Surgical Propedeutics

New topics of 2015

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A messy copy paste note from Schwartz's Principles of Surgery with some help of Wikipedia to fill in missing info. Put together thanks to the lovely teachers that are pissed off with low attendance and refuse to hand out their lectures. Time will show if it's enough to pass. I take no responsibility!

1 Palliative interventions. Irresectability and inoperability tumors

“Palliative surgery is defined as surgical intervention targeted to alleviate a patient's symptoms, thus improving the patient's quality of life despite minimal impact on the patient's survival.”

- **Goal:** symptom relief and preservation of quality of life in terminal disease states.
- Surgeons must decide if major surgery is justified in elderly patients.
- Provide maximal benefit to patient with the least-invasive intervention.
- Ranges from extensive debulking operations to aid effectiveness of chemo/radiation to less complex surgery (laparoscopy, percutaneous methods) to ease symptoms common in terminal disease. (vomiting, pain, cachexia, anorexia)
- Success of palliative interventions: Achieving symptom relief without new symptoms from the palliative intervention itself occuring.

Examples:

- Malignant effusions: Treating symptoms, not effusion itself unless it causes significant distress for the patient.
- Bowel obstruction: Intestinal bypass or diverting colostomy.
- Bone metastases: prophylactic fixation of long bones to decrease pain as well as morbidity from pathologic fractures.
- Recurrent airway compromise: Stenting.

Unresectable and Inoperable Tumors:

For patients with unresectable disease or distant metastases, palliative care options exist. Palliative treatment is aimed at improving a patient's symptoms and may include radiation, chemotherapy, or consultation with a pain specialist.

- CT guided needle biopsy to investigate tumors.
- Radiation may be given as primary therapy for local control. It is rarely curative.

Examples:

- Teratocarcinomas are often diagnosed at an unresectable stage.
- Malignant effusions generally indicates advanced stage and unresectability.
- Cervical esophageal cancer: early invasion of larynx, trachea and great vessels.
- Liver tumors: Radiofrequency ablation can be effective to destroy unresectable malignant tumors.

2. Treatment options of tumor patients, quality of resection (R0,R1,R2)

Treatment options depend on the type of cancer and include;

Surgery: To diagnose, treat, or prevent cancer. Often offers the greatest chance of cure if the tumor has not metastasized.

Chemotherapy: Use of drugs to prevent growth of cancer cells.

Radiation therapy: High-energy particles or waves that destroy or damage cancer cells.

Also: Stem cell transplant, targeted therapy, immunotherapy, hormonal therapy.

Surgical management of primary tumors:

A curative operation presupposes that the tumor is confined to the organ of origin or to the organ and the regional lymph node basin.
The operability of primary tumors is best determined before surgery with appropriate imaging studies that can define the extent of localregional disease.
Disease involving multiple distant metastases is deemed inoperable because it is usually not curable with surgery of the primary tumor.

Surgical management of the regional lymph node basin:

Most neoplasms have the ability to metastasize via the lymphatics. Therefore, most oncologic operations have been designed to remove the primary tumor and the draining lymphatics. Lymphadenectomy is likely to minimize the risk of regional recurrence of most cancers.

The sentinel node is the first node to receive drainage from tumor site and is the node most likely to contain metastases. The goal of lymphatic mapping and sentinel lymph node biopsy is to identify and remove the lymph nodes most likely to contain metastases in the least invasive fashion. Lymphatic mapping can be performed by using isosulfan blue dye.

Surgical management of distant metastases:

Once a tumor has metastasized it usually is not curable with surgical therapy, but it has resulted in cure in selected cases with isolated metastases to the liver, lung, or brain.
The cancer type is a major determinant in surgical decision making. A liver metastasis from a colon cancer is more likely to be an isolated and thus resectable lesion than a liver metastasis from a pancreatic carcinoma.
In curative surgery for distant metastases, as with surgery for primary tumors, the goal is to resect the metastases with negative margins.

Quality of Resection:

A **resection margin** is the margin of apparently non-tumerous tissue around a tumor that has been surgically removed.

Margins are classified as:

- R0 - no cancerous cells seen microscopically; this is the desired result
- R1 - cancerous cells can be seen microscopically

- R2 – even gross examination by the naked eye shows tumor tissue on the margin, indicating more remains on the patient.

R0 is also called "clean", "tumor negative" or "negative margin"; R1 and R2 are "tumor positive"

If cancerous cells are found at the edges the operation is much less likely to achieve the desired results.

3. Types of precancerosis. Spreading of tumors, tumor symptoms

Precancerosis is the prescence of precancerous lesions.

The term *precancerous* does not mean that an inevitable progression to invasive carcinoma will occur, but lesions, particularly those with high-grade dysplasia, do constitute a clear marker of the potential for later development of invasive cancer.

Respiratory tract: 3 types.

1) Squamous dysplasia and carcinoma in situ:
   - Smoking can cause metaplasia (pseudostratified ep. to squamous) which can lead to dysplasia. (increased cell size, number of cell layers, and increased mitosis)
   - Carcinoma in situ: still confined by basement membrane.

2) Atypical adenomatous hyperplasia:
   - a lesion <5.0 mm consisting of epithelial cells lining the alveoli that are similar to type II pneumocytes. Stepwise evolution to Bronchoalveolar carcinoma -> adenocarcinoma.

3) Diffuse idiopathic pulmonary neuroendocrine cell hyperplasia:
   - rare lesion representing a diffuse proliferation of neuroendocrine cells but without invasion of the basement membrane. If they breach basement membr: carcinoid tumors.

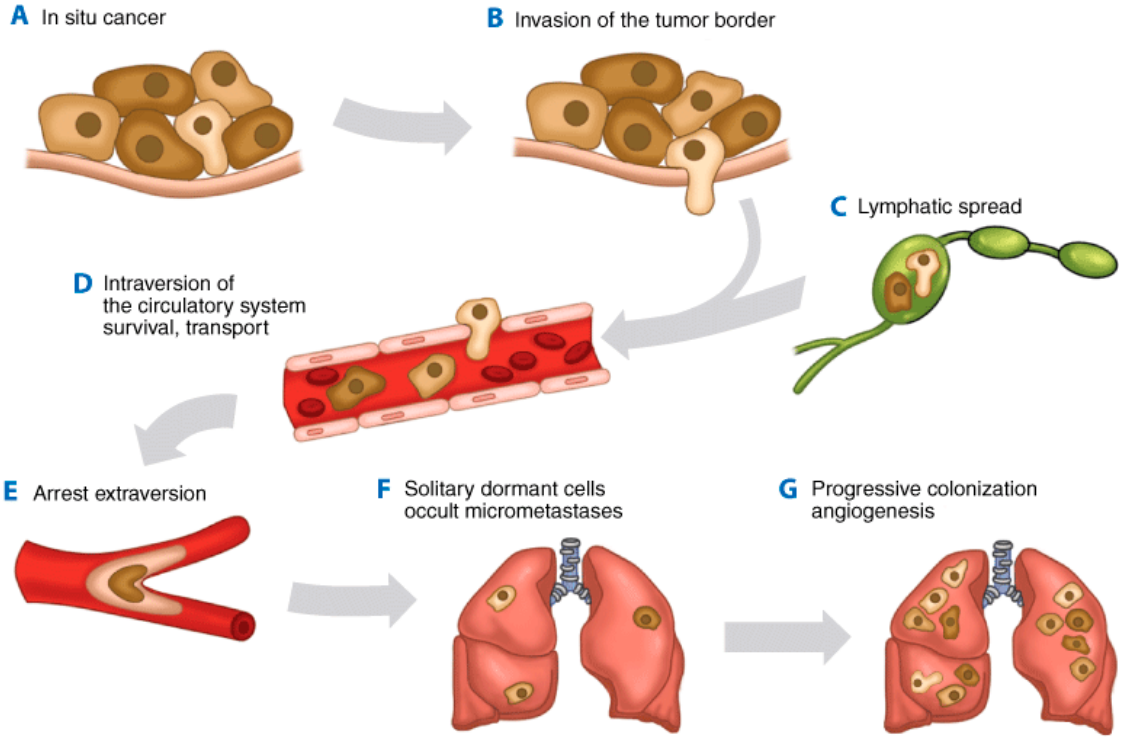
Stomach:

Atrophic gastritis (most common- 95%), adenoma, chronic ulcer, polyps (inflammatory, hamartomatous, heterotopic, hyperplastic, and adenoma)

Spreading of tumors:

Metastases arise from the spread of cancer cells from the primary site and the formation of new tumors in distant sites. The metastatic process consists of a series of steps that need to be completed successfully. First, the primary cancer must develop access to the circulation

through either the blood circulatory system or the lymphatic system. After the cancer cells are shed into the circulation, they must survive. Next, the circulating cells lodge in a new organ and extravasate into the new tissue. Next, the cells need to initiate growth in the new tissue and eventually establish vascularization to sustain the new tumor.



Tumor symptoms: (topic 56 in Patho 1)

Very much depends on the type of cancer. Common for terminal disease: vomiting, pain, cachexia, anorexia.

Clinical problems arise due to:

- Location: Compression of surrounding tissues, effect on local organs, obstruction in luminal organs.
- Functional activity: Hormones, paraneoplasia.
- Bleeding, infections, erosion, ulceration: melena, hematuria, haemoptisis, blood aspiration.
- Rupture or necrosis of tumor.

4. Classification of tumors (topic 57 in Patho 1)

Cancer staging is a system used to describe the anatomic extent of a malignant process in an individual patient. Staging systems may incorporate relevant clinical prognostic factors such as tumor size, location, extent, grade, and dissemination to regional lymph nodes or distant sites. Accurate staging is essential in designing an appropriate treatment regimen for an individual patient.

PET scans can be used in cancer staging. FDG-PET assesses the rate of glycolysis. FDG uptake is increased in most malignant tissues but also in benign pathologic conditions such as inflammatory disorders, trauma, infection, and granulomatous disease.

Grading and staging: Look up grading & AJCC's TNM system for staging in your pathology notes.

5. Metastatic surgery

Surgical management of distant metastases:

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The cancer type is a major determinant in surgical decision making. A liver metastasis from a colon cancer is more likely to be an isolated and thus resectable lesion than a liver metastasis from a pancreatic carcinoma.
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6. Hyperparathyriodism

Hyperparathyroidism is overactivity of the parathyroid glands resulting in excess production of parathyroid hormone (PTH). The parathyroid hormone regulates calcium and phosphate levels and helps to maintain these levels.

Primary: Primary hyperparathyroidism results from a hyperfunction of the parathyroid glands themselves. There is oversecretion of PTH due to aparathyroid adenoma, parathyroid hyperplasia or, rarely, a parathyroid carcinoma.

Secondary: Secondary hyperparathyroidism is due to physiological (i.e. appropriate) secretion of parathyroid hormone (PTH) by the parathyroid glands in response to hypocalcemia. The most common causes are vitamin D deficiency.

Tertiary: Tertiary hyperparathyroidism is seen in patients with long-term secondary hyperparathyroidism which eventually leads to hyperplasia of the parathyroid glands and a loss of response to serum calcium levels. This disorder is most often seen in patients with chronic renal failure and is an autonomous activity

Symptoms: Hypercalcemia which leads to neurologic impairment, musculoskeletal weakness and pain, renal dysfunction, and GI symptoms of nausea, vomiting, and abdominal pain. Cardiac symptoms can be manifest as hypertension, cardiac arrhythmias, and a worsening of digitalis toxicity.

Very high calcium and parathyroid hormone levels in a patient with primary hyperparathyroidism should alert the surgeon to the presence of a possible parathyroid carcinoma.

Parathyroidectomy has been shown to improve the classic and so-called *nonspecific symptoms* and metabolic complications of primary hyperparathyroidism.

7. Thyroid tumors, symptoms, treatment options

In the United States, thyroid cancer accounts for <1% of all malignancies (2% of women and 0.5% of men) and is the most rapidly increasing cancer in women. Thyroid cancer is responsible for six deaths per million persons annually. Most patients present with a palpable swelling in the neck, which initiates assessment through a combination of history, physical examination, and FNAB.

1) **Papillary carcinoma:** Papillary carcinoma accounts for 80% of all thyroid malignancies in iodine-sufficient areas and is the predominant thyroid cancer in children and individuals exposed to external radiation. Papillary carcinoma occurs more often in women, with a 2:1 female-to-male ratio, and the mean age at presentation is 30 to 40 years.

   Symptoms: slow-growing painless mass in the neck. Dysphagia, dyspnea, and dysphonia usually are associated with locally advanced invasive disease. Lymph node metastases are common, especially in children and young adults, and enlarged lymph nodes may be the presenting complaint.

2) **Follicular carcinoma:** Follicular carcinomas account for 10% of thyroid cancers and occur more commonly in iodine-deficient areas. The cumulative mortality from follicular thyroid cancer is approximately 15% at 10 years and 30%at 20 years.

   Symptoms: Follicular cancers usually present as solitary thyroid nodules, occasionally with a history of rapid size increase, and long-standing goiter. Pain is uncommon, unless hemorrhage into the nodule has occurred. Unlike papillary cancers, cervical lymphadenopathy is uncommon at initial presentation.

Treatment:

Patients diagnosed by FNAB as having a follicular lesion should undergo thyroid lobectomy because at least 80% of these patients will have benign adenomas. Some surgeons recommend total thyroidectomy in older patients with follicular lesions >4 cm because of the higher risk of cancer in this setting (50%). Total thyroidectomy should be performed when thyroid cancer is diagnosed.

8. Surgical treatment of hyperthyroidism.

Surgery (thyroidectomy to remove the whole thyroid or a part of it) is not extensively used because most common forms of hyperthyroidism are quite effectively treated by the

radioactive iodine method, and because there is a risk of also removing the parathyroid glands, and of cutting the recurrent laryngeal nerve, making swallowing difficult, and even simply generalized staphylococcal infection as with any major surgery. Some people with Graves' may opt for surgical intervention. This includes those that cannot tolerate medicines for one reason or another, people that are allergic to iodine, or people that refuse radioiodine.

If people have toxic nodules treatments typically include either removal or injection of the nodule with alcohol.

9. Nodular diseases of the thyroid gland

Several conditions can cause nodules to develop in the thyroid gland:

- **Iodine deficiency.** Lack of iodine in your diet can sometimes cause your thyroid gland to develop thyroid nodules. But iodine deficiency is uncommon in the United States, where iodine is routinely added to table salt and other foods.
- **Overgrowth of normal thyroid tissue:** Why this occurs isn't clear, but such a growth — which is sometimes referred to as a thyroid adenoma — is noncancerous and isn't considered serious unless it causes bothersome symptoms from its size. Some thyroid adenomas (autonomous or hyperfunctioning thyroid nodules) produce thyroid hormones outside of your pituitary gland's normal regulatory influence, leading to an overproduction of thyroid hormones (hyperthyroidism).
- **Thyroid cyst:** Fluid-filled cavities (cysts) in the thyroid most commonly result from degenerating thyroid adenomas. Often, solid components are mixed with fluid in thyroid cysts. Cysts are usually benign, but they occasionally contain malignant solid components.
- **Acute (suppurative) Thyroiditis:** *Streptococcus* and anaerobes account for about 70% of cases. Acute suppurative thyroiditis is more common in children and often is preceded by an upper respiratory tract infection or otitis media. It is characterized by severe neck pain radiating to the jaws or ear, fever, chills, odynophagia, and dysphonia. Complications such as systemic sepsis, tracheal or esophageal rupture, jugular vein thrombosis, laryngeal chondritis, and perichondritis or sympathetic trunk paralysis may also occur.
- **Chronic thyroiditis.** Hashimoto's disease, a thyroid disorder, can cause thyroid inflammation resulting in nodular enlargement. This often is associated with reduced thyroid gland activity (hypothyroidism). It’s an autoimmune process leading to destruction of thyrocytes by cytotoxic T cells but by autoantibodies, which lead to complement fixation and killing by natural killer cells. In classic goitrous Hashimoto's thyroiditis, physical examination reveals a diffusely enlarged, firm gland, which also is lobulated. An enlarged pyramidal lobe often is palpable

- **Multinodular goiter:** "Goiter" is a term used to describe any enlargement of the thyroid gland, which can be caused by iodine deficiency or a thyroid disorder. A multinodular goiter contains multiple distinct nodules within the goiter, but its cause is less clear. Over several years, enough thyroid nodules become autonomous to cause hyperthyroidism -> Toxix multinodular goiter.
- **Diffuse toxic goiter:** Graves' disease is by far the most common cause of hyperthyroidism in North America (60 to 80% of cases). It is an autoimmune disease with a strong familial predisposition, female preponderance (5:1), and peak incidence between the ages of 40 to 60 years. Graves' disease is characterized by thyrotoxicosis, diffuse goiter, and extrathyroidal conditions including ophthalmopathy, dermopathy (pretibial myxedema), thyroid acropachy, gynecomastia, and other manifestations.

10. Postoperative complications after thyroid surgery

- Nerves, parathyroids, and surrounding structures are all at risk of injury during thyroidectomy. Injury to the RLN may occur by severance, ligation, or traction, but should occur in <1% of patients undergoing thyroidectomy by experienced surgeons.

- Transient hypocalcemia (from surgical injury or inadvertent removal of parathyroid tissue) has been reported in up to 50% of cases, but permanent hypoparathyroidism occurs <2% of the time.

- Postoperative hematomas or bleeding may also complicate thyroidectomies and rarely necessitate emergency reoperation to evacuate the hematoma. Bilateral vocal cord dysfunction with airway compromises requires immediate reintubation and tracheostomy.

- Wound cellulitis and infection, and injury to surrounding structures such as the carotid artery, jugular vein, and esophagus are infrequent.

11. Tumors of the suprarenal gland. Surgical treatment

Tumors of the adrenal cortex:

- **Adrenocortical adenoma:** Benign tumors that are extremely common.
- **Adrenocortical carcinoma:** Highly aggressive cancer of cortical cells with a poor prognosis as they are often discovered late.

A minority of tumors are "functional" meaning that they
produce glucocorticoids, mineralcorticoids, and/or sex steroids, resulting in endocrine disorders such as Cushing's syndrome, Conn's syndrome (hyperaldosteronism), virilization of females, or feminizationof males. Functional adrenocortical adenomas are surgically curable.

Cushing's syndrome: a collection of signs and symptoms due to prolonged exposure to cortisol. Signs and symptoms may include: high blood pressure, abdominal obesity but with thin arms and legs, reddish stretch marks, a round red face, a fat lump between the shoulders, weak muscles, weak bones, acne, and fragile skin that heals poorly. Women may have more hair and irregular menstruation.

Conn's syndrome: excess production of aldosterone resulting in low renin levels. Often it produces few symptoms. Most people have high blood pressure which may cause poor vision or headaches. Complications include cardiovascular diseases such as stroke, myocardial infarction, kidney failure, and abnormal heart rhythms.

Tumors of the adrenal medulla:

- **Neuroblastoma:** Neuroblastoma is an aggressive cancer of immature neuroblastic cells (precursors of neurons), and is one of the most common pediatric cancers, with a median age at diagnosis of two years. Adrenal neuroblastoma typically presents with a rapidly enlarging abdominal mass. This cancer is unusual in that many cases are highly curable even after metastasis. Neuroblastic tumors often produce elevated levels of cathecholamine precursors.

- **Pheochromocytoma:** Pheochromocytoma is a neoplasm composed of cells similar to the chromaffin cells of the mature adrenal medulla. Pheochromocytomas occur in patients of all ages, and may be sporadic or hereditary. Only 10% are malignant. The most clinically important feature of pheochromocytomas is their tendency to produce large amounts of epinephrine (adrenaline) and norepinephrine. This may lead to potentially life-threatening high blood pressure, or cardiac arrythmias, and numerous symptoms such as headache, palpitations, anxiety attacks, sweating, weight loss, and tremor. Most pheochromocytomas are initially treated with anti-adrenergic drugs to protect against catecholamine overload, with surgery employed to remove the tumor once the patient is medically stable.

Incidentalomas:

An adrenal *incidentaloma* is an adrenal tumor found by coincidence without clinical symptoms or suspicion. It is one of the more common unexpected findings revealed by computed tomography (CT), magnetic resonance imaging (MRI), or ultrasonography

Treatment:

1) Observe with no surgery: Very small tumors tumors not producing any symptoms and found by chance on CT scan can be followed with a repeat CT scan in six months, larger tumors should be removed due to the risk of an underlying cancer. It is recommended that tumors greater than four centimeters should be removed.

2) Laparoscopic adrenalectomy:This is the treatment of choice for tumors less than 10cm.

3) Open adrenalectomy: This is recommended only in patients where there is suspicion of cancer

4) Laparoscopic removal of both adrenal glands: Recommended for patients with disease in both adrenal glands causing Cushing's disease or pheochromocytoma.

12. Gastroduodenal ulcers and their surgical treatment

Peptic ulcers are focal defects in the gastric or duodenal mucosa that extend into the submucosa or deeper. They may be acute or chronic and, ultimately, are caused by an imbalance between mucosal defenses and acid/peptic injury. Helicobacter pylori infection(acid hypersecretion, and compromise of mucosal defense) and/or NSAID (compromise of mucosal defenses) use are common causes. Smoking, stress and other factors can increase the risk.

Symptoms: 90% of patients experience burning pain located in the epigastrium. Patients with duodenal ulcer often experience pain 2 to 3 hours after a meal and at night.

Complications: The three most common complications of ulcers, in decreasing order of frequency, are bleeding, perforation, and obstruction.

Surgical treatment: The indications for surgery are bleeding, perforation, obstruction, and intractability or nonhealing. Today, most patients undergoing operation for ulcers have simple oversewing of a bleeding ulcer, simple patch of a perforated ulcer, or distal gastrectomy.

13. Inguinal hernia

An **inguinal hernia** is a protrusion of abdominal cavity contents through the inguinal canal. Symptoms are present in about 66% of people. This may include pain or discomfort especially with coughing, exercise, or going to the toilet. Often it gets worse throughout the day and improves when lying down. Often, ultrasound, CT and MRI is used in addition to physical examination to give a diagnosis.

Hernias are partly genetic, and risk factors include smoking, COPD, obesity, pregnancy and previous open appendectomy.

Nyhus classification system:

Type I: Indirect hernia; internal abdominal ring normal; typically in infants, children, small adults
Type II: Indirect hernia; internal ring enlarged without impingement on the floor of the inguinal canal; does not extend to the scrotum
Type IIIA: Direct hernia; size is not taken into account

Type IIIB: Indirect hernia that has enlarged enough to encroach upon the posterior inguinal wall; indirect sliding or scrotal hernias are usually placed in this category because they are commonly associated with extension to the direct space; also includes pantaloon hernias
Type IIIC: Femoral hernia.
Type IV: Recurrent hernia; modifiers A–D are sometimes added, which correspond to indirect, direct, femoral, and mixed, respectively

Treatment: (This is not mentioned in the topic title, but a lot of techniques are referred to in the book!! I have no idea if they mentioned it in lectures)

The treatment of inguinal hernias can be subdivided according to approach (i.e., open vs. laparoscopic). Open inguinal hernias can be further subdivided according to whether the repair is performed anterior or posterior to the inguinal floor.

Open approach: Before the widespread use of prosthetic material, inguinal hernia repairs were based on restoring tissue strength through the use of sutures.

Laparoscopy: Laparoscopic inguinal hernia repairs capitalize on the preperitoneal approach using a series of small incisions. The predominant techniques include transabdominal preperitoneal (TAPP) and totally extraperitoneal (TEP) repair, with intraperitoneal only mesh (IPOM) performed the least.

14. Abdominal hernia. Surgical treatment

Hernias of the anterior abdominal wall, or *ventral* hernias, represent defects in the parietal abdominal wall fascia and muscle through which intra-abdominal or preperitoneal contents can protrude. Ventral hernias may be congenital or acquired.

Acquired hernias may develop through slow architectural deterioration of the muscular aponeuroses or they may develop from failed healing of an anterior abdominal wall incision (*incisional hernia*). The most common finding is a mass or bulge on the anterior abdominal wall, which may increase in size with a Valsalva maneuver.

Abdominal hernias may be asymptomatic or cause a considerable degree of discomfort, and generally enlarge over time. Physical examination reveals a bulge on the anterior abdominal wall that may reduce spontaneously or with manual pressure. A hernia that cannot be reduced is described as *incarcerated* and requires emergent surgical correction

Primary ventral hernias (nonincisional) are also termed *true* ventral hernias. Named according to their anatomic location such as *Epigastric hernias*(in the midline between umbilicus and xyphoid proc.) These may be congenital and due to defective midline fusion.

***Umbilical* hernias** occur at the umbilical ring and may either be present at birth or develop gradually during the life of the individual. Umbilical hernias are present in approximately 10 percent of all newborns and are more common in premature infants. Most congenital

umbilical hernias close spontaneously by age 5 years. If closure does not occur by this time, elective
surgical repair usually is advised.

Incisional hernias: occurs in 10-15% of abdominal wounds.
Usually appearing within the first year, but can be delayed up to 15 years after surgery.
Caused by breakdown of repair
Risk factors: obesity, distention and poor muscle tone, wound infection and multiple use of the same infection site. It usually presents as a bulge in the abdominal wall close to the previous wound. It's usually asymptomatic, but there may be pain and strangulation.
Surgical repair is used in case of pain, strangulation or nuisance.

Treatment: Surgical treatment can consist of primary sutured repair or placement of prosthetic mesh for larger defects (>2 cm) using open or laparoscopic methods.

Open mesh repair of incisional hernias generally requires incision or excision of the previous laparotomy scar, with care taken to avoid injury to the underlying abdominal contents.

Laparoscopic procedures have become a new gold standard for abdominal wall reconstruction for ventral hernia with a recurrence rate of only 3.4%.

Patients with advanced liver disease, ascites, and umbilical hernia require special consideration. Enlargement of the umbilical ring occurs as a result of increased intra-abdominal pressure from uncontrolled ascites. The first line of therapy is aggressive medical correction of the ascites with diuretics, dietary management.

15. Appendicitis

Appendicitis is inflammation of the appendix. Appendicitis commonly presents with right lower quadrant abdominal pain, nausea, vomiting, and decreased appetite. However, one third to a half of persons do not have these typical signs and symptoms. Severe complications of a ruptured appendix include wide spread, painful inflammation of the inner lining of the abdominal wall and sepsis.

Appendicitis is caused by a blockage of the hollow portion of the appendix, most commonly by a fecolith. However inflamed lymphoid tissue from a viral infection, parasites, gallstone or tumors may also cause the blockage.This blockage leads to increased pressures within the appendix, decreased blood flow to the tissues of the appendix, and bacterial growth inside the appendix causing inflammation. The combination of inflammation, reduced blood flow to the appendix and distention of the appendix causes tissue injury and tissue death. If this process is left untreated, the appendix may burst, releasing bacteria into the abdominal cavity, leading to severe abdominal pain and increased complications.

Diagnosis: Despite the increased use of ultrasonography, computed tomographic scanning, and laparoscopy, the rate of misdiagnosis of appendicitis has remained constant (15.3%), as has the rate of appendiceal rupture. Compared with younger patients, elderly patients with

appendicitis often pose a more difficult diagnostic problem because of the atypical presentation. Blood samples are also used to detect leukocytosis.

Treatment: Appendectomy for appendicitis is the most commonly performed emergency operation in the world. The standard treatment for acute appendicitis is surgical removal of the appendix. This may be done by an open incision in the abdomen or by laparoscopic intervention.

16. Symptoms and diagnosis of ileus.

Ileus is a disruption of the normal propulsive ability of the GIT characterized by symptoms and signs of intestinal obstruction in the absence of a lesion-causing mechanical obstruction.

Symptoms: The clinical presentation of ileus resembles that of small bowel obstruction. Inability to tolerate liquids and solids by mouth, nausea, and lack of flatus or bowel movements are the most common symptoms. Vomiting and abdominal distention may occur. Bowel sounds are characteristically diminished or absent, in contrast to the hyperactive bowel sounds that usually accompany mechanical small bowel obstruction.

Diagnosis: Physical examination usually reveals marked abdominal distention without pain or tenderness; however, patients may have symptoms mimicking obstruction. Plain abdominal radiography reveals isolated, proximal large bowel dilatation, as shown in the image below, and contrast imaging distinguishes this from mechanical obstruction.

Treatment: Limiting oral intake and correcting the underlying factor. Gentle feeding by enteral feeding tube may help to restore motility by triggering the gut's normal feedback signals, so this is the recommended management initially.

17. Acute gastrointestinal bleedings

Upper gastrointestinal bleeding: acute bleeding proximal to the ligament of Treitz, which requires blood transfusion. In multiple series, the stomach and proximal duodenum is by far the most common source of pathology associated with this diagnosis. The most common causes of acute GI bleeding in emergency room or hospitalized patients are peptic ulcer and gastritis.

High risk situations:

- Large blood loss over a short time period. Indicated by Hypotension, tachycardia, oliguria, low hematocrit, pallor and hematemesis.
- Patient with significant chronic disease that compromises physiologic reserve such as lung, liver, kidney and heart disease.
- The patient is anticoagulated, or immunosuppressed.
- On endoscopy there is bleeding from varices, active bleeding, visible vessel, deep ulcer overlying a large vessel or arterioenteric fistula bleeding.

If judged to be low risk, most patients will stop bleeding with supportive treatment and IV PPI. Selected patients may be discharged from the emergency room and managed on an outpatient basis.
If the patient is judged to be high risk based on one or more of the questions above, then the following should be done immediately:

1. Type and crossmatch for transfusion of blood products.
2. Admit to ICU or monitored bed in specialized unit.
3. Consult surgeon.
4. Consult gastroenterologist.
5. Start continuous infusion of PPI.
6. Perform upper endoscopy within 12 hours, after resuscitation and correction of coagulopathy. Endoscopic hemostasis should be considered in most high-risk patients with acute upper GI bleeding.

Lower gastrointestinal bleeding: The first goal in evaluating and treating a patient with GI hemorrhage is adequate resuscitation. (ensure free airways, support ventilation etc.)
The second goal is to identify the source of hemorrhage. Because the most common source of GI hemorrhage is esophageal, gastric, or duodenal, nasogastric aspiration should always be performed; return of bile suggests that the source of bleeding is distal to the ligament of Treitz. Anoscopy and/or limited proctoscopy can identify or rule out anorectal bleeding.

Techneticum-99–tagged red blood cell scan used to localize bleeding. This is imprecise, but if the test is positive, angiography can then be used to make a precise localization.
If patient is hemodynamically stable: colonoscopy can be used instead.

Treatment: Segmental resection is preferred if the bleeding source can be localized. "Blind" subtotal colectomy may very rarely be required in a patient who is hemodynamically unstable with ongoing colonic hemorrhage of an unknown source

18. Diagnosis of breast cancer

Early detection is the key to success in cancer therapy. Screening for common cancers using relatively noninvasive tests is expected to lead to early diagnosis, allow more conservative surgical therapies with decreased morbidity, and potentially improve surgical cure rates and overall survival rates.

Breast selfexamination: Monthly, starting at age 20
Clinical breast examination: Every 3 y at age 20-39, and every year from 40 years.
Imaging tests are used to evaluate breast disease: in breast cancer the size of the tumor could be obtained from a physical examination, mammogram, or ultrasound, and the tumor size is based only on the invasive component.

Physical Examination:

- **Inspection:** The surgeon inspects the woman's breast with her arms by her side, with her arms straight up in the air, and with her hands on her hips (with and without

pectoral muscle contraction). Symmetry, size, and shape of the breast are recorded, as well as any evidence of edema, nipple or skin retraction, or erythema. With the arms extended forward and in a sitting position, the woman leans forward to accentuate any skin retraction.

- **Palpation:** As part of the physical examination, the breast is carefully palpated. Search for unusual texture, lumps and lymphadenopathy.

Mammograms: An x-ray of the breast. Specific mammographic features that suggest a diagnosis of breast cancer include a solid mass with or without stellate features, asymmetric thickening of breast tissues, and clustered microcalcifications.

Breast ultrasound: A valuable tool to use along with mammography because it is widely available and less expensive than other options, such as MRI. Usually, breast ultrasound is used to target a specific area of concern found on the mammogram. Ultrasound helps distinguish between cysts (fluid-filled sacs) and solid masses.

MRI of the breast: MRI can be used along with mammograms for screening women who have a high risk of developing breast cancer, or it can be used to better examine suspicious lesions found by a mammogram.

Nipple discharge exam: Blood in the discharge could indicate tumor, but the cause is more commonly injury, infection, or benign tumors.

Ductography: The primary indication for ductography is nipple discharge, particularly when the fluid contains blood. Radiopaque contrast media is injected into one or more of the major ducts and mammography is performed. A duct is gently enlarged with a dilator and then a small, blunt cannula is inserted under sterile conditions into the nipple ampulla. Intraductal papillomas are seen as small filling defects surrounded by contrast media. Cancers may appear as irregular masses or as multiple intraluminal filling defects.

The definitive diagnosis of solid tumors usually is obtained by performing a biopsy of the lesion. Biopsy findings determine the tumor histology and grade and thus assist in definitive therapeutic planning

19. Operable breast tumors (surgical and adjuvant treatment)

In Situ Breast Cancer (Stage 0):

- **LCIS (Lobular CIS):** Expert pathologic review is required in all cases. Bilateral mammography is performed to determine the extent of the in situ cancer and to exclude a second cancer. Because LCIS is considered a marker for increased risk rather than an inevitable precursor of invasive disease, the current treatment options for LCIS include observation, chemoprevention with **tamoxifen**, and **bilateral total mastectomy**. The goal of treatment is to prevent or detect at an early stage the invasive cancer that subsequently develops in 25 to 35% of these women.

- **DCIS (Ductal CIS):** Women with DCIS and evidence of extensive disease (>4 cm of disease or disease in more than one quadrant) usually require **mastectomy**. For women with limited disease, lumpectomy and radiation therapy are recommended. Low-grade DCIS of the solid, cribriform, or papillary subtype that is <0.5 cm in diameter may be managed by lumpectomy alone without radiation if the margins of resection are widely free of disease. Specimen mammography is performed to ensure that all visible evidence of cancer is excised. Adjuvant **tamoxifen** therapy is considered for DCIS patients. Women treated with mastectomy have local recurrence and mortality rates of <2%. Women treated with lumpectomy and adjuvant radiation therapy have a similar mortality rate, but the local recurrence rate increases to 9%.

Early Invasive Breast Cancer (Stage I, IIA, or IIB):

Currently, **mastectomy** with assessment of axillary lymph node status and breast conserving surgery with assessment of axillary lymph node status and radiation therapy are considered equivalent treatments for patients with stage I and II breast cancer.

Axillary lymphadenopathy confirmed to be metastatic disease or metastatic disease in a sentinel lymph node necessitates an **axillary lymph node dissection**. Breast conservation is considered for all patients because of the important cosmetic advantages.

Adjuvant **chemotherapy** for patients with early invasive breast cancer is considered for all patients with node-positive cancers, all patients with cancers that are >1 cm, and patients with node-negative cancers of >0.5 cm when adverse prognostic features are present.

Tamoxifen therapy is considered for women with hormone receptor–positive cancers that are >1 cm.

Advanced Local-Regional Breast Cancer (Stage IIIA or IIIB):

Women with stage IIIA and IIIB breast cancer have advanced local-regional breast cancer but have no clinically detected distant metastases. In an effort to provide optimal local-regional disease-free survival as well as distant disease-free survival for these women, surgery is integrated with radiation therapy and chemotherapy.

Neoadjuvant chemotherapy should be considered in the initial management of all patients (to reduce the size of primary cancer and permit breast-conserving surgery) with locally advanced stage III breast cancer. Surgical therapy for women with stage III disease is usually a modified radical mastectomy, followed by adjuvant radiation therapy.

Chemotherapy is used to maximize distant disease-free survival, whereas radiation therapy is used to maximize local-regional disease-free survival.

Distant Metastases (Stage IV):

Treatment for stage IV breast cancer is not curative but may prolong survival and enhance a woman's quality of life. Hormonal therapies that are associated with minimal toxicity are preferred to cytotoxic chemotherapy. Women with stage IV breast cancer may develop anatomically localized problems that will benefit from individualized surgical treatment, such as brain metastases, pleural effusion, pericardial effusion, biliary obstruction, ureteral obstruction, impending or existing pathologic fracture of a long bone, spinal cord compression, and painful bone or soft tissue metastases.

20. Benign breast tumors, inflammations of the breast

(Pure Patho 2 topic, but here's what the book says)

Benign tumors:

FIBROADENOMAS:

Removal of all fibroadenomas has been advocated irrespective of patient age or other considerations, and solitary fibroadenomas in young women are frequently removed to alleviate patient concern. Yet most fibroadenomas are self-limiting and many go undiagnosed, so a more conservative approach is reasonable. Careful ultrasound examination with core-needle biopsy will provide for an accurate diagnosis. Cryoablation is an approved treatment for fibroadenomas of the breast.

Phyllodes Tumors:

These tumors are classified as benign, borderline, or malignant. Borderline tumors have a greater potential for local recurrence. Mammographic evidence of calcifications and morphologic evidence of necrosis do not distinguish between benign, borderline, and malignant phyllodes tumors. Consequently, it is difficult to differentiate benign phyllodes tumors from the malignant variant and from fibroadenomas.

Phyllodes tumors (even benign ones) can sometimes come back in the same place if they are removed without taking enough of the normal tissue around them. For this reason, they are treated by removing the tumor and at least a 1 cm (a little less than ½ inch) area of normal breast tissue around the tumor.

Intraductal papillomas. These are small, wart-like growths in the lining of the mammary duct near the nipple. They usually affect women 45 to 50 years of age and can produce bleeding from the nipple.

Inflammations of the breast:

PERIDUCTAL MASTITIS:

Painful and tender masses behind the nipple-areola complex are aspirated with a 21-gauge needle attached to a 10-mL syringe. Any fluid obtained is submitted for cytologic

examination and for culture using a transport medium appropriate for the detection of anaerobic organisms. In the absence of pus, women are started on a combination of metronidazole and dicloxacillin while awaiting the results of culture. Antibiotics are then continued based on sensitivity tests.

Duct ectasia:
Duct ectasia is a clinical syndrome characterized by dilated subareolar ducts that are palpable and often associated with thick nipple discharge. Haagensen regarded duct ectasia as a primary event that led to stagnation of secretions, epithelial ulceration, and leakage of duct secretions (containing chemically irritating fatty acids) into periductal tissue. This sequence was thought to produce a local
inflammatory process with periductal fibrosis and subsequent nipple retraction

Bacterial Infection:

Staphylococcus aureus and *Streptococcus* species are the organisms most frequently recovered from nipple discharge from an infected breast. Breast abscesses are typically seen in staphylococcal infections and present with point tenderness, erythema, and hyperthermia. These abscesses are related to lactation and occur within the first few weeks of breastfeeding.

Mycotic Infections:

Fungal infections of the breast are rare and usually involve blastomycosis or sporotrichosis. Intraoral fungi that are inoculated into the breast tissue by the suckling infant initiate these infections, which present as mammary abscesses in close proximity to the nipple-areola complex. Pus mixed with blood may be expressed from sinus tracts. Antifungal agents can be administered for the treatment of systemic (noncutaneous) infections. This therapy generally eliminates the necessity of surgical intervention, but occasionally drainage of an abscess, or even partial mastectomy, may be necessary to eradicate a persistent fungal infection.
Candida albicans affecting the skin of the breast presents as erythematous, scaly lesions of the inframammary or axillary folds.

Hidradenitis Suppurativa:

Hidradenitis suppurativa of the nipple-areola complex or axilla is a chronic inflammatory condition that originates within the accessory areolar glands of Montgomery or within the axillary sebaceous glands.20 Women with chronic acne are predisposed to developing hidradenitis. Antibiotic therapy with incision and drainage of fluctuant areas is appropriate treatment. Excision of the involved areas may be required.

Mondor's Disease:

Mondor's disease is a variant of thrombophlebitis that involves the superficial veins of the anterior chest wall and breast. Typically, a woman presents with acute pain in the lateral aspect of the breast or the anterior chest wall. A tender, firm cord is found to follow the distribution of one of the major superficial veins. Rarely, the presentation is bilateral, and

most women have no evidence of thrombophlebitis in other anatomic sites. This benign, self-limited disorder is not indicative of a cancer. When the diagnosis is uncertain, or when a mass is present near the tender cord, biopsy is indicated.

Therapy for Mondor's disease includes the liberal use of anti-inflammatory medications and application of warm compresses along the symptomatic vein. The process usually resolves within 4 to 6 weeks. When symptoms persist or are refractory to therapy, excision of the involved vein segment is appropriate.

21. Acute abdomen

(I have no idea what they want from this topic!)

The term **acute abdomen** refers to a sudden, severe abdominal pain of unclear etiology that is less than 24 hours in duration. It is in many cases a medical emergency, requiring urgent and specific diagnosis. Several causes need surgical treatment

Acute conditions of the abdomen are produced by inflammatory, obstructive, or vascular mechanisms and are manifested by sudden onset of abdominal pain, gastrointestinal symptoms and varying degrees of local and systemic reaction. They require urgent treatment, often including emergency operation. Their urgency usually precludes prolonged investigation and there are few specific tests or examinations which may be relied upon to give clear-cut answers as to the exact cause of the acute condition.

Examples:

- Acute appendicitis: inflammatory
- Acute small bowel obstruction: mechanical
- Mesenteric vascular occlusion: vascular
- Perforated duodenal ulcer: perforated viscera.
- Peritonitis

Physical examination:

First, the patient is surveyed rapidly for fever and/or evidence of shock, hemorrhage, anemia, dehydration or cardiac decompensation. Complete and systemic examination of all organ systems is done next, usually leaving abdominal rectal and pelvic examination until last. It is important that the heart and lungs are examined, not only to determine if an extraabdominal cause for abdominal pain is present, but also whether the patient is in satisfactory condition for surgery if this is indicated.

+ X ray, blood samples and the usual stuff…

Conditions that indicate need for acute surgery:

- Severe abdominal pain in healthy patients lasting over 6h.
- Persistent localized tenderness with muscle spasm indicating peritonitis.
- Severe, intermittent cramping, colic pain, with obstruction of a hollow viscus.

- Markedly hyperactive bowel sounds with small intestinal obstruction, or decreased to absent bowel sounds with paralytic ileus.
- Repeated vomiting of copious amounts of bile-stained or fecal material - in small bowel obstruction.
- Palpation of a mass. Pelvic exam can reveal ectopic pregnancy.
- Certain tests when associated with characteristic clinical features:

1. markedly elevated serum amylase levels - acute pancreatitis
2. free air under diaphragm in an upright x-ray film perforation of a hollow viscus - usually a duodenal ulcer
3. distended loops of small bowel above the level of obstruction in small bowel obstruction with absence of gas below by x-ray; generalized distention of large and small bowel - paralytic ileus

22. Indications and contraindications of laproscopic surgery

Indications:

Minimally invasive surgical procedures reduce the costs of surgery most when length of hospital stay can be shortened and return to workis quickened. For example, shorter hospital stays can be demonstrated in laparoscopic cholecystectomy, Nissen fundoplication, splenectomy, and adrenalectomy. Procedures such as inguinal herniorrhaphy that are already performed as outpatient procedures are less likely to provide cost savings.
With responsible use of disposable instrumentation and a commitment to the most effective use of the inpatient setting, most laparoscopic procedures can be made less expensive than their conventional equivalents.

Almost any gynecologic surgery can be performed laparoscopically in carefully selected patients and in the hands of a skilled minimally invasive surgeon. Advancement in technology and the availability of a wide spectrum of laparoscopic equipment and energy sources have allowed a large variety of surgery to be performed laparoscopically, ranging from simple tubal ligation to complex urogynecologic and oncologic procedures.

Contraindications

Absolute contraindications for operative laparoscopy include the following:

- Inadequately equipped operating room
- Shock
- Markedly increased intracranial pressure
- Retinal detachment

Relative contraindications include:

- Compromised cardiopulmonary status
- Ventriculoperitoneal shunt
- Pregnancy
- Large pelvic masses

- Portal hypertension until the portal pressures are reduced with portal decompression.

23. Surgical endoscopy (Laproscopy, Thoracoscopy)

Laparoscopy
Operative laparoscopy has become the standard approach for most common surgeries, including tubal ligation, cholecystectomy, appendectomy, and ovarian cystectomy.
The unique feature of laparoscopic surgery is the need to lift the abdominal wall from the abdominal organs. Two methods have been devised for achieving this. The first, used by most surgeons, is a pneumoperitoneum.

Procedure:
A tube is inserted through the incision, and carbon dioxide gas is pumped through the trocar to inflate the abdomen. This allows the surgeon to see the organs more clearly and gives more room to work. A laparoscope is then inserted through the trocar. The laparoscope will relay images to a television monitor in the operating theatre, giving the surgeon a clear view of the whole area.
If the laparoscopy is used to carry out a surgical treatment, such as appendectomy, further incisions will be made in the abdomen. Small, surgical instruments can be inserted through these incisions, and the surgeon can guide them to the right place using the view from the laparoscope. Once in place, the instruments can be used to carry out the required treatment.
After the procedure, the carbon dioxide is let out of the abdomen, the incisions are closed using stitches or clips and a dressing is applied.
When laparoscopy is used to diagnose a condition, the procedure usually takes 30-60 minutes. It will take longer if the surgeon is treating a condition, depending on the type of surgery being carried out.

Pneumoperitoneum:
Carbon dioxide (CO_2) and Nitrous oxide N_2O used for inflating the abdomen. N_2O had the advantage of being physiologically inert and rapidly absorbed. It also provided better analgesia for laparoscopy performed under local anesthesia when compared with CO_2 or air. Despite initial concerns that N_2O would not suppress combustion, controlled clinical trials have established its safety within the peritoneal cavity.

The physiologic effects of CO_2 pneumoperitoneum can be divided into two areas: gas-specific effects and pressure-specific effects. CO_2 is rapidly absorbed across the peritoneal membrane into the circulation. In the circulation, CO_2 creates a respiratory acidosis by the generation of carbonic acid. Body buffers, the largest reserve of which lies in bone, absorb CO_2 (up to 120 L) and minimize the development of hypercarbia or respiratory acidosis during brief endoscopic procedures. Once the body buffers are saturated, respiratory

acidosis develops rapidly, and the respiratory system assumes the burden of keeping up with the absorption of
CO2 and its release from these buffers.

In patients with normal respiratory function, this is not difficult; the anesthesiologist increases the ventilatory rate or vital capacity on the ventilator. If the respiratory rate required exceeds 20 breaths per minute, there may be less efficient gas exchange and increasing hypercarbia.

Conversely, if vital capacity is increased substantially, there is a greater opportunity for barotrauma and greater respiratory motion-induced disruption of the upper abdominal operative field. In some situations, it is advisable to evacuate the pneumoperitoneum or reduce the intra-abdominal pressure to allow time for the anesthesiologist to adjust for hypercarbia.

Although mild respiratory acidosis probably is an insignificant problem, more severe respiratory acidosis leading to cardiac arrhythmias has been reported. Hypercarbia also causes tachycardia and increased systemic vascular resistance, which elevates blood pressure and increases myocardial oxygen demand.

Thoracoscopy
The physiology of thoracic MIS (thoracoscopy) is different from that of laparoscopy. Because of the bony confines of the thorax, it is unnecessary to use positive pressure when working in the thorax. The disadvantages of positive pressure in the chest include decreased venous return, mediastinal shift, and the need to keep a firm seal at all trocar sites. Without positive pressure, it is necessary to place a double-lumen endotracheal tube so that the ipsilateral lung can be deflated when the operation starts. By collapsing the
ipsilateral lung, working space within the thorax is obtained. Because insufflation is unnecessary in thoracoscopic surgery, it can be beneficial to use standard instruments via extended port sites in conjunction with thoracoscopic instruments. This approach is particularly useful when performing advanced procedures such as thoracoscopic anatomic pulmonary resection.

24. Criteria of brain death. Medical and legal aspects

Legal definition: Brain death is irreversible unconsciousness with complete loss of brain function, including the brain stem, although the heartbeat may continue. Absence of apparent brain function is not sufficient, it must be accompanied by evidence of irreversibility. Brain death may be used as a sole basis for the determination that a person has died (in case of artificial ventilation).

Medically:
Brain death means that all brain and brain stem function has irreversibly ceased, while circulatory and ventilatory functions are maintained temporarily. The clinical diagnosis of brain death rests on three criteria:

1) Irreversibility of the neurologic insult.

2) Absence of clinical evidence of cerebral function.
3) Absence of clinical evidence of brain stem function.

A brain-dead individual has no clinical evidence of brain function upon physical examination. This includes no response to pain and no cranial nerve reflexes. Reflexes include pupillary response (fixed pupils), oculocephalic reflex, corneal reflex, no response to the caloric reflex test, and no spontaneous respirations.

When testing for brain death, hypothermia, medication side effects, drug overdose, and intoxication must be excluded. Brain death can be diagnosed by routine neurologic examinations (including cold caloric and apnea testing on two separate occasions at least 6 hours apart), coupled with prior establishment of the underlying diagnosis. Confirmatory tests must verify the absence of intracranial blood flow on brain flow studies or the presence of an isoelectric electroencephalogram reading. Once the diagnosis of brain death has been established, the process of organ donation can be initiated.

Legal aspects:
In some countries (for instance, Spain, Poland, Wales, Portugal and France), everyone is automatically an organ donor after diagnosis of death on legally accepted criteria, although some jurisdictions allow opting out of the system. Elsewhere, consent from family members or next-of-kin may be required for organ donation.

25. Types of organ donation

There are two tyes of organ donation: Living and deceased.

Living donor: Living-donor transplantation is unique in that surgeons are operating on a healthy individual (i.e., a living donor) who has no medical disorders and does not require an operation. The use of living donors is an integral and important part of the field of transplantation today. The first transplants ever performed used living donors. Today, living donors are commonly used for
every type of transplant except heart transplants.

The use of living donors offers numerous advantages. Primary is the availability of a life-saving organ. A certain percentage of transplant candidates die while waiting for a deceased-donor organ as a direct result of a complication, or of progression of their underlying disease. A shorter waiting time generally implies a healthier candidate—one whose body has not been ravaged by prolonged end-stage organ failure.

Moreover, living-donor transplants are planned(rather than emergency) procedures, allowing for better preoperative preparation of the potential recipient. Receiving an organ from a closely matched relative may also have immunologic benefits. Lastly, long-term results may be superior with living-donor transplants, which is certainly the case with kidney transplants.

The major disadvantage of living-donor transplants is to the donor. Medically, there is no possibility of benefit for the donor, only potential for harm. The risk of death associated with

donation depends on the organ being removed. For nephrectomy, the mortality risk is estimated to be less than 0.05%. However, for partial hepatectomy, it is about 0.5%.

Deceased donor: Most extrarenal transplants performed today, and roughly one half of all renal transplants, are from deceased donors. These donors are deceased individuals who meet the criteria for brain death, but whose organs are being perfused by life-support measures, allowing adequate time for contacting the potential donor's family and possibly obtain consent to procure suitable organs.

It is important to keep in mind that management of the deceased organ donor is an active process, requiring aggressive monitoring and intervention to ensure that perfusion to the organs of interest is not compromised. For all organ donors, core temperature, systemic arterial blood pressure, arterial oxygen saturation, and urine output must be determined routinely and frequently. Arterial blood gases, serum electrolytes, blood urea nitrogen, serum creatinine, liver enzymes, hemoglobin, and coagulation tests also need to be monitored regularly. Other key factors in donor management include respiratory maintenance, good renal perfusion with brisk urine output, and avoidance of hypothermia.

Surgery: Organs are dissected and flushed with preservative solution.

26. Immunosuppressive therapy after organtransplantation

Transplant rejection is when transplanted tissue is recognized as foreign and attacked by the recipient's immune system, which destroys the transplanted tissue. Transplant rejection can be lessened by determining the molecular similitude between donor and recipient and by use of immunosuppressant drugs after transplant.

To lower the risk of rejection, maintenance immunosuppressive therapy is started immediately posttransplant.

Chronic rejection(characterized by obliteration of small vessels and fibrosis.) is generally considered irreversible and poorly amenable to treatment—only retransplant generally indicated if feasible—though inhaled cyclosporine is being investigated to delay or prevent chronic rejection of lung transplants. **Acute rejection** is treated with one or multiple of a few strategies.

A short course of high-dose corticosteroids can be applied, and repeated. *Triple therapy* adds a calcineurin inhibitor and an anti-proliferative agent. Where calcineurin inhibitors or steroids are contraindicated, mTOR inhibitors are used.

Antibody-based treatments

Antibody specific to select immune components can be added to immunosuppressive therapy. The monoclonal anti-T cell antibody OKT3 once used to prevent rejection, and still occasionally used to treat severe acute rejection, has fallen into disfavor, as it commonly

brings severe cytokine release syndrome and late post-transplant lymphoproliferative disorder.

Blood transfer

Cases refractory to immunosuppressive or antibody therapy are sometimes given blood transfusions—removing antibody molecules specific to the transplanted tissue.

Marrow transplant

Bone marrow transplant can replace the transplant recipient's immune system with the donor's, and the recipient accepts the new organ without rejection. The marrow'shematopoietic stem cells—the reservoir of stem cells replenishing exhausted blood cells including white blood cells forming the immune system—must be of the individual who donated the organ or of an identical twin or a clone. There is a risk of graft-versus-host disease (GVHD), however, whereby mature lymphocytes entering with marrow recognize the new host tissues as foreign and destroy them.

Conclusion:

Immunosuppressive therapy has played an essential role in the success of clinical transplants. However, it is a double-edged sword, because suppression of the immune system prevents or decreases the risk of rejection while concomitantly predisposing the transplant recipient to a wide variety of complications, including infections and malignancies. Infections in transplant recipients may be caused by so-called *opportunistic microbes*, organisms that would not be harmful to a normal, nonimmunosuppressed host, as well as more common pathogens.

27. Preparation of the organ donor. Conservation of cadaver kidneys

Deceased donor:

It is important to keep in mind that management of the deceased organ donor is an active process, requiring aggressive monitoring and intervention to ensure that perfusion to the organs of interest is not compromised. For all organ donors, core temperature, systemic arterial blood pressure, arterial oxygen saturation, and urine output must be determined routinely and frequently. Arterial blood gases, serum electrolytes, blood urea nitrogen, serum creatinine, liver enzymes, hemoglobin, and coagulation tests also need to be monitored regularly. Other key factors in donor management include respiratory maintenance, good renal perfusion with brisk urine output, and avoidance of hypothermia.

Living kidney donor:
Potential living donors are first evaluated to ensure that they have normal renal function with two equally functioning kidneys and that they do not have any significant risk factors for developing renal disease (e.g., hypertension or diabetes). The anatomy of their kidneys and the vasculature can be determined by using various radiologic imaging techniques,

including an IV pyelogram, arteriogram, or computed tomographic (CT) angiogram. Which kidney is removed depends on the anatomy. If there is any minor abnormality in one kidney, that kidney should be removed. If both kidneys are the same, the left kidney is preferred because of the longer left renal vein. Nephrectomy can be performed through a flank incision, by an anterior retroperitoneal approach, or by a laparoscopic technique. With the laparoscopic technique, an intraperitoneal approach is used. This involves mobilization of the colon, isolation of the ureter and renal vessels, mobilization of the kidney, division of the renal vessels, and removal of the kidney.

Preservation:
Organ preservation methods have played an important role in the success of cadaver-donor transplants. They have resulted in improved graft function immediately posttransplant and have diminished the incidence of primary nonfunction of organs. By prolonging the allowable cold ischemia times, they have also allowed for better organ allocation and for safer transplants.

The most common methods involve the use of hypothermia and pharmacologic inhibition to slow down metabolic processes in the organ once it has been removed from the deceased donor. Hypothermia very effectively slows down enzymatic reactions and metabolic activity, allowing the cell to make its limited energy reserves last much longer. A temperature decrease from 37° to 4°C (the temperature of most preservation solutions) slows metabolism about 12- fold. However, in the absence of any energy inflow into the cell, degradative reactions begin to provide the cell with an energy source. The result can be destruction of important structural elements and, eventually, structural damage to the cells and the organ.

Cold storage solutions do not readily permeate the cell membrane and have an electrolyte composition resembling the intracellular environment (low sodium, high potassium), thus preventing the loss of cellular potassium. The most commonly used fluid worldwide is the University of Wisconsin solution.

Although cold preservation has improved cadaver-donor transplant results, the amount of time that an organ can be safely preserved is limited. After that, the incidence of organ nonfunction starts to increase. With kidneys, exceeding the preservation time limit results in delayed graft function, requiring dialysis support for the recipient until function improves.

With kidneys, cold ischemic times should be kept below 36 to 40 hours; after that, delayed graft function significantly increases.

28. Kidney transplantation. Early and late complications

A kidney transplant now represents the treatment of choice for patients with end-stage renal disease (ESRD). It offers the greatest potential for restoring a healthy, productive life in most such patients. Compared with dialysis, it is associated with better patient survival and superior quality of life, and is more cost effective.

COMPLICATIONS:

Early:

- **Hemorrhage:**
  Bleeding is uncommon after a kidney transplant; usually it occurs from unligated vessels in the graft hilum or from the retroperitoneum of the recipient.

- **Vascular complications:**
  Vascular complications can involve the donor vessels (renal artery thrombosis or stenosis, renal vein thrombosis), the recipient vessels [iliac artery thrombosis, pseudoaneurysms, and deep venous thrombosis (DVT)], or both. Renal artery thrombosis usually occurs early posttransplant; it is uncommon, with an incidence of less than 1%. However, it is a devastating complication, usually resulting in graft loss.

- **Urologic complications:**
  Urinary tract complications, manifesting as leakage or obstruction, generally occur in 2 to 10% of kidney recipients. The underlying cause often is related to poor blood supply and ischemia of the transplant ureter. Leakage most commonly occurs from the anastomotic site. Causes other than ischemia include undue tension created by a short ureter, and direct surgical injury. Presentation is usually early (before the fifth posttransplant week); symptoms include fever, pain, swelling at the graft site, increased creatinine level, decreased urine output, and cutaneous urinary drainage.

Late:
Careful attention should be paid to compliance; it often is easy for recipients to become less attentive to their medications as they progress through the posttransplant period. Monitoring kidney function may help detect noncompliance, but also is important to detect late rejection episodes, recurrence of disease, or late technical problems (such as renal artery stenosis or ureteric stricture). Other potential problems in these recipients include hypercholesterolemia, hypertriglyceridemia, and increased blood pressure, which may or may not be related to the immunosuppressive drugs.

Graft rejection can occur at any time, and the patient will be having a life-long increased risk for infections due to the immunosuppressive therapy.

29. Indications of liver and pancreas transplantation:

Diabetes mellitus is a very common medical condition with immense medical, social, and financial costs. In North America, it is the leading cause of kidney failure, blindness, nontraumatic amputations, and impotence. The discovery of insulin changed diabetes from a lethal disease to a chronic illness. However, even though exogenous insulin can prevent the acute metabolic complications and decrease the incidence of secondary complications associated with diabetes, it cannot provide a homeostatic environment comparable to that afforded by a functioning pancreas.

Only a functioning pancreas can provide immediate insulin responses to the moment-to-moment changes in glucose levels. A successful pancreas transplant can establish normoglycemia and insulin independence in diabetic recipients, with glucose control similar to that seen with a functioning native pancreas. A pancreas transplant also has the potential to halt progression of some secondary complications of diabetes. No current method of exogenous insulin administration can produce a euglycemic, insulin-independent state akin to that achievable with a technically successful pancreas graft. Any contraindications to a transplant, such as active malignancy or infection, must be ruled out.

A liver transplant is indicated for liver failure, whether acute or chronic. Liver failure is signaled by a number of clinical symptoms [e.g., ascites, variceal bleeding, hepatic encephalopathy (HE), and malnutrition], and by biochemical liver test results that suggest impaired hepatic synthetic function (e.g., hypoalbuminemia, hyperbilirubinemia, and coagulopathy). The cause of liver failure often influences its presentation. For example, patients with acute liver failure generally have HE and coagulopathy, whereas patients with chronic liver disease most commonly have ascites, GI bleeding, and malnutrition.

Diseases that could be treated by liver transplant:

Cholestatic liver diseases
Primary biliary cirrhosis
Chronic hepatitis
Hepatitis B
Hepatitis C
Autoimmune hepatitis
Alcohol liver disease
Metabolic diseases
Hemochromatosis
Tyrosinemia
Cystic fibrosis
Hepatic malignancy
Hepatocellular carcinoma
Amyloidosis

30. Requirements of one day surgery

In Hungary ambulatory and one-day surgery interventions are regulated by a ministerial decree with strict, legally controlled professional, social and other requirements. The purpose of this regulation is that patients receive professionally impeccable service in utmost safety.

The patient can leave the hospital after the operation on the same day, or within 24 hours on their own or with accompanying person. The further stages of recovery are spent at home which strongly reduces hospital costs.

There are no age limits of the intervention, but it's important, that the patient should be healthy apart from the disorder, which will be operated on. If there is comorbidity it should be balanced by pharmaceutical treatment (e.g. high blood pressure). That's the only way how the patient may recover at home.

Pre-operative screening by protocol includes: laboratory tests, X-ray, ECG, examination of internal medicine specialist and other examinations if required.

Specialties of one-day surgery:

- General surgery: hemorrhoids, hernia surgery, varicectomy, spider veins' sclerotisation.
- Pediatric surgery: circumcision, abdominal and inguinal hernia surgery, vascular malformation, varix surgery
- Orthopedics: arthroscopic knee surgery, mallet finger surgery, fat fleet or fallen arches surgery, tennis elbow surgery
- Urology: hydrocele surgery, circumcision, varicocele surgery

31. Types of artificial feeding

Nutritional support is used to help people who aren't able to eat or drink in the usual way. It can: prevent weight loss, help people who need to put on weight help to overcome weakness or tiredness, make sure that people are getting enough liquid, ease the pressure of having to eat - for example, if people have problems swallowing and find it difficult to eat.

Parenteral nutrition: This is where the nutritional fluid is given through a tube that is put into a vein (intravenously). PN is sometimes called TPN (total parenteral nutrition) as it aims to give total nutritional support, although this isn't always possible. PN is usually used if people are unable to have EN. This may happen if you've had major surgery on the small bowel, have a bowel obstruction or if the insertion of the tubes used for EN would be difficult, which may happen after some types of surgery to the head, neck or stomach.

Enteral nutrition: This is where the nutritional fluid is given into the gut through a tube going into the stomach or small intestine. There are different ways of giving EN. EN is best for you if your digestive system is working normally but you aren't able to eat enough - for example, because of a cancer in the head or neck area.

- **Nasogastric tube:** Short-term use only; aspiration risks; nasopharyngeal trauma; frequent dislodgment
- **Nasoduodenal/nasojejunal tube**: Short-term use; lower aspiration risks in jejunum; placement challenges (radiographic assistance often necessary)

- **Percutaneous endoscopic gastrostomy (PEG**) Endoscopy skills required; may be used for gastric decompression or bolus feeds; aspiration risks; can last 12–24 mo; slightly higher complication rates with placement and site leaks.
- **Surgical gastrostomy**: Requires general anesthesia and small laparotomy; procedure may allow placement of extended duodenal/jejuna feeding ports; laparoscopic placement possible

32. Indications, contraindications of artificial feeding

Indications:

Parenteral nutrition:

The principal indications for parenteral nutrition are malnutrition, sepsis, or surgical or traumatic injury in seriously ill patients for whom use of the gastrointestinal tract for feedings is not possible. In some instances, intravenous nutrition may be used to supplement inadequate oral intake.

The safe and successful use of parenteral nutrition requires proper selection of patients with specific nutritional needs, experience with the technique, and an awareness of the associated complications. As with enteral nutrition, the fundamental goals are to provide sufficient calories
and nitrogen substrate to promote tissue repair and to maintain the integrity or growth of lean tissue mass.

Enteral nutrition:

Enteral nutrition generally is preferred over parenteral nutrition based on the lower cost of enteral feeding and the associated risks of the intravenous route, including vascular access complications. Laboratory models have long demonstrated that luminal nutrient contact reduces intestinal mucosal atrophy compared with parenteral or no nutritional support. Studies comparing postoperative enteral and parenteral nutrition in patients undergoing gastrointestinal surgery have demonstrated reduced infectious complications and acute phase protein production in those fed by the enteral route.

Contraindications:

Parenteral Nutrition:

- Functioning gastrointestinal tract
- Treatment anticipated for less than 5 days in patients without severe malnutrition
- Inability to obtain venous access
- A prognosis that does not warrant aggressive nutrition support
- When the risks of PN are judged to exceed the potential benefits.

Enteral Nutrition:

- Diseases associated with ileus: peritonitis, multiple trauma.
- Intestinal obstruction

- Active GI hemorrhage
- Hemodynamic instability: enteral nutrition in an ischemic small bowel can worsen ischemia and lead to necrosis.

33. Burn Causes, Diagnosis, Symptoms, and Treatment

Causes: Burns are commonly classified as thermal, electrical, or chemical burns, with thermal burns consisting of flame, contact, or scald burns. Flame burns are not only the most common cause for hospital admission of burns, but also have the highest mortality. This is primarily related to their association with structural fires and the accompanying inhalation injury and/or CO poisoning.

Diagnosis: Burn wounds are commonly classified as superficial (first degree), partial thickness (second degree), full thickness (third degree), and fourth-degree burns, which affect underlying soft tissue. Partial-thickness burns are then classified as either superficial or deep partial thickness burns by depth of involved dermis.

Symptoms: Clinically, first-degree burns are painful but do not blister, second-degree burns have dermal involvement and are extremely painful with weeping and blisters, and third-degree burns are hard, painless, and nonblanching.

Treatment:

-Fluids & cooling as first reaction after burn injury.

There are multitudes of topical therapies for the treatment of burn wounds. Of these, silver sulfadiazine is the most widely used in clinical practice. Silver sulfadiazine has a wide range of antimicrobial activity, primarily as prophylaxis against burn wound infections rather than treatment of existing infections. It has the added benefits of being inexpensive and easily applied, and has some soothing qualities. It is not significantly absorbed systemically and thus has minimal metabolic derangements.

Topical antimicrobial drugs are used to prevent infections of the burn wound.

Silver-impregnated dressings such as Acticoat (Smith & Nephew, London, England) and Aquacel Ag (Convatec, Princeton, NJ) are increasingly being used for both donor sites and skin grafts, as well as for burns that are clearly partial-thickness on admission. These help reduce the number of dressing changes and may be more comfortable for the patient, but should not be used in wounds of heterogeneous depth.

Surgery: Many superficial partial-thickness burns will heal with expectant management, while the majority of deep partial-thickness burns require excision and skin grafting. The last area of a burn is called the *zone of hyperemia*, which will heal with minimal or no scarring.