

Physical examination of liver- inspection, percussion, auscultation

Inspection

Inspection of the abdomen should be done with the patient in vertical or lying position.

Research of an abdomen in a vertical position begins with survey. Thus the doctor sits on a chair, and the patient faces the doctor, the person to him, completely having naked the abdomen.

For exact delimitation of localization of the signs revealed by objective inspection, abdomen conditionally part on some regions. Two horizontal lines (the first line bridges the tenth ribs, the second - the top edges of ileac bones) divide a front abdominal wall part on three departments, locating one under another: *epi-, meso-and hypogastric regions*. Two collateral vertical lines conducted on outside edges of rectus abdominis muscles divide epigastric region into two *subcostal (hypogastric) regions (right and left)* and (in more narrow sense) *epigastric region* posed in the middle; mesogastric - on two *lateral flancs (flanks)* and on *umbilical region*; hypogastric region - on two *inguinal (ileac) regions* locating on each side and *suprapubic region*.

At the beginning of survey the form of the abdomen is defined. In the healthy person the form of the abdomen substantially depends on his constitution.

Percussion of liver

Percussion is used to determine the borders, size and configuration of the liver. The superior and inferior borders of the liver are outlined. Two superior borders of liver dullness are distinguished: relative dullness, which is the true upper border of the liver, and the absolute dullness, i.e. the upper border of that part of the anterior surface of the liver which is directly adjacent to the chest and is not covered by the lungs. Practically, absolute dullness is determined only because a position of the superior border varies depending on the size and configuration of the chest, the height of the right cupula of diaphragm, and also because the upper edge of the liver is deeply hidden behind the lungs. Finally, the liver usually becomes enlarged in the downward direction. This is determined by the position of its inferior edge.

Liver (as the dense organ) produces a percussion dull sound; right lung adjoining above - a clear pulmonary sound; stomach and intestine, adjoining below - a tympanic sound. As the right pulmonary inferior edge locates into space between anterior chest wall and liver, filling a costal-diaphragmatic sinus, the high border of the dulled sound coincides with true edge of a liver, and appearance of a dull sound corresponds to its part which is not covered with edge of lung. The border between a dulled and dull sound is designated as a high border of absolute hepatic dullness.

The upper border of a liver determined by percussion is always below the true anatomical border. The quiet percussion is applied to revealing of a high border of absolute hepatic dullness.

Percussion of the liver is performed according to the general rules of topographic percussion, i.e. a position of the pleximeter-finger should be collateral to the border which is necessary for determining, percussion from a clear sound to dull, border designate from the side of a clear sound. Quiet percussion is used to determine the absolute liver dullness. The direction of percussion is from top to bottom, along the vertical lines, like in determining the borders of the right lung. The border is detected by contrast between the clear pulmonary resonance and liver dullness. The found border for each vertical line is marked on the skin by dots by the upper edge of the pleximeter-finger.

Superior border of absolute hepatic dullness is determined on parasternalis, midclavicular, right anterior axillary lines by percussion on intercostal spaces. On the parasternalis line a position of the border is specified by percussion on two overlying ribs above the dullness. Having received different percussion sound above them, a physician marks the border on the upper edge of the subjacent rib from them (routinely the 6-th).

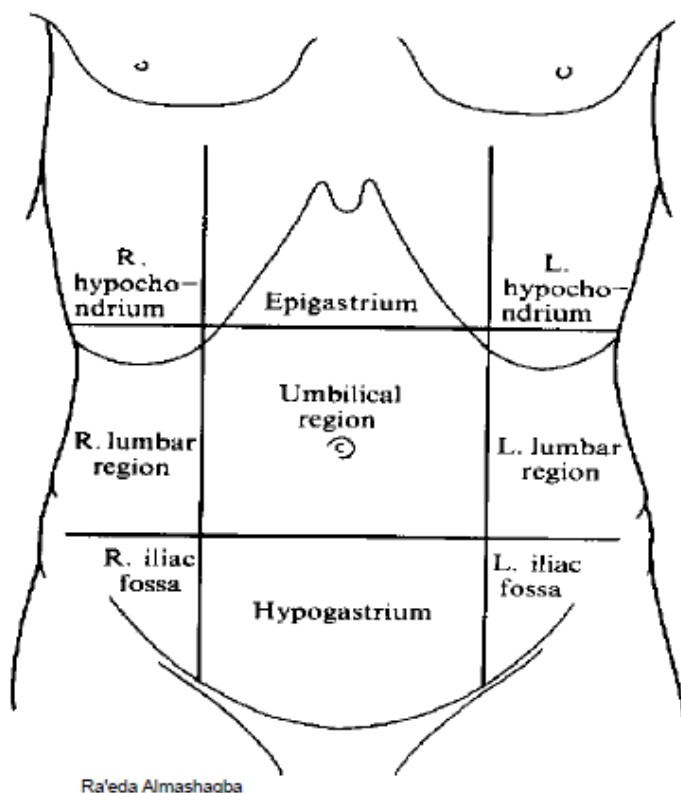
In norm the superior border of absolute hepatic dullness passes on right parasternalis line at the level of the upper edge of the 6-th rib, on the midclavicular line - at the level of inferior edge of the 6-th rib, on anterior axillary line - at the level of inferior edge of the 7-th rib. The superior bound of relative dullness of a liver is posed on one rib above absolute dullness of the liver. The superior border of the liver can be determined posteriorly, but normally the determination ends by percussion in the three mentioned lines.

Delimitation of the **inferior border of absolute hepatic dullness** is difficult because of the presence of hollow organs in the vicinity of the liver. The stomach and the intestine give high

tympanic sound that masks the liver dullness. The lightest (quietest) percussion should therefore be used.

Percussion gives information about the vertical dimensions of the area of liver dullness. The distance between the superior and inferior borders of absolute dullness is measured on the three vertical lines. The distance between the superior and inferior borders of absolute dullness of a liver compounds the *height of absolute hepatic dullness*. This distance in the right anterior axillary line is normally 10-12 cm, in the right midclavicular line - 9—11 cm, and in the right parasternal line - 8—10 m. The increase of the height of absolute hepatic dullness has relation mainly to enlargement of the right lobe of liver.

Elevation of the inferior margin indicates diminution of the liver; it can also occur in meteorism and ascites which displace the liver upwards. The lower border usually descends when the liver is enlarged (due to hepatitis, cirrhosis, cancer, echynococcosis, blood congestion associated with heart failure, etc.). But it can sometimes be explained by low position of the diaphragm. Systematic observation of the liver borders and changes in the liver dullness gives information on changes in its size during the disease.



- Liver assessed by percussion and palpation
- percussion (to estimate size and shape)
- Palpation (to evaluate its surface, consistency, and tenderness)

Percussion: to measure vertical span

- Identify the lower border of the liver by Percuss at the Rt MCL start from under the umbilicus

(tympany) then move upward toward the liver (Dullness)

- Identify the upper border of the liver by Percuss at Rt MCL start from lung resonance down to liver dullness

- You can percuss at MSL

- Normal liver span ranges from 6-12cm at Rt MCL or 4-8cm at MSL and in male > female, tall>shorter

- Increase liver span in liver enlargements

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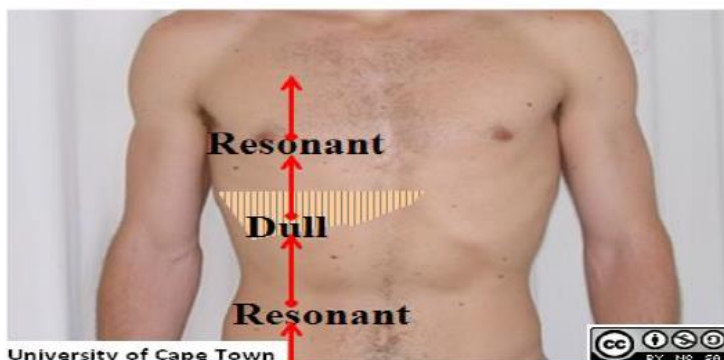
1- Lower border of the liver:

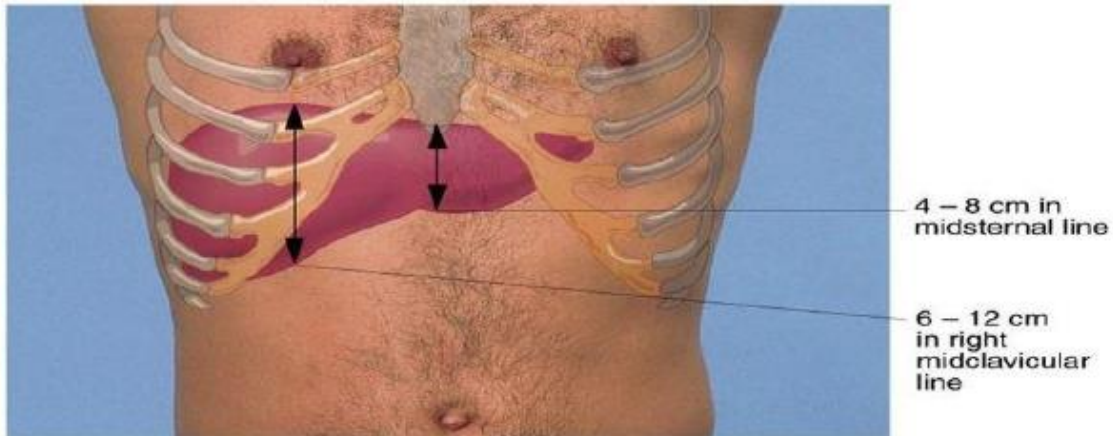
Start percussion from right iliac fossa and go upwards in mid clavicular line till you reach the area of lower border hepatic dullness .

2- Upper Border of the liver:

Start from the second right intercostal space till you reach the hepatic dullness which is normally in 5th right intercostal space

Percuss downwards from the fifth intercostal space as a check of the size of the liver AND localize the right lobe lower edge by palpation (**liver span**). **Normal liver span is 6-12 cm at the right MCL and 4-8 cm at midaxillary line. Measurements by means of percussion typically underestimates liver size.**





Normal liver spans

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- *Auscultation of abdomen in vertical position* of the patient it is performed for definition of a *friction murmur of a peritoneum* in the right and left hypogastrium in perihepatitis and episplenitis. The importance of auscultation for diagnosis of diseases of the liver and gall bladder is only relative. In only rare cases peritoneal friction can be heard over the liver and the gall bladder (in perihepatitis or pericholecystitis). This sound resembles pleural friction, and is a dangerous sign. It indicates deep extension of inflammation onto all walls of the gall bladder and possible perforation.
- *Auscultation of esophagus*. Listening to epigastric range below xiphoid process or above it, at swallowing fluids by the healthy person it is possible to hear two murmurs: the first - at once after swallowing, and 6-9 seconds later the second - connected to transit of fluid through cardia. Delay or absence of the second murmur specifies an interrupting arised in the inferior third of an esophagus, in a cardiac department of a stomach.
- *Auscultation of abdomen in horisontal position*
- *Auscultation of peristalsis intestinal tones* gives information about the motor function of the intestine. During gastric digestion and movement of the chyme along the small

intestine, long periodic rumbling can be heard. Rhythmic intestinal murmurs can be heard 2-3 per minute 5—7 hours after meals. The peristalsis intestinal tones are listened in the cecum (right inguinal range), in the small intestine (above the point of Porges – 2 sm from umbilicus in upper and left direction) and in sigmoid (left inguinal range). In mechanical obstruction of the intestine, its peristalsis is resonant (in large waves). Peristalsis disappears in paralytic obstruction of the intestine; the abdomen is absolutely "silent" in perforation of the ulcer with secondary paralysis of the intestine; peritoneal friction can be heard in patients with fibrinous peritonitis during respiratory movements.

- *Auscultation of stomach. Splashing sound (succussion)* can be heard if the patient is lying on his back, while the examiner pushes the anterior wall of the peritoneum with four flexed fingers of the apt hand. The other hand of the physician should fix the muscles of the abdominal prelin against the sterna edge. The thrust of the hand is transmitted through the stomach wall to the liquid and air contained inside it to cause a readily audible splashing sound which is inaudible outside the inferior borders of the stomach. This technique for outlining the inferior border of the stomach is effective in cases where the stomach border formed by the greater curvature is at the normal level or lowered. Succession gives information about the evacuator function of the stomach: the splashing sounds in healthy subjects can only be heard after meals. Splashing sounds heard 7-8 hours after meals suggest evacuator dysfunction of the stomach (mostly in pyloric stenosis) or its pronounced hypersecretion (*gastrosuccorhea*). Splashing sounds heard to the right of the
- median line of the abdomen indicate dilatation of the prepyloric part of the stomach (Vasilenko's symptom).

- Auscultation of the stomach is helpful when used together with palpation of the stomach to outline its inferior border. *Auscultative (stethacoustic) palpation* is performed as follows: stethoscope is placed beneath the left costal arch below the Traube's space. The examiner rubs the abdominal wall overlying the stomach by the finger of left arm and gradually moves the finger away from the stethoscope bell. As long as the finger rubs the skin overlying the stomach, the physician hears the friction, but when the finger moves outside the stomach borders, the sound disappears. This method is very simple but the findings are sometimes inaccurate.
- *Auscultation of abdominal aorta* is performed on midline 5-7 sm above umbilicus. Systolic murmurs can be listened in abdominal aorta aneurysm, atherosclerosis of abdominal aorta and its branches.

Source:

- 1- OSCE And Clinical skills handbook: Hurley KF, second edition. Elsevier Canada 2011
- 2- Online osceskills website. www.osceskills.com
- 3- Macleod`s clinical examination ,thirteenth ed. 2013
- 4- www.geekymedics.com
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- 7- VITEBSK STATE MEDICAL UNIVERSITY DEPARTMENT OF PROPEDEUTICS OF INTERNAL DISEASES. GENERAL PROPEDEUTICS OF INTERNAL DISEASES LECTURE COURSE Compiled by L.M. Nemtsov, MD (2-е издание) Vitebsk, EI «VSMU» 2016