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MORPHOFUNCTIONAL PECULIARITIES OF THE PLACENTA IN WOMEN WITH UNDIFFERENTIATED CONNECTIVE TISSUE DYSPLASIA SYNDROME

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ABSTRACT

The aim: The impact of undifferentiated connective tissue dysplasia on the formation of the placenta.

Materials and methods: The morphostructure of 50 placentas with the undifferentiated connective tissue syndrome and 50 placentas of women with physiological pregnancy and absence of connective tissue pathology was studied.

Results: The results of morphological studies have shown that the main pathogenetic link of placental dysfunction with highly resistant blood flow in the umbilical arteries in pregnant women with undifferentiated connective tissue dysplasia syndrome is a disorder of functional differentiation of the villous tree. In these cases the dominants were large and medium-sized villi with narrowed lumen in arterial, venular and capillary vessels and arterial spasm and venous plethora, as well as with numerous chaotically sclerosed villi, indicating stage I and II of placental. There is a large amount of fibrins in intervillous space which narrows it and leads to violation of microcirculation and placenta tissue hypoxia.

Conclusions: The morphological basis of high flow resistance in the umbilical artery with the undifferentiated connective tissue dysplasia syndrome in pregnant women is a pathological immaturity of the placental villous tree. Morphological study of the architecture of the stem and intermediate placental villi revealed a violation of the structure of collagen fibers in the form of lack of crosslinks of bundles of collagen fibers.

KEY WORDS: placenta, pregnancy, undifferentiated connective tissue dysplasia syndrome, fibrin

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INTRODUCTION

Undifferentiated forms of connective tissue dysplasia (UDCTD) in women of reproductive age reach from 28% to 86% of cases in different populations. The negative influence of connective tissue pathology on gestational process, prenatal morbidity and infant mortality has been proved [1-4].

Violation of the stroma and vascular component of the endometrium affects not only the nidation and implantation, but also the differentiation of the villous tree of the placenta fetal part of the placenta in women with UDCTD [5,6].

THE AIM

The impact of undifferentiated connective tissue dysplasia on the formation of the placenta

MATERIALS AND METHODS

Morphological features of gestational placental transformation in two representative groups of 50 patients with premature birth with undifferentiated connective tissue dysplasia syndrome (group I) and 50 patients with physiological childbirth and absence of UDCTD (group II) were studied.

HISTOLOGY

For morphological study of the placental tissue in the form of a piece was fixed in 10% formaldehyde solution for 24 hour, followed by passing through alcohols of increasing concentration and pouring in paraffin, made sections of 5-6 μm thick, sections stained with hemotoxylin and eosin (H&E), *picrofuxin* on Van Gieson`s.

MORPHOMETRY

Morphometrically using Stefanova SB N3 / 16 scoring grid, determined the relative areas of the main structural components of the placenta on an area of 625 μm^2 . Microphotography of the structural components of the placenta was performed on a digital Sony DSH-57.2MpS camera).

STATISTICAL ANALYSIS

The results were calculated and analyzed by using standard statistical analysis programs In Vivo Stat V.3.0 Sofa Stat V.1,4,6 and Hiber Office Calc V.5.2,2.2 using the distribution normality check. Pearson Chi-square criteria were used to compare the significance of the difference between groups in terms of frequency of manifestation.

Table I. Variants of pathological immaturity of the placental villi from women with undifferentiated connective tissue dysplasia syndrome (absolute number, %)

Variants of pathological immaturity of the placental villi	I group (n=50)		II group (n=50)	
	abs.	%	abs.	%
Intermediate villi	5	10	9	18
Immature intermediate villi	21	42	3	6
Chaotic sclerosed villi	19	38	1	2

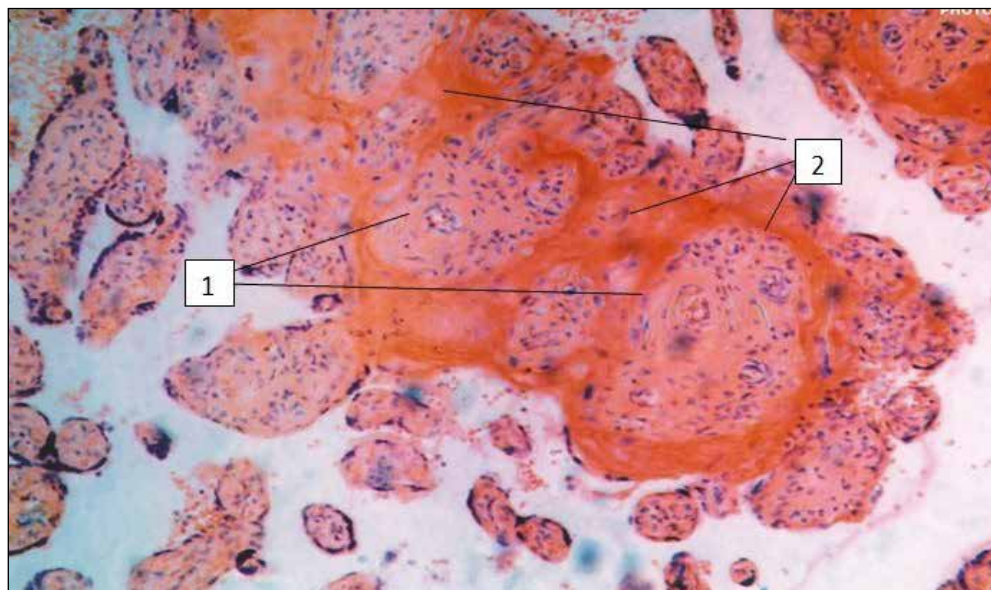


Fig. 1. Intermediate villus with narrowed lumen of ventricular and capillary types of vessels (1) and fibrinoid in the intervillous space (2). Stained with hematoxylin and eosin (H&E)

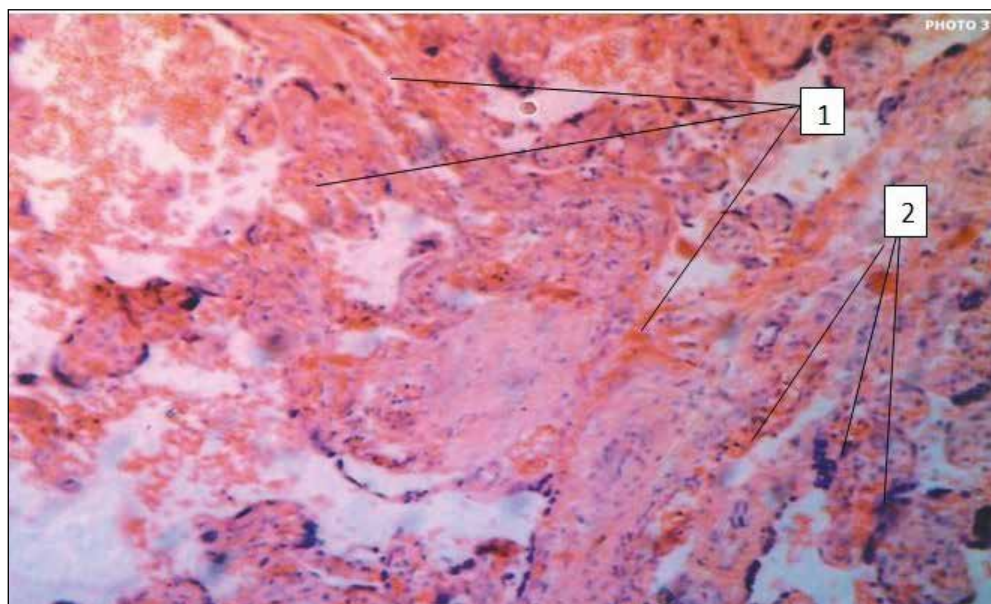


Fig. 2. Intermediate villus with arterial spasm (1) and full vein (2). Highly resistant blood flow was recorded in the artery of the umbilical cord doplemetry (IP 0.65). Stained with hematoxylin and eosin (H&E)

Results $p < 0.05$ (probability of difference more than 95%) were considered relevant.

RESULTS

In a comparative aspect, the morphofunctional peculiarities of the placental and fetal blood circulation in 50 patients with undifferentiated connective tissue dysplasia

syndrome (group I) and 50 patients in physiological pregnancy with no UDCTD markers (group II).

According to the results of our research, 15 (30%) placentas from mothers of group 1 revealed circulatory infarctions in the diameter from 1 cm to 3. Where in women of group II infarctions were occurred in less than 4 (8%) placentas. In 30 (60%) cases of patients with undifferentiated connective tissue dysplasia syn-

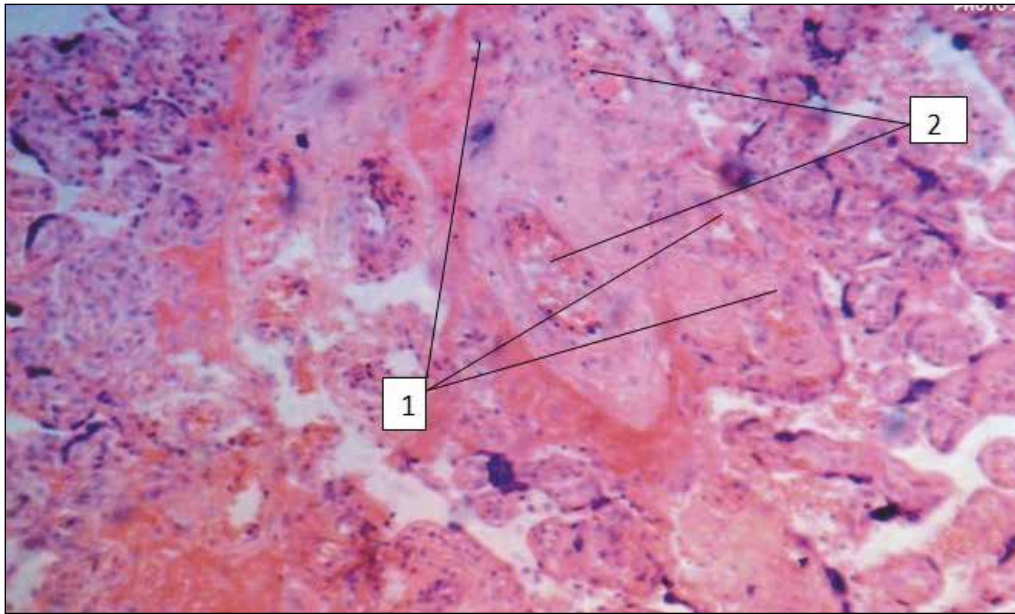


Fig. 3. Stem villus with chaotic growth of connective tissue (1) and varicose veins (2). Highly resistant blood flow was recorded in the artery of the umbilical cord doplemetry (IP 0.69). Stained with hematoxylin and eosin (H&E)

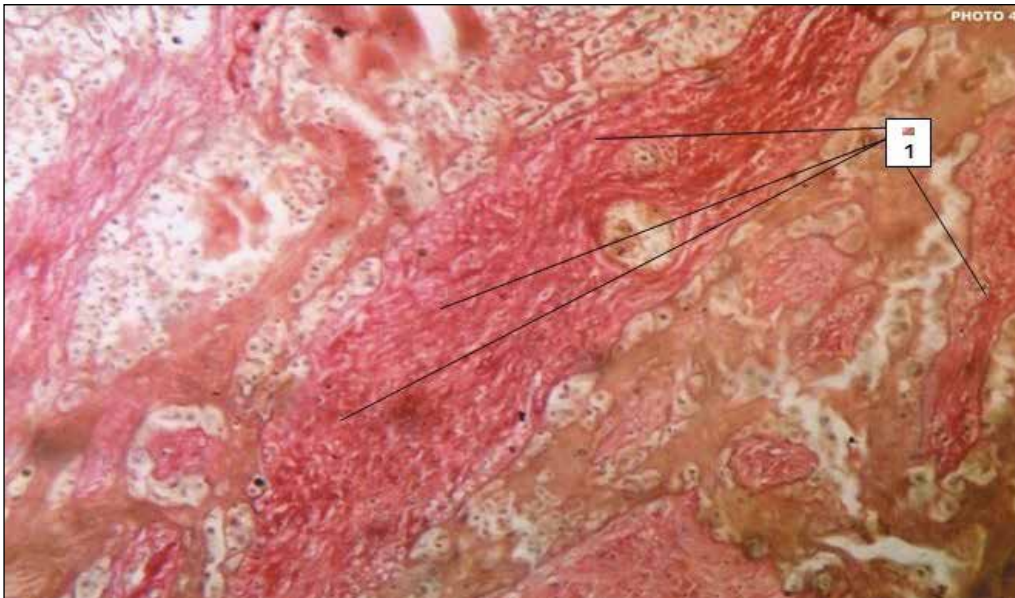


Fig. 4. Disorder of the structural organization of collagen fibers in the stemvillus. Insufficient cross linking of collagen fibers (increasing gaps between collagen fibers) (1). Stained with Van Gieson's

drome, signs of abnormal fetal part of the placenta were detected (Table I).

A distinctive histological peculiarity of the immature intermediate villi, which is 2.3 times more frequent in the placenta of patients with undifferentiated connective tissue dysplasia syndrome is the dominance of large and medium-sized villi with a narrowed lumen in the arterial, venular and capillary vessels, as well as the accumulation of fibrinoid in the intervillous space .

The spasm of arterial vessels and venous plethora were marked in all immature intermediate villi with highly resistant blood flow in umbilical artery which is a characteristic morphological sign of stage 1 of chronic placental hypertension [7].

While studying the morphology of the stem villi it was found that, compared to the norm, they are reduced in size with the chaotic growth of fibrous tissue and the presence of enlarged intraplacental veins which is a characteristic

morphological feature of stage 2 of chronic placental hypertension [8].

However, it is noted that in these cases there is an increase in the gaps between the beams of collagen fibers in the stem and intermediate villi, which is a morphological sign of decreased oxygenation of the connective tissue [9].

DISCUSSION

In the present study, we performed an analysis morphological features of gestational placental transformation in two representative groups with premature delivery with syndrome of undifferentiated connective tissue dysplasia and with physiological delivery and no markers (UDCTD). According to the results of our research, 15 (30%) placentas from mothers with (UDCTD) revealed circulatory infarctions in the diameter from 1 cm to 3. Where in women without signs of (UDCTD) infarctions were occurred in

less than 4 (8%) placentas. All placentas from mothers with (UDCTD) has immature intermediate villi with highly resistant blood flow in umbilical artery. All this characteristics morphological sign of chronic placental hypertension. Chronic placental hypertension increasing risk of placental abruption, preeclampsia and fetal growth restriction (FGR) [10,11].

To reduce fetal death rate in women with UDCTD diagnostic and prophylactic measures should be aimed at correcting disorders of uterine-placental circulation [12].

CONCLUSIONS

The morphological basis of highly resistant blood flow in the umbilical artery with the undifferentiated connective tissue dysplasia syndrome in pregnant women is the pathological immaturity of the placenta villous tree. Morphological study of the architectonics of the stem and intermediate placental villi revealed a violation of the structure of collagen fibers in the form of lack of crosslinks of bundles of collagen fibers. Morphological signs of chronic placental hypertension with undifferentiated connective tissue dysplasia syndrome in mother is a reduction of blood flow in the microcirculatory system in villous tree of the placenta.

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