Digestive system

Test Objectives

3. Topographical relationships between organs: -Organs projection on the abdominal wall. -Syntopy. -Abdominal cross sections.
5. Ducts tributary and course.
6. Vessel branches and tributaries and functions.

Description of the test

The written test on the digestive system follows the general rules for written tests (see Continuous testing – organisation). The basic topics of the test are the structure of the wall of the intestinal tract, and the structure, location, syntopy, topography, innervation and blood supply of each organ of the digestive system. For each organ it is necessary to know the detailed blood supply, venous and lymph drainage. Detailed knowledge of the innervation of the organs of the digestive tract is required from the oral cavity to the pharynx. For organs located aboral to the pharynx it is required to know the main nerves; details about their branching patterns are not required. The test includes questions based on pictures and schemes of the general structure of the intestinal tract, topographic spaces of the peritoneal cavity and projections of organs on the anterior abdominal wall. The test also includes radiographical images. In the final part of the test the student is required to draw and describe an anatomical scheme from the list of required schemes (see below).
Clinical notes

Facial clefts are caused by incomplete fusion of the lips, maxilla and hard palate.

**Cheiloschisis** – cleft lip

**Gnathoschisis** – cleft maxilla

**Palatoschisis** – cleft hard palate

**Cheilognathopalatoschisis** – combined cleft of all the above mentioned structures.

The danger triangle of the face (*trigonum mortis*) is an area richly supplied with blood, located between the angles of the mouth and root of the nose. Venous blood from this area drains into the intracranial venous sinuses, thus there is a risk of a pathological process spreading to the intracranial space from this area.

An orthopantomograph (OPG) is an X-ray image that clearly shows the facial part of the skull with the teeth in both dental arcades.

When performing first aid, the tongue must be prevented from falling backwards and blocking the airways. This is done by moving the mandible forward (as the tongue is attached to the mandible by the genioglossus). The same effect can be achieved by bending the head backwards, which causes the root of tongue to move out of the laryngeal part of the pharynx.

During acute tonsillitis dead bacteria and denuded epithelial cells accumulate in the pits and crypts of the tonsil and a white exudate emerges on the surface. Swollen tonsils can narrow or even completely close the lumen of the pharynx, impairing swallowing or even causing asphyxiation. Inflammation of the palatine tonsils is also called angina tonsillaris.

The internal carotid artery runs close to the palatine tonsil in the parapharyngeal space. It can be damaged during a careless tonsillectomy as it runs about 25 mm dorsal to the tonsil. Nevertheless, the most common structure prone to bleeding during and after tonsillectomy is the paratonsillar vein (a tributary of the external palatine vein).

Oesophageal varices are a severe consequence of portal hypertension. The
elevated portal vein pressure is transmitted to the veins in the submucosa of the cardia and lower part of the oesophagus. Blood stagnates in these veins, resulting in a dilated venous submucosal plexus in the cardia and lower third of the oesophagus. There is a risk of the rupture and life threatening bleeding from oesophageal varices.

**Gastric ulcers** are more likely to occur in areas of the stomach that have poor blood supply, such as where the anastomotic arterial arches are attached to the lesser and greater curvatures of the stomach.

**Duodenal glands / Brunner's glands** are submucosal serous tuboalveolar glands that produce and secrete an alkaline liquid, which neutralises the acidic content from the stomach.

**Meckel's diverticulum** is a blind ended vestigial remnant of the omphaloenenteric duct, an embryological structure that connects the primitive intestinal tract to the yolk sac. Meckel's diverticulum is present in 2% of the population. In more than 50% of cases Meckel's diverticulum contains ectopic tissue (e.g. stomach, duodenal or pancreatic tissue), which may become a source of bleeding. Inflammation of Meckel's diverticulum can resemble appendicitis. Thus during an appendectomy it is necessary to examine 100cm of small intestinal oral to the ileocecal valve for presence of Meckel's diverticulum.

**Acute appendicitis** is an acute inflammation of the appendix. The classical presentation of appendicitis is pain in the right area under the umbilicus, but it can imitate inflammation of other organs according to its position. It is causes severe abdominal pain, a condition known as an acute abdomen. Retrocaecal appendices have the worst prognosis.

**Liver cirrhosis** is scarring of the liver caused by chronic inflammation. The hepatic parenchyma becomes nodular. Portal venous blood pressure may rise due to cirrhosis. This is called portal hypertension and can lead to an expansion of the portocaval anastomosis between the stomach and oesophagus, which results in oesophageal varices. Bleeding of ruptured varices is a life-threatening condition.

**Division of the liver parenchyma into segments** allows surgical removal of individual segments according to their blood supply.

**Tumors of the head of the pancreas** can compress the bile duct leading to icterus (jaundice), compress the portal vein leading to portal hypertension and
compress the pylorus or duodenum leading to obstruction of the passage of chyme.

**Peritoneocentesis** is a procedure in which a needle is inserted into the peritoneal cavity and peritoneal fluid is aspirated. It is performed between the left and middle third of a line connecting the umbilicus to the left anterior superior iliac spine. Under ultrasound guidance it may be performed in other positions.

**The subphrenic space** is an area between the diaphragmatic surface of the liver and inferior surface of the diaphragm. Pathological processes in this area may present with the phrenic sign: pain radiating into the right shoulder (sensory fibres of the phrenic nerve reach the inferior surface of the diaphragm).

**The lesser sac** can be surgically approached in three ways. The upper approach through the lesser omentum does not carry a risk of bleeding but provides only limited access to the lesser sac. Dissection of the gastrocolic ligament carries a risk of bleeding from the gastroomental vessels and their branches but provides a larger view of the lesser sac. The lower approach through the transverse mesocolon necessitates ligation of the middle colic vessels but provides a larger view of the lesser sac. The lesser sac is most commonly approached through the gastrocolic ligament.

**The right subhepatic recess (space of Morison)** is the deepest space of the supramesocolic part of the peritoneal cavity in a patient lying down (supine position). It is necessary to remove blood and fluid that accumulates in this space during surgery.

**Fluid** (blood, peritoneal exudate, etc.) tends to collect in the recto-uterine pouch, as it is the deepest part of the peritoneal cavity (in a standing woman). The rectouterine pouch can be accessed via the posterior fornix of the vagina to drain this fluid. Similarly, a peritoneal dialysis catheter can be placed here to insert and drain the dialysate.

**Other interesting points**

**The enteric nervous system** is a special part of the autonomic nervous system that controls the digestive system. The submucous plexus of Meissner (*plexus submucosus*) and the myenteric plexus of Auerbach work together. They are able to work independently of extrinsic signals, but both are influenced by the
sympathetic and parasympathetic nervous systems.

According to the knowledge of tooth eruption, it is possible to estimate the age of a child with a discrepancy of about half a year.

Division of the parotid gland by the intraparotid plexus (branches of the facial nerve) into the superficial and deep part does not match exactly the morphological division into the pars superficialis and pars profunda.

The auditory tube / pharyngotympanic tube / Eustachian tube (tuba auditiva, tuba pharyngotympanica, salpinx) is a tube connecting the nasopharynx to the middle ear. It serves to equilibrate air pressure in the middle ear.

The suspensory muscle of duodenum / Ligament of Treitz (musculus suspensorius duodeni) is a musculo-ligamentous fascicle extending from the left crus of the diaphragm. It suspends the duodenojejunal flexure.

The terminal ileum is a clinical term for the aboral part of ileum, which continues into the caecum. Inflammatory bowel diseases such as Crohn's disease may affect this part of small intestine.

The developmental border zone between the midgut and hindgut is situated between the middle and left thirds of transverse colon (the Cannon-Böhm point). This also represents the border between parasympathetic innervation from the vagus nerve and from the sacral spinal segments.

The appendicular tonsil is a term for the vermiform appendix based on the extensive amount of lymphoid tissue in its wall.

It can be sometimes difficult to determine the position of the vermiform appendix, particularly when it is in atypical positions or during inflammation of the abdominal cavity. In such cases, orientation by the taeniae coli can help as they converge on the vermiform appendix to form a continuous muscular layer.

The haemorrhoidal plexus (internal rectal venous plexus) is located in the submucosa of the oral part of the anal canal. It elevates the submucosa and contributes to the closure mechanism of the rectum. The superior rectal vein supplies blood to this area and it plays a key role in the pathogenesis of
The sphincter of the hepatopancreatic ampulla is closed during the resting phase of digestion. This causes bile to accumulate in the bile duct and, after it reaches the level of the cystic duct, passively flow into the gallbladder.

The liver is held in its position by the inferior vena cava, its adhesion to the diaphragm (bare area), support of the abdominal organs, the round ligament of the liver and other attachments.

The greater omentum is formed not by two, but by four layers of peritoneum. So it is, in fact, not a duplication but a quadruplication of peritoneum. It merges with the gastrocolic ligament. It is wide and hangs freely, full of vessels and adipose tissue and functions to enlarge the surface of the peritoneum. It hangs down in front of the intestines like an apron.

The term Space of Proust is not commonly used in the clinical medicine. Instead, the term Pouch of Douglas is incorrectly used for both genders.

Required schemes

- Dental formula (for deciduous and permanent teeth)
- Innervation of the tongue (somatosensory and special sensory)
- Syntopy of the stomach (ventral and dorsal surfaces)
- Frontal section of the rectum
- Syntopy of the liver (facies visceralis)
- Gallbladder and extrahepatic biliary tree
- Branching pattern of the coeliac trunk
- Branching pattern of the superior and inferior mesenteric arteries
- Branching pattern of the portal vein

Radiological images