A histopathological study of the umbilical cord of the pregnant women infected with the pregnancy diabetes

*Dr. Salem Rashid AL-Abady college medicine / Baghdad university.
*Dr. Noah Shaker AL-Badry college veritably medicine/AL-Qadisiy university
*Dr.Wasan Abdul Wahab/college of since /university of AL-Mustansiriya

الخلاصة:-

في هذا البحث تمت دراسة نماذج من الحبل السري العائدة لمجموعة النساء المريضات بسكر الحمل مع مقارنتها مع نماذج أخرى من الحبل السري لمجموعة من النساء ذوات حمل طبيعي اعتمدن كسيطرة (Control). استخدمت طريقة Morphometric method وباستخدام العدسة العينية Ocular لقياس أقطار الأوعية الدموية (الشريان، الوريد) للحبل السري وسمكها.

حيث أظهرت النتائج زيادة سمك في الحبل السري عموماً، وزيادة حجم وسمك جدران كل من الوعائين وتضخم في أنسجة البطانة الداخلية وفرط تنسجها مع ضيق في سعة فتحة تجويف كل من الوعائيين (الشريان ، الوريد) السريين.

Abstract:

Ahisttopathological study for samples of umbilicals cord from a group of the women infected with pregnancy diabetes competed with for samples of umbilical cords of group of the women that have a healthy pregnancy and considered as (control). Morphometic method has been used with using ocular lens for measuring the diameters of the blood vessels (arteries and veins) of umbilical cord and its thickness.

The results have shown an increase in the thickness of the umbilical cord in general, and increasing in thickness and size of the walls of the two vessels and inflation in the endothelial tissues and its hyperhistogenesis with a narrowness in the cavity opening size of the umbilical vessels (artery,vein).

Introduction:

Emberyologically the umbilical cord in human begins to form the 5th week of embryo age (Langmans,2004) so it is responsible for the nourishing and providing the embryo with oxidized blood and food, where as it considered as contact point between the mother and the embryo.

The two umbilical arteries carry the blood from the umbilical cord to the placenta, while the vein returns through the umbilical cord from the placenta (Langman , 2004), thus the metabolic results for decreasing insulin is kitoacidosis (Hanas, 1998), especially, the pregnancy diabetes causing a constitutional deformation in the embryo. The probable damage of pregnancy diabetes effect begins whenever the pregnancy progresses, so the damage be double more in the late trimester of the pregnancy (Menegola et al., 1995).

The umbilical cord of the embryo of the health human consists of two arteries and single vein, and the structure of the umbilical cord vessels is similar to the blood vessels structure in different parts of the body (B. Yong and J.W.Health, 2000). The artery consists of the three fundamental tunicas for each blood vessel of in side (tunica-initima) that forms from of endothelial cells, beneath it there is a subendothilial layer forming of connective tissue layer with the fibers being colloid, follows it (tunica media) that is formed from of united- center layers of the smooth muscle cell, and from outside (tunica adventitia)that it is forming from colloid and elastic fibers that link the vessel with the surrounding tissues.

The vein consist of the same layers (three tunicae) with a difference in the thickness and nature of the forming layers according to type, nature and function of the vessel (the vein) where as the quantity of colloid fibers is increasing between the muscle cells layer so more than that in the artery, also it appears that the vein opening is larger than the artery opening (B. Yong and J.W.health, 2000).

Diabetes is one of the wide spread diseases, where as the genetics, environmental factors and other effects are playing an important role in its appearance. So diabetes is a chronic metabolic disease may by distinguished by in increasing in sugar level in the blood or what calls Hyperglycemia, due to a relative or total deficiency in insulin that is secreted from the pancreas cells of beta-type that found in islets of langerhans causing a deficit in equilibrium in carbohydrates and proteins assimilation (crger *et al*, 1996).

The materials and work method:

Samples (1cm) have been taken from the umbilical cord of the placentas of the pregnant women who are complaing of with the pregnancy diabetes, and sections of umbilical cord from women having a health pregnancy considered as a (control) for purpose of the histopathological comparison diameters size of the blood vessels. After washing the samples by using phosphate buffer (BPS), the sample preserved in formalin solution (10%) for purpose of preparing the samples in order to make a microscopic sections according to (Bancrott & stevens, 1992), so that stains like

himatoxylin and eosin have been used and compared with PAC stains and trichrom by using Olympus light microscope, as for the diameters of the blood vessels of the umbilical cord (artery, vein), Morphometric method has (Abd Al- Wahab, 2002).

The results and discussion :

The histopathological changes occurring in the histolaryars that form the walls of the blood vessels (Artery and vein) in the umbilical cord have been studied. The changes could be distinguished by the general magnitude of the umbilical cord and inflating its vessels causing narrowness in the cavity of both artery and vein and smallness in size of the internal cavity of them with considerable increasing in the thickness of blood vessels, this agrees with the result of Jones and stones,(1998). Ahyperhistology in the endothelial cells layer has been appeared and forming blood congestion for some of these vessels, and that is what had the researchers be agreed about (Johnson et al, 1997). So the fibrous precipitation between the smooth muscular fibers that form the vascular layer of the vessel have been remarked, with occurrence of decay for the endothelial cells, of the internal blood vessel layer because of the passive effect of the free roots causing a spoilage in the vessel, as a result a deficit in the embryo nourishment (Delia, 1990).

The changes occurring in the blood vessel of the umbilical cord are called diabetic angiopthy, due to a change in the chemical structure of the basic membrane of the endothelial cell, causing a

change in the cellular function and a change in the character of blood flow, in addition to a decrease in blood ability for carrying oxygen (Bailes, 2002).

Measuring of (diameter, thickness) of the blood vessel (artery, vein) for the umbilical cord :

The table (1) states the average of diameter and thickness of the umbilical cord artery of the group of the patient women in order : (3.1+_0.27) and (5.43+_0.09) µm, in comparison with the average of diameter and thickness of the umbilical cord artery of the group of the healthy women which reached in order : (4.20±0.14) and (2.56± 0.14) µm. Where as that states existing moral differences at probability level (p>0.05).

Table (1)rate of diameter and thickness of umbilical artery

	Measuring unit in Micrometer µm		
group	**No**	**Art- dia SE+-Mean**	**Art- dia SE+-Mean**
Control	**25**	**4.2 ±0.14 a**	**2.56 ± 0.14 a**
patients	**65**	**3.14 ± 0.27 b**	**5.43 ± 0.09 b**

The different letters mean that three are moral differences at probability level P>0.05.

The table (2) states the rate of diameter and thickness of the umbilicus vein of the group of the patient women, whereas it reached in order : Mm (7.0±0.115) and (9.35± 0.066) µm , in comparison with the group of the healthy women (control). Where

as the average of diameter and thickness of the umbilicus vein in order : Mm (8.29±0.07) and (3.29±0.62) µm.

Statistically, the results elucidate existing a moral differenences at probability level : (P<0.05).

Table (2) rate of diameter and thickness of umbilical vein

	Measuring unit in Micrometer µm		
group	**No**	**Art- dia SE±Mean**	**Art- dia SE±Mean**
control	**25**	**8.29 ± 0.07 a**	**3.26 ± 0.62 a**
patients	**65**	**7.00 ± 0.115 b**	**9.35 ± 0.066 b**

The different letters Mean that there are moral differences at probability level P>0.05.

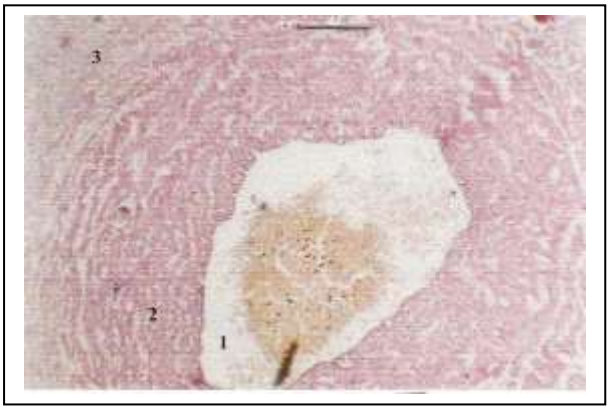

Figure (1): section in blood vessel (umbilicus vein) elucidates the natural histostructure of the vessel (H& E * 100).

Figure (2): section in blood vessel (umbilicus artery) elucidates the natural histostructure of the vessel (H& E*100).

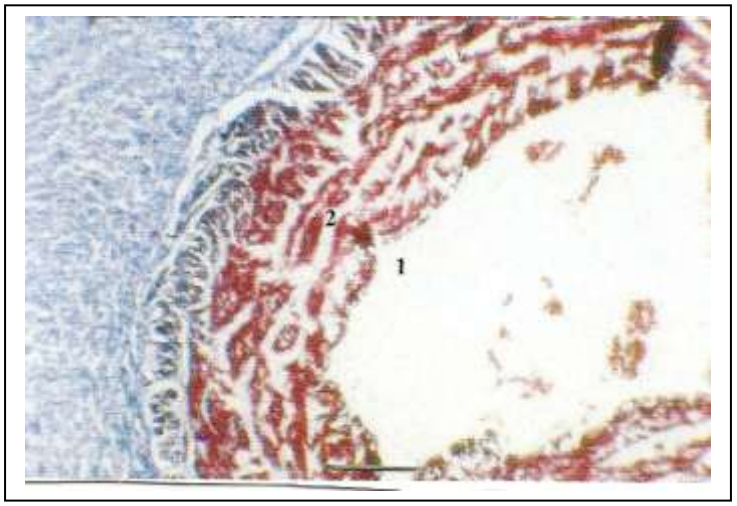

Figure (3): section in blood vessel (umbilicus vein) for women infected with pregnancy diabetes- trichom stain.

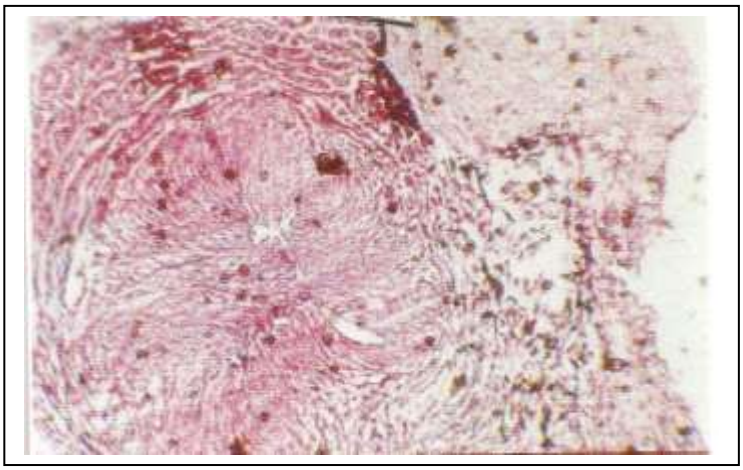

Figure (4): section in blood vessel (umbilicus artery) for women infected with pregnancy diabetes-PA*100 stain.

Figure (5): section in blood vessel (umbilicus artery)for women infected with pregnancy diabetes- trichom stain.

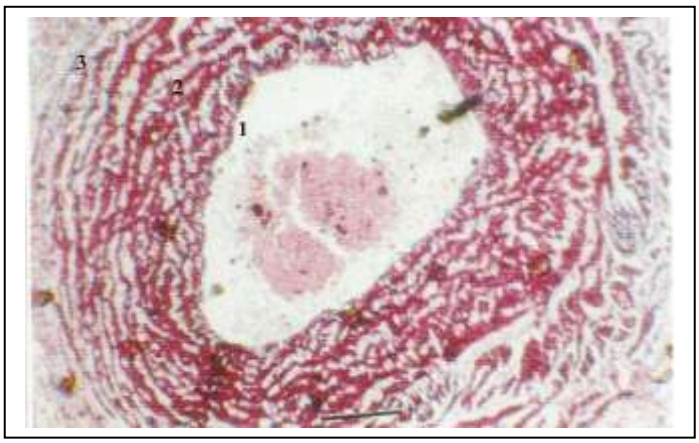

Figure (6): section in blood vessel (umbilicus vein) for women infected with pregnancy diabetes- PAS*100 stain.

References

- Abd AL wahab, T.A.(2002). The effect of iodide, calicium and fluoride on the thyroid gland. M. Sc. Thesis college of science, AL- Mustansiriya University.
- B. Yong and John, W. HEATH. (2000). Wheat functional histology, Atext and Colour Atlas.
- Bailes, B. K. (2002). AORN. J. 4, 1-9.
- Bancroft, J. D. and Stevens, A. (1982). Theory and paractice of histological Technique. 2nd. Ed., Churchill Living stone: 483-516.
- Crgerr, P. E. and Childs, B. P. (1996). Who has diabetes. In ″American Diabetes Association complete Guide top Diabetes″ American Diabetes publication. P. 6.
- Delia, L. E. (1990). Obstetrics and gynecology : placental and fetal development 6th Ed. J. B. Lippincott.CO., Philadelphia, London, Syndey.
- Hanas, R. (1998). Insulin-Dependent Diabetes Mellitus. ″In Insulin Dependent Diabetes Mellitus in children. Adolescents and Adults″ Published in paperback by piara publication, P:1-4.

- Jones, M. w., Stone, L. C. (1998). Management of the women withgestational diabetetes mellitus, J. Perinat Neonattal Nars, 11(4):13, Mar.
- Langmans, J. (2004). Medical embryology. Willams & Wilkns Co, Baltimore, London.
- Menegola, E.; Part, M.; Broccia, M. L.; Ricolfi.; R. and Giavini, E. (1995). In ritro development of rat embryos obtained from diabetic mothers. [Experientia. Apr 15, 51(4): 394-7].