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SPATIAL TOPOGRAPHY OF THE HUMAN DIAPHRAGM

ПРОСТОРОВА ТОПОГРАФІЯ ДІАФРАГМИ ЛЮДИНИ

Резюме. Для проведення діагностичних і лікувальних маніпуляцій має велике значення знання індивідуальної просторової топографії діафрагми пацієнта. Проведене дослідження з метою встановити індивідуальні особливості просторової топографії діафрагми людини в двох вертикальних площинах – сагітальній та фронтальній, на основі даних СКТ-дослідження з урахуванням статі, віку та соматотипу. Матеріалом були дані 75 пацієнтів обстежених з приводу захворювань різних органів черевної та грудної порожнин. Вимірювання висоти розташування правого і лівого куполів діафрагми і кутів її приєднання виконувалося у фронтальній площині по задньо-задньо пахвовій, середньо-середньо пахвовій і передньо-передньо пахвовій лініях. Статистична обробка отриманих вимірювань виявила малу кореляційний залежність між віком і висотою розташування куполів у чоловіків. Інші показники не мали кореляції з досліджуваними значеннями (стать і тип будови тіла).

Ключові слова: індивідуальна просторова топографія, висота розташування діафрагми, кут приєднання діафрагми.

Individual spatial topography of the diaphragm is of great importance for understanding the organization of the body in a particular clinical case. For diagnostic and particularly therapeutic manipulation knowledge of the individual characteristics of each patient is required [1-4]. This knowledge allows you to avoid damage to the internal organs of the abdominal and thoracic cavities when they puncture (catheterization) and more accurately determine the localization of the pathological process, choose the method further surgical or conservative treatment [5-7].

Objectives. The purpose of our research was determination of the individual characteristics of the spatial topography of the human diaphragm in two vertical planes – sagittal and frontal based on SCT-research depending on gender, age and somatotype.

According to the results of the measurements reveal the presence (or absence) of the relationship between individual characteristics and spatial topography of gender, age and the type of body structure. The resulting data were also used to make individual 3D modeling programs for human diaphragm.

Material and methods. Material the data of 75 patients surveyed in the last 2 years about various diseases of the abdominal and thoracic cavities. Any diaphragm with pathology was excluded. Analysis and image processing were performed on a workstation "HP-Z820" c using the specialized program "Vitrea 2".

Gender-based cases were: male – 61 and female – 14 cases. Age interval from 26 to 82 years old, according to the type of the structure revealed the following relationships – male hypersthenics – 35%, normostenics – 60%, asthenics – 15%; for female following ratio was 30%, 50% and 20% resp. Type of body structure was determined by the index of Pinue. Due to the limited amount of messages we do not give all the findings are limited to the minimum and maximum values.

The height of the cupola of a diaphragm and angles of its attachment in the frontal plane have been calculated.

Measurement of the height of the right and left hemidiaphragm produced in the frontal plane in three axillary lines: posterior-posterior, middle-middle



Fig. 1. The height of the cupola and angles of attachment of the diaphragm in the sagittal plane on the posterior-posterior axillary line

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and anterior-anterior.

Presentation data show in the next way depending to male and female gender: the height of the right and left cupola, angles of attachment of the right and left cupola on the posterior-posterior axillary line.

Figure 1 shows the image being described measurements posterior-posterior axillary line in the frontal projection.

Results and discussion. Extreme values of the height of the right cupola of the diaphragm in men were 12.8 mm (66 years old, hypersthenic) and 73.4 mm (38 years old, astenic). A few cases are marked the same value - 25.1 mm (30 years old, hypersthenic and 66 years old, astenic), 25.9 mm (77 years old, hypersthenic and 53 years old, hypersthenic), 30.2 mm (26 years old, astenic and 74 years old, hypersthenic), 35.4 mm (36 years old and 66 years old, both normostenic), 52.7 mm (26 years old, astenic and 71 years old, astenic).

The largest number of cases – 17 (28.3%) were found in the interval from 21.0 mm to 29.0 mm and 30.2 mm to 39.7 mm. Overall, 55.8% of the patients interval from 20 to 40 mm.

Women extremes height of the right hemidiaphragm was 17.5 mm (63 years old, normostenic) and 72.6 mm (57 years old, normostenic).

The more frequent cases in the interval from 21.1 mm to 29.6 mm - three cases (27.3%) and in the interval of 31.8 mm to 35.7 mm – three cases (27.3%). Similar values were found.

Extreme values of the height of the left cupola of the diaphragm in men were 14.7 mm (79 years old, normostenic) and 66.4 mm (45 years old, hypersthenic). It is often the same value – 14.7 mm (79 years, normostenic and 59 years old, hypersthenic), 21.5 mm (66 years old, hypersthenic and 55 years old, astenic), 28.4 mm (33 years old, normostenic and 26 years old, astenic), 29.1 mm - three cases (66 years old, 44 years old and 49 years old, hypersthenics). Just three patients met the value of 33.2 mm – they were 75 years old, normostenic, 72 years old, hypersthenic and 43 years old, normostenic. In two cases revealed height 33.7 mm (50 years old, astenic and 69 years old, hypersthenic), 34.0 mm (80 years old and 38 years old, both asthenics), 40.7 mm (26 years old, astenic and 76 years old, normostenic). The largest number of values – 22 (36.6%) were in the interval from 31.5 mm to 38.7 mm, at an interval of 20.0 mm to 29.1 mm had 17 values (28,3%). Extreme values of the height of the left cupola of the women were 19.4 (63 years old, astenic) and 39.7 mm (44 years old, normostenic). Similar values were found.

The most frequently occurring value in a interval from 32.4 mm to 39.7 mm. Such values were 7 (63.6%).

Extreme values of the angle of attachment right cupola of the diaphragm in men were 22.9 degrees and 52.3 degrees (62 years old, hypersthenic and 75 years old, astenic).

Often met matching values – 30.5 degrees – two cases (43 years old, normostenic and 38 years old, astenic), 34.7 degrees – two cases (46 years old, astenic and 72 years old, hypersthenic), 35.2 degrees – two cases (74 years old, hypersthenic and 51 years old, normostenic), 38.1 degrees – two cases (33 years old and 75 years old, both normostenics).

Most of the cases noted in the interval from 30.4 degrees to 39.8 degrees. Such cases were 34 (56.6%). In the interval from 40.0 degrees to 49.7 degrees met 13 cases (21.6%). Thus 78.2% of the cases observed in the interval of from 30 to 50 degrees. Extreme values of the angle of the right attachment of the cupola in women were 26.4 degrees (57 years old, normostenic) and 59.3 degrees (53 years old, normostenic). The same values have been identified.

The largest number of values accounted for the interval from 31.2 degrees to 38.9 degrees – 6 cases (54.54%).

Extreme values of the angle of the left attachment of the cupola over the posterior-posterior axillary area men were 22.7 degrees (45 years old, hypersthenic) and 65.0 degrees (28 years old, astenic).

In several cases, marked the same values of angle: 27.8 degrees – in two cases (37 years old and 64 years old, both normostenics), 32.5 degrees – in two cases, (73 and 77 years old, both hypersthenics), 33.1 degrees – in two cases (66 years old, hypersthenic and 66 years old, normostenic), 36.3 degrees – in two cases (46 years old, astenic and 36 years old, normostenic), 36.9 degrees – in two cases (75 years old, normostenic and 31 years old, astenic), 39.9 degrees – in two cases (44 years old, normostenic and 68 years old, astenic), 65.0 degrees – in two cases (71 years old, normostenic and 28 years old, astenic).

The largest number of values – 25 (41.6%) were in the interval from 30.3 degrees to 39.9 degrees. In intervals from 22.7 degrees to 29.9 degrees and from 40.0 degrees to 48.7 degrees were 14 (23.3%) values.

Extreme values of the angle of the left attachment of the cupola in posterior-posterior axillary line for female were 29.6 degrees (53 years old, astenic) and 52.8 degrees (53 years old, normostenic).

In two cases was the same value – 41.6 degrees (57 years old, normostenic and 36 years old, astenic).

The largest number of values – 6 (54.54%) – was in the interval from 30.2 degrees to 37.5 degrees.

Statistical analysis of the measurements revealed little correlation between the age and height of diaphragmatic cupolas in male. Other parameters were

not correlated with the studied values (sex and type of body structure).

Conclusion. 1. Individual spatial topography of the diaphragm is highly variable and is practically independent of sex, age and type of body structure. 2. In some cases (16%) in both sexes the height of the left cupola of the diaphragm more on the left side than the right, due to the high position of the spleen. 3. Ob-

tained data should be taken into account in the interpretation of X-ray research data and performing thoracotomy left.

Prospects for further research. For increase knowledge about the spatial topography of the human diaphragm further studies in other planes and projections relatively with sex, age and type of body structure are needed.

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ПРОСТРАНСТВЕННАЯ ТОПОГРАФИЯ ДИАФРАГМЫ ЧЕЛОВЕКА

Резюме. Для проведения диагностических и лечебных манипуляций имеет большое значение знание индивидуальной пространственной топографии диафрагмы пациента. Проведено исследование с целью установить индивидуальные особенности пространственной топографии диафрагмы человека в двух вертикальных плоскостях – сагиттальной и фронтальной на основе данных СКТ-исследования с учетом пола, возраста и соматотипа. Материалом послужили данные 75 пациентов обследованных по поводу заболеваний различных органов брюшной и грудной полостей. Измерение высоты расположения правого и левого куполов диафрагмы и углов её присоединения воспроизводилось во фронтальной плоскости по задне-задне подмышечной, средне-средне подмышечной и передне-передне подмышечной линиям. Статистическая обработка полученных измерений выявила маленькую корреляционную зависимость между возрастом и высотой расположения куполов у мужчин. Остальные показатели не имели корреляции с изучаемыми значениями (пол и тип строения тела).

Ключевые слова: индивидуальная пространственная топография, высота расположения диафрагмы, угол присоединения диафрагмы.

SPATIAL TOPOGRAPHY OF THE HUMAN DIAPHRAGM

Abstract. To conduct diagnostic and therapeutic manipulation it is important to know individual spatial topography of the patient's diaphragm. The study to determine individual characteristics of the spatial topography of the human diaphragm in two vertical planes – sagittal and frontal based on SCT-examination considering gender, age and somatotype has been conducted. The material for the study was the data of 75 patients examined for different diseases of the abdominal and thoracic cavities. Measuring the height of the right and left cupola of the diaphragm and the angles of its attachment has been performed in the frontal plane on the posterior-posterior axillary, middle-middle axillary and anterior-anterior axillary lines. Statistical processing of the measurements revealed has found a little correlation between the age and height of the cupola in male. Other parameters were not correlated with the studied values (gender and type of body structure).

Key words: individual spatial topography, height of the diaphragm, angle of diaphragm attachment.

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