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## **TOPOGRAPHIC AND ANATOMIC RELATIONS BETWEEN THE TRUE PELVIS ORGANS IN HUMAN FEMALE PREFETUSES**

**Abstract.** *While studying horizontal sections of prefetuses with 17,0-19,0 mm of CRL we found out that the ovaries lie in the cavity of the large pelvis almost horizontally. The right ovary is 374-380 microns long, 198-204 microns wide, the size of the left ovary is: 506-510 microns and 176-180 microns respectively. In the prefetuses with 38,0-42,0 mm of CRL the ovaries separate from the primary kidneys, a convex surface of the ovaries is projected into the body cavity. At this stage of the intrauterine development the pelvic cavity only contains the caudal rectum. In the prefetuses under study with 74,0-79,0 mm of CRL the ovaries are mostly upright. The right ovary is oblate. During the 3rd month of the intrauterine development (9th -12th week, crown-rump length of the fetuses is 33,0-80,0 mm) there is a further differentiation of the muscles of the perineum, which is closely linked with the development of external sexual organs.*

**Key words:** *ovaries, pelvis organs, prefetuses, human.*

**Introduction.** According to the literature review, an integrated study of the growth of walls and organs in the true pelvis was passed by. There are some fragmentary findings on the development of bones and muscles of the pelvis, some internal organs and the perineum [1-7]. At the same time a large number of defects in this area, which are often combined together have been described. For instance, Koppler-Noren K. [8] after studying 14 cases of combinations of defects in the pelvis and its walls, suggests looking for pathogenesis of these malformations during embryonal development of the cloaca and the urorectal septum.

**Objective:** To establish topographic and anatomic features and further development of the walls and the contents in the true pelvis during the prefetal period of the prenatal human ontogenesis.

**Materials and methods.** By using the methods of histological research, we have studied 10 series of successive sections of prefetuses with 14,0-80,0 mm of CRL.

**Results and discussion.** It was established that in the early prefetal period (the 7th week, the prefetuses with 14,0-20,5 mm of CRL) the processes of transformation of the embryonal cloacal part are intensively going on. The urorectal fold that appears in the corner between the allantois and the hindgut at the end of 6 weeks, is growing into the lumen of the

cloaca towards the cloacal membrane and reaches the latter in prefetuses with 16,0-17,0 mm of CRL, becoming the urorectal membrane. The membrane is positioned frontally and divides the cloaca into two parts: the dorsal one, that is, the primary rectum and the ventral one – the urogenital sinus. In the same way the cloacal membrane divides into two sections: the posterior one – the rectal (anal) membrane and the anterior one – the urogenital membrane (urogenital diaphragm).

While studying horizontal sections of prefetuses with 17,0-19,0 mm of CRL we found out that the ovaries lie in the cavity of the large pelvis almost horizontally. The right ovary is oval with concave mesenteric edge, which is adjacent to the primary right kidney and is connected with it by two cruses, the medial and lateral ones. Anteriorly to the ovary the right elongated lobe of the liver lies and it is separated from the gonad by a fissure. In the liver area, directed towards the gonads, there is a depression coinciding with the convex surface of the sexual gland. Parenchyma of the gonad is divided by fissures of different direction into separate areas which are mostly round and oval. The left elongated oval ovary is connected, like the right one, by short mesenchymal cruses with the primary kidney, which is located behind it. Anteriorly to the gonad, all way along it, a rudiment of the pancreas lies. Between the

primary kidneys there is a fold of the peritoneum, whose initial departments are separated, both on the right and on the left by fissures from the gonads rudiments. The right ovary is 374-380 microns long, 198-204 microns wide, the size of the left ovary is: 506-510 microns and 176-180 microns respectively.

In the sagittal sections of studied fetuses with 22,0-26,0 mm of CRL, the ovaries are mostly rounded. Anteriorly to the left ovary there is a rudiment of the pancreas, and that of the liver lies anteriorly to the right ovary. The primary kidneys to which both the right and left ovaries are connected by one mesenchyme crus are located behind the ovaries. The considerably sized adrenals lie over the ovaries. The ovarian parenchyma, as in the previous stage of the development, is divided by variously directed fissures into separate areas which are mostly round, oval and elongated-oval.

In the fetuses with 38,0-42,0 mm of CRL the ovaries separate from the primary kidneys, a convex surface of the ovaries is projected into the body cavity. In this age group the length of the right ovary prevails over the length of the left one, whereas the left ovary is wider than the right one. The separation of the ovarian parenchyma into some round, oval and elongated-oval parts becomes much more visible, indicating a further process of their differentiation. At the same time there is an intensive development of ovarian blood vessels. In the fetuses with 50,0-60,0 mm of CRL the true pelvis as an anatomical structure begins to form. At this stage of the intrauterine development the pelvic cavity only contains the caudal rectum.

While studying a human fetus with 70.0 mm of CRL, we found some features of the internal female reproductive organs syntopy. The right elongated fusiform ovary lies almost vertically in the cavity of the large pelvis. There are lateral and medial surfaces, curved free anterior and concave posterior mesentery edges in the ovary. The uterine end of the ovary is closely adjacent to the back surface of the uterus anteriorly and to the anterior-lateral surface of the rectum posteriorly. The tubular end of the ovary is adjacent to the suspensory ligament of ovary and is located at the level of the iliac crest. The right ovary is 6.0 mm long, 3.1 mm wide and 2.2 mm thick. The uterine and

tubular ovarian ends are rounded. The ovarian mesentery reaches 4.6 mm long, the ligament of ovary – 1.1 mm long. The ileal loops are closely adjacent both to the lateral and to the medial surfaces of the ovary, forming a kind of place for the right ovary. The left elongated fusiform ovary lies in the large pelvis almost horizontally. We distinguish between the front and back surfaces, pointed upper free and lower mesentery edges in the ovary. The uterine ovarian end is closely adjacent to the back surface of the uterus anteriorly and to the front surface of the rectum posteriorly. The tubular pointed end of the ovary touches closely the proximal loop of the sigmoid colon. The uterine ends of the two ovaries are adjacent to each other behind the uterine fundus. The ovary is 6.8 mm long, 3.0 mm wide and 2.1 mm thick. The mesentery of the ovary is 4.8 mm long, the ligament of ovary is 1.2 mm long. The right uterine tube is S-shaped and 6.5 mm long, with the same diameter, except the funnel, which was slightly dilated. The initial section of the tube is adjacent to the lateral surfaces and the rear edge of the right ovary. The left uterine tube lies horizontally according to the ovary placement and is adjacent to the lower edge of the left ovary. The thickness of the uterine tube along its whole length, except for a larger funnel is the same. The uterus is flattened in the anteroposterior direction, 1.1 mm thick at the bottom. The right ureter can be found behind the mesentery of the right ovary, the left ureter is closely adjacent to the back surface of the ovary at the border between its medial and central parts.

In the fetuses under study with 74,0-79,0 mm of CRL the ovaries are mostly upright. The right ovary is oblate. We can distinguish between lateral and medial surfaces, front and rear edges, rounded tubular and uterine ends, the fallopian tube is adjacent to the right ovary surface, and the rectum to its medial surface. The right ovary is  $5,8 \pm 1,5$  mm long,  $2,6 \pm 1,1$  mm wide and  $1,8 \pm 1,2$  mm thick. The left ovary is elongated and crescent-shaped. It has anterior-lateral and posterior-medial surfaces, medial and lateral edges, pointed tubular and uterine ends. The fallopian tube is adjacent to the anterior lateral surface of the ovary, and the rectum touches its concave posterior medial surface. The left ovary is  $4,9 \pm 1,2$  mm long,  $2,4$

$\pm 1,0$  mm wide and  $1,7 \pm 1,1$  mm thick. The suspensory ligaments of ovary are fused with the lumbar fascia above the entrance to the true pelvis, and in its thickness they reach the ovarian vessels. The ovarian ligament, being  $1,1 \pm 0,9$  mm long is attached to the right side of the uterus below the uterine tube. The mesentery of the ovary is  $3,4 \pm 1,8$  mm long and  $0,8 \pm 0,6$  mm wide. The right uterine is winding in shape with no clear boundaries between the respective parts; it is surrounded by the serous membrane on all sides.

The end of the second month of the intrauterine development (8th week, prefetuses with 21,0-30,0 mm of CRL) is characterized by onset and partial resorption of the urogenital and anal membranes. With the appearance of these apertures the area of the perineum can be seen better. Cloacal sphincter also divides into two sections: urinary and anal ones. Due to the fact that the development of the external sexual characteristics is behind the development of the gonads, during this period there still is homology of the rudiments of the perineum muscles. The space between the bones of the pelvis, rectum and the urogenital sinus being formed is the future recto-gluteal fossa filled with undifferentiated mesenchyma, where some rudiments of vessels and nerves can be identified.

During the 3rd month of the intrauterine development (9th -12th week, crown-rump length of the fetuses is 33,0-80,0 mm) there is a further differentiation of the muscles of the perineum, which is closely linked with the development of external sexual organs. We can identify the urogenital and pelvic diaphragms even in the prefetuses with 50,0-56,0 mm of CRL. The development of the urogenital organs in the area of the urogenital sinus leads to the differentiation of the urogenital sphincter into separate bundles – the rudiments of the muscles of the urogenital diaphragm. For instance, from this sphincter in the prefetuses aged 11 – 12 weeks (50,0-80,0 mm of CRL) it is possible to detect some bundles that reach the pubis that we regard as the appearance of a rudiment of the musculus bulbocavernosus. Deep areas of the sphincter located around the distal part of the urogenital sinus remain circularly directed, the cells become elongated, they are located close to each other.

**Conclusions.** 1. In the prefetal period (prefetuses with 50,0-60,0 mm of CRL) the true pelvis as an anatomical structure is formed containing the caudal part of the hindgut.

2. Topographic and anatomic relations of the organs located at the entrance to the true pelvis are characterized by complexity and expressed dynamism in their formation.

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