogenesis

Pituitary gland undergoes enlargement during pregnancy

Requires increased blood supply

Postpartum hemorrhage, if severe, leads to shock

Shock results in ischemic necrosis of gland

Clinical features

Failure of lactation	(Prolactin)
Hypothyroidism	(TSH)
Hypoadrenalism	(ACTH)
Amenorrhea	(FSH, LH)

S

Sherman *

Sherman paradox

In certain genetic disorders the risk of developing the disorder varies with the position of the individual in the pedigree.

In families affected with Fragile X syndrome, later generations are at increased risk of developing the syndrome than are earlier generations

Pathogenesis

In triplet repeat syndromes (including Fragile X syndrome), the number of repeats increases with each generation.

The severity of the clinical syndrome depends on the number of repeats.

Shy–Drager *

Shy-Drager syndrome

Dysfunction of autonomic nervous system in patients who develop Parkinsons disease

Clinical features

Autonomic symptoms

Postural hypotension, impotence, bladder dysfunction,

Parkinsonian symptoms

Onset some time after autonomic symptoms

Pathology

Diffuse neuronal degeneration in many parts of CNS

Striatonigral degeneration with Lewy bodies

Prognosis

Progressive, death within 5-10 years

Sipple **

Sipple syndrome: MEN 2A

Association of 1. Pheochromocytoma with
2. Medullary carcinoma of the thyroid gland and
3. Hyperplasia or adenoma of parathyroid glands

Etiology

Mutations in RET oncogene

Codes for receptor for glial-derived neurotrophic factor

Mutated receptor is constitutively activated

Constant proliferative stimulation in absence of ligand

Sjogren ***

Sjogrens syndrome

Destruction of lachrymal and salivary glands

Etiology

Autoimmune damage to glands

Possible viral trigger (EBV, HTLV-1)

Clinical features

Occurs mainly in women age 30 – 60 years
Enlargement of affected glands
Keratoconjuctivitis sicca and xerostomia (dry eyes and mouth)

Pathology

Lymphocytic infiltration into glands
Mainly CD4 cells
Extensive destruction of acini and ducts
Autoantibodies to nuclear antigens
Anti SS-A and SS-B (Ro and La)

Associations

Other autoimmune disorder present in 60% patients
Especially rheumatoid arthritis
Increased incidence of lymphoma in the affected glands

Smith *

Smith antigen

Antigen present in nucleus
Autoantibodies to this antigen are diagnostic of SLE

Stein–Leventhal **

Stein-Leventhal syndrome

Multiple follicular cysts of the ovaries associated with oligomenorrhea
Anovulation, obesity and hirsutism

Etiology

Defects in regulation of hormonal biosynthesis
LH, insulin growth factors

Pathology

Thickened ovarian cortex
Numerous follicular cysts in cortex of gland
Corpora lutea rare or absent.

Stevens–Johnson *

Stevens-Johnson syndrome

Severe variant of Erythema Multiforme with extensive involvement of mucosal surfaces

Etiology

Abnormal immunoreactivity associated with
Drug ingestion —penicillin, sulphonamides etc
Viral infections—EBV, HSV.

Clinical features

Children predominantly affected

Ulceration of lips and oral mucosa with hemorrhage
Involvement also of perianal region, urethra, conjunctiva, GIT
Fever and superimposed infections

Pathology

Edema of dermis
Infiltration of epidermis by lymphocytes
Zones of epidermal necrosis
Blister formation
Ulceration

Stewart–Treves *

Stewart-Treves syndrome

Rare occurrence of angiosarcoma after mastectomy.
Occurs in skin on edematous arm
Edema caused by impairment of lymphatic drainage

Still *

Stills disease: Juvenile arthritis

Rheumatoid arthritis occurring in childhood

Features

Lymphadenopathy, hepatosplenomegaly, fever, systemic symptoms
Often negative for rheumatoid factor

Sturge–Weber **

Sturge-Weber syndrome

Developmental anomaly of blood vessels in brain and skin
Meningeal hamartomatous masses of blood vessels
Port wine stain on same side of face – often in distribution of trigeminal nerve

Clinical features

Seizures
Hemiplegia
Mental retardation

T

Takayasu **

Takayasu arteritis: Pulseless disease

Arteritis of medium and large aterties

Affects mainly arch of aorta and it's branches leading to narrowing of lumen

Etiology

Immune damage to wall of arteries

Clinical features

Affects mainly women ages <30 years

Absence of pulses in arms

Ocular disturbances due to ischemia

Neurological symptoms

Pathology

May affect arch and/or descending aorta

Histology

Early	Giant cell infiltration of wall of affected vessels
	Granulomata
	Necrosis
Late	Fibrosis of all layers of aorta
	Especially in intima

Associations

Myocardial infarction if coronary arteries are involved

Pulmonary involvement may lead to pulmonary hypertension

Renal involvement may lead to systemic hypertension

Prognosis

Highly variable.

Tay–Sachs ***

Tay-Sachs disease

Accumulation of GM_2 gangliocides in various tissues

Due to defective hexosaminidase A

Etiology

Defective gene on chromosome 15 that encodes α chain of Hexosaminidase A

Several different mutations identified (>30)
Prevalent in Askenazy Jews – carrier rate 1:30
Clinical features
Variable depending on which mutation is present
Severe deficiency of hexosaminidase A leads to
Neurological impairment within 6 months
Motor incoordination
Mental retardation leading to dementia
Cherry red spot on retina
Pathology
Intracellular accumulation of gangloiside GM_2
Especially in neurons although other cells affected to lesser degree
Material is stored in lysosomes
Stains positively for lipid (Oil Red O, Sudan Black)
Electron microscopy
Stored material is arranged as whorled membranes.
Later there is extensive neuron loss
Prognosis
Death within 2 – 3 years in severe cases

Trousseau **

Trousseaus sign: Trousseaus syndrome
Migratory thrombophlebitis.
Association
Carcinoma of *pancreas*, colon, lung

Turcot *

Turcots syndrome
Adenomatosis polyposis of the colon associated with tumors of the central nervous system
Medulloblastoma and Glioblastoma multiforme

Turk *

Turk cells
Atypical lymphocytes in peripheral blood that resemble plasma cells.
Cell have abundant basophilic cytoplasm
Association
Infectious mononucleosis

Turner ***

Turner syndrome: 45 XO
Commonest sex chromosome abnormality in females (1:3,000 births)

Clinical features
- Infancy
  - Edema at periphery due to malformation of lymphatic system
  - Cystic hygroma in neck
  - Congenital heart disease
    - Coarctation of the aorta
    - Bicuspid aortic valve
- Older patients
  - Short stature
  - Web neck
  - Failure of development of secondary sexual characteristics
    - Amenorrhea

Pathology
- Patients have streak ovaries
  - Accelerated loss of oocytes from ovaries during early development
  - Complete loss by 2 years of age

Associations
- Autoimmune disease of the thyroid gland in 50% of patients

Tzanck **

Tzanck test
- Test for herpes simplex infection
- Inspection of blister fluid for cells showing signs of viral infection
  - Intranuclear viral inclusions
  - Multinuclear giant cells.

U

Usher *

Ushers syndrome
Genetic disorder characterized by
Deafness, vestibular loss and blindness (retinitis pigmentosa)

V

Verner-Morrison *

Verner-Morrison syndrome

Rare syndrome due to excessive secretion of VIP by tumor of pancreatic islets

Clinical features

Episodic profuse watery diarrhrea
Hypokalemia
Hypochlorhydria

Pathology

Patients have tumor of D1 cells of pancreatic islets
High serum level of Vasoactive Intestinal Peptide.

Verocay *

Verocay bodies

Histological structures that are found in schwannomas of Antoni type A
Cells of the tumor align together so that their nuclei form a palisade.
This alignment is referred to as a Verocay body

Vincent *

Vincents angina

Ulcerating lesions affecting mouth in
Immunocompromized individuals
After trauma to mouth mucosa

Etiology

Infection by organisms that are normally present in buccal flora
Fusiform bacillus and Borrelia Vincentii

Pathology

Ulceration and necrosis of mucous membrane
Pseudomembrane formation

Virchow ***

Virchows triad

Refers to the three elements that contribute to formation of a thrombus

Endothelial cell injury
Hypercoagulability of the blood
Loss of laminar blood flow

Virchows node
Enlarged supraclavicular node caused by secondary carcinoma from stomach
Also known as *Sentinel node*

Von Economo *

V

Von Economo encephalitis: Encephalitis lethargica
Historical encephalitis that accompanied the influenza pandemic in WW I
Etiologic agent unknown—believed to be viral
Clinical features
Extreme somnolence leading to death in majority of patients
Pathology
Perivascular cuffing by lymphocytes in CNS
Associations
Development of *Parkinsons disease* in survivors.

Von Gierke **

Von Gierke disease: Type I glycogenosis
Accumulation of glycogen in liver due to deficiency of *glucose-6-phosphatase*
Clinical features
Onset of symptoms within 3 months
Hepatomegaly, enlarged abdomen
Hypoglycemia and lactic acidosis
Associations
Hyperlipidemia
Hyperuricemia (may lead to *gout* in adolescence)
See also

Glycogenosis type II	*Pompe disease*
Glycogenosis type III	*Cori disease*
Glycogenosis type IV	*Andersen disease*
Glycogenosis type V	*McArdle disease*

Von Hippel-Lindau **

Von Hippel-Lindau disease
Retinal angiomas with cerebellar hemangioblastoma
Etiology
Rare autosomal dominant gene defect (*chromosome 3p*)
Gene encodes tumor suppressor product (pVHL)
pVHL prevents RNA elongation during synthesis

Associations
Angiomas of spinal cord
Renal cell carcinoma (bilateral)
Pheochromocytoma
Polycythemia (EPO production by cerebellar tumor)
Cysts in pancreas, kidneys, liver

Von Recklinghausen ***

Von Recklinghausens disease: Neurofibromatosis Type I
Widespread neurofibromas, café au lait spots and *Lisch* nodules in iris
Etiology
Autosomal dominant gene defect (50%) – chromosome 17q
The rest have a new mutation
Gene product encodes *neurofibromin*, a tumor suppressor gene
Clinical features
Expression of the disorder may range from minimal to severe
Neurofibromas – widespread through out body – especially skin
Skin pigmentation – classically present as *café au lait* spots
Six or more lesions required for diagnosis
Lisch nodules – hamartomas of the iris
Associations
Bone lesions – erosion by neurofibromas or bone cysts
Reduced intelligence
Increased risk of developing other tumors
Pheochromocytoma, *Wilm's* tumor, meningioma, optic glioma, chronic myeloid leukemia

Von Recklinghausens disease of bone: Osteitis fibrosa cystica
Excessive osteolytic activity secondary to elevated parathormome levels
Clinical presentation
Bone pain
Pathologic fractures
Hypercalcemia
Renal stones
Pathology
Localized hyperactivity of osteoclasts—osteopenia
Local regions of severe bone resorption (cysts)
Replacement by fibrous tissue
Hemorrhage into fibrous tissue leads to brown coloration
"Brown tumors"

Von Meyenburg *

Von Meyenburg complexes

Multiple bile duct hamartomas in the liver

Surrounded by fibrous stroma

Lesions are cystic and lined by bile duct cells and may contain bile

They are not clinically significant.

Von Willebrand ***

V

Von Willebrand disease

Absence or defective function of Von Willebrand factor (VWF)

Etiology

Type I Autosomal dominant inheritance (most cases)

Partial deficiency of VWF

Type III Autosomal recessive inheritance

Total deficiency of VWF – severe disease

Type II A number of qualitative defects in VWF also occur with varying clinical consequences.

Normal functions of VWF

Synthesis

VWF is released from *Weibel Palade* bodies in endothelial cells

Functions

Binding of platlets to collagen

Binds glycoprotein Ib on platlets

Binding of platlets to other platlets to form hemostatic plug

Binds glycoprotein IIb / IIIa molecules on platlets

Stabilizes factor VIII

Defective factor VIII function in VW Disease

Clinical feature

Mild bleeding tendency (except for type III)

Epistaxis, menorrhagia, easy bruising, GIT bleeding

Excessive hemorrage after trauma

Pathology

Prolonged bleeding time

Ristocetin test

Ristocetin is used to upregulate glycoprotein Ib expression on platlets

The test plasma is added to the Ristocetin modified platlets

Failure to agglutinate indicates deficiency of VWF

W

Waldenstrom **

Waldenstroms macroglobulinemia

Tumor of B lymphocytes that is associated with production if monoclonal IgM

Clinical features

Indolent tumor affecting older people

Lymphadenopathy and *hepatosplenomegaly*

Hyperviscosity symptoms

Neurological symptoms

Dizziness, paresis, headache

Cardiovascular symptoms related to hyperviscosity

Bleeding tendency – coating of platlets by monoclonal protein

Pathology

Plasmacytoid lymphocytes present

Intermediate features of plasma cells and lymphocytes

More cytoplasm than normal lymphocyte

Rough endoplasmic reticulum present (IgM synthesis)

Mononclonal IgM protein present in plasma

High molecular weight prevents escape from vascular system.

Prognosis

Indolent tumor, slowly progressive

Hyperviscosity requires immediate treatement—Plasmapheresis

Warthin **

Warthin tumor of parotid gland: Adenolymphoma

Benign tumor of parotid gland containing both glandular and lymphoid elements

Clinical features

Enlargement of parotid gland in older males (> 40 years)

May be bilateral

Strong association with cigarette smoking

Pathology

Tumor contains c*ystic regions lined by double layer of cells*

May have papillary projections into cysts

Epithelial element is surrounded by *lymphoid tissue*
Germinal centers may be present

Prognosis
Total excision is curative, recurrence rare

Warthin–Fingeldey **

Warthin-Fingeldey cells
Multinucleated giant cells which are *pathognominic for measles*

Appearance
Scant cytoplasm, delicate nuclear chromatin, small nucleoli.
Eosinophilic inclusions bodies in cytoplasm and nucleus

Waterhouse–Friderichsen ***

Waterhouse-Friderichsen syndrome
Disseminated intravascular coagulation, hemorrhage into adrenal gland and shock

Etiology
Meningococcal meningitis (other organisms also)

Clinical features
Young children expecially but any age may be affected
Sudden onset of fever, endotoxic shock, prostration

Pathology
Meningococcal septicemia is associated with damage to blood vessels
Petechiae and hemorrhages into tissues generally
Severe damage to capillaries in adrenal medulla
Adrenal glands are enlarged and filled with blood
Destruction of gland is responsible for the profound shock

Prognosis
Death within a short time unless promptly and agressively treated.

Wegener ***

Wegeners granulomatosis
Severe vasculitis leading to necrosis of vessel walls
Especially affects upper respiratory tract and kidneys

Etiology
Immune damage to vessel walls
c-ANCA present in 90% of patients

Clinical features
Affects men aged 40 – 60 years
Present with pneumonia type illness (90%)
Pulmonary infiltrates and cavitation on x ray
Sinusitis
Nasopharyngeal ulceration

Glomerulonephritis
Hematuria and proteinuria

Pathology
Respiratory tract lesions
Granulomas within blood vessel walls and in tissues
Widespread mucosal ulceration and tissue necrosis
Renal lesions
Crescent formation in glomeruli
Focal necrosis of glomeruli

Prognosis
Rapidly downhill course without treatment
Excellent response to immunosuppressive therapy.

Weibel-Palade **

Weibel-Palade bodies
Membrane bound structures inside endothelial cells (3 x 0.1 mm)
Contain *Von Willebrand* factor

Wermer **

Wermer syndrome: MEN type I
Parathyroid, Pancreas and Pituitary glands involved. (3Ps)

Etiology
Gene defect on chromosome 11q
Gene product has no known function

Clinical features
Onset in adult life (age > 40)

Pancreas:	Insulinomas- recurrent hypoglycemia
	Gastrinoma—peptic ulceration (Zollinger-Ellison)
Pituitary :	Adenomas—usually not clinically significant
	Prolactinoma is the most common adenoma
Parathyroid:	Hyperplasia or adenomas—hypercalcemia
	Most common presenting symptom

Werner *

Werner syndrome: Progeria
Early onset of signs of aging

Etiology
Autosomal recessive disorder, gene located on 8p
Encodes for DNA helicase
Unwinds DNA and helps preserve it's integrity
Buildup of DNA damage in absence of gene product

Clinical features
Premature onset of signs of aging

Hair loss, cataracts, osteoporosis
Atherosclerosis, skin changes etc

Prognosis

Death from complications of atherosclerosis or from carcinoma in 5th decade

Wernicke **

Wernicke encephalopathy

Syndrome of thiamine deficiency in chronic alcoholics

Clinical features

Disturbance of thermal regulation
Ophthalmoplegia and nystagmus
Ataxia
Mental disorientation

Pathology

Early : Dilated capillaries with enlarged endothelial cells
Foci of hemorrhagic around capillaries
Necrosis in
Mamillary bodies
Area adjacent to third and fourth ventricles.
Anterior cerebellum

Later: Cystic changes
Hemosiderin-laden macrophages in area

Wernicke–Korsakoff **

Wernicke-Korsakoff syndrome

Syndrome of thiamine deficiency seen in chronic alcoholics

Clinical features

Progression from Wernicke encephalopathy to include
Korsakoffs syndrome
Impairment of recall (retrograde amnesia)
Confabulation (inventing a history)

Pathology

As for Werkickes syndrome but usually lesions are of the late type
Lesions are also found in the thalamus.

Whipple **

Whipples disease

Systemic disorder involving GIT, brain and joints
Accumulation of macrophages containing Tropheryma whippelii

Etiology

T. whippellii

Clinical features

White males aged 30 – 40 years

Present with GIT symptomatology
Diarrhea, malabsorption and weight loss
Also may have joint pain and CNS symptoms, lymphadenopathy and skin pigmentation

Pathology
Affected tissues infiltrated by large macrophages (Whipple cells)
Macrophages contain PAS positive material
EM shows the material to consist of rod shaped bacilli
GIT
Whipple cells distend the villi and block lymph drainege
Cystic lymph channels are present

Prognosis
Good response to antibiotics in most patients

Williams *

Williams syndrome
Aortic stenosis affecting the ascending aorta,
Associated with hypercalcemia of infancy and developmental defects in other organ systems

Etiology
Defective elastin gene in some cases

Wilms ***

Wilms tumor
Tumor of embryonal renal elements, the commonest renal tumor of childhood

Etiology
Abnormality of *WT* genes
WT-1 and *WT-2* genes on chromosome 11p
Possible *WT-3* gene elsewhere in some families

Clinical presentation
Presents in children age 2 – 4 years typically
Present with abdominal mass, may cross midline
Abdominal pain
Intestinal obstruction
Hematuria

Pathology
Large tumors with regions of hemorrhage and necrosis
Tumor tries to recapitulate normal renal development
Primitive tubular and glomerular elements present

Prognosis
90% long term survival with appropriate treatment

Associations
Wilms tumor is associated with several genetic abnormalities
WAGR syndrome
*W*ilms. *A*niridia, *G*enital abnormalities, mental *R*etardation
Autosomal dominant genetic disorder, gene on chromosome 11p
Related to *WT-1* gene locus
Denys-Drash syndrome
Wilms, gonadal dysgenesis, renal failure
Abnormal gene located on chromosome 11p also
Also related to *WT-1* locus
Beckwith-Wiedemann syndrome
Large organs, hemihypertrophy, renal cysts, adrenal cytomegaly
Gene in different region of chromosome 11p (related to *WT-2*)

Wilson ***

Wilsons disease: Hepatolenticular degeneration
Accumulation of copper in tissues of the body
Etiology
Autosomal recessive disorder, gene (*ATB7B*) is on chromosome 13
Encodes copper transporting protein present in biliary canaliculi
Defectve protein unable to facilitate secretion of copper
Clinical features
Accumulation of copper damages tissues
Onset of clinical symptoms usually in childhood (>6years)
Liver – leading to cirrhosis
Brain – behavioural changes, psychosis, *Parkinsons*
Eye – *Kayser-Fleischer* rings in *Descemets* membrane
Pathology
Progressive changes in liver from fatty change to frank cirrhosis
High levels of copper in liver.
Deposition of copper in basal ganglia – especially putamen
Serum ceruloplasmin levels are low
Urinary secretion of copper is high
Prognosis
Much improved with chelation therapy

Wiscott-Aldrich *

Wiscott-Aldrich syndrome
Recurrent infections, with thrombocytopenia and eczema
Etiology
X-linked recessive disorder
Abnormal gene encodes Wiskott-Aldrich Syndrome Protein (WASP)
WASP maintains integrity of cytoskeleton and ensures signal transduction

Clinical presentation
- Infections in early life
  - Especially pneumococcal infections, P. carinii, H. influenza
  - Associated with *IgM deficiency*
- Predisposition to bleeding due to thrombocytopenia
  - Platlets are small
- Eczematous rash

Prognosis
- Bone marrow transplantation often successful

Associations
- Autoimmune diseases
- Cancer

Z

Zahn ***

Lines of Zahn

Alternating pale and darker lines observed grossly in thrombi
Pale lines contain mainly platlets and fibrin
Darker lines also contain red blood cells.

Pockets of Zahn

Puckering of the endocardium in the left ventricle just below the aortic valve
Found in patients who have aortic incompetence

Pathogenesis

Puckering is induced by jets of blood that regurgitate through the incompetent valve during diastole.

Zahns infarct

Obstruction of portal vein tributaries resulting in "infarction" of part of liver
Cells undergo *atrophy* rather than necrosis in the "infarct" region.

Etiology

Obstruction by carcinoma
Chronic venous congestion

Zenker *

Zenker diverticulum

Outpouching of esophageal wall above upper esophageal sphincter

Etiology

Increased intraluminal pressure acting on weak region of the wall

Clinical features

Retention of food in the diverticulum may cause
- Halitosis
- Food regurgitation
- Dysphagia (if it compresses the esophagus wall)
- Aspiration pneumonia

Zollinger–Ellison ***

Zollinger-Ellison syndrome

Gastrin producing tumor of the pancreatic islets (*Gastrinoma*)
Excessive production of *hydrochloric acid* by stomach
Peptic ulceration of stomach, duodenum, jejunum.

Clinical presentation

Symptoms of peptic ulceration
Intractable to treatement
Diarrhea

Pathology

Tumors usually arise in pancreatic islets
Also are found in peri-pancreatic tissue and duodenum

Prognosis

50% have metastasized by time of diagnosis