Original article

Pathological study of Placenta Samples Sent to the Department of Pathology in Shahid Sadoughi Hospital from 2009 to 2016

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Abstract:

Introduction: Placenta disorders are the most prevalent and the most serious complications of pregnancy in human beings. In the current study, pathological analysis of placental samples sent to the department of pathology from 2009 to 2016 was done.

Methods: The present study is a cross-sectional study on placenta samples sent to the department of pathology taking a census. Age and number of pregnancies, microscopic and macroscopic findings of placenta and umbilical cord, placental length, placental width, placental thickness, placental weight, the length of umbilical cord and the thickness of umbilical cord were recorded. The data were collected by a checklist and were entered in SPSS version 17.

Findings: The results also showed that there was a significant statistical difference between microscopic findings of placenta and age and also between microscopic and macroscopic findings of placenta and the number of pregnancies (P-value<0.05).

Conclusion: Since there is a meaningful statistical relationship between placental microscopic findings and age, and between placental microscopic and macroscopic findings and the number pregnancy, it can be concluded that age increasing and number of pregnancy are two main factors associated with an increase in the risk of placental changes.

Keywords: Placenta disorders, Pathology, Age, Number of pregnancy

Introduction:

Placenta and its health are important and vital for healthy pregnancy and normal growth of placenta (1).This organ provides oxygen and food required for fetal development and removes poisons and wastes from blood that flows through fetus. Moreover, placenta has an important role in hormone production in body and protects fetus from bacteria and various infections (2). Placenta is adhered to uterine wall and is connected to fetus with umbilical cord. In most of pregnancies, placenta is located in upper part of the womb or next to uterine wall, nevertheless, in some cases, placenta position or its connection to uterine wall is in such a way that leads to some problems in mothers (3). Placenta disorders are the most prevalent and the most serious complications of pregnancy in human beings. The factors that increase the risk of placenta disorders are including race, maternal smoking , high blood pressure, multi-gestational pregnancies, maternal coagulation disorders, previous record of surgery or cesarean section, previous record of placental problems, maternal drug use, mother's age, premature rupture of membranes (PROM) and … (4). Placenta changes are classified into several groups such as vascular and necrotic changes, inflammatory changes, tumor and mole, abnormal site of placenta or umbilical cord, multi-gestational and so on (5).Among the prevalent placenta disorders, we can mention the placenta previa, premature separation of placenta, placenta accreta and immune/idiopathic inflammatory lesions (6). Trophoblastic neoplasms include a wide spectrum of neoplastic diseases whose source is placental trophoblast. The disorders contain hydatiform mole, invasive mole, choriocarcinoma, partial hydatiform mole, placental site trophoblastic tumor (PSTT) among which hydatiform mole is the most prevalent. Pathological study plays an important role in diagnosis of these lesions, especially in diagnosis of choriocarcinoma (7). A few studies have been done on frequency distribution of placental lesion in consideration of the fact that nowadays the rate of placenta disorders including placenta previa, placenta accrete, placenta percreta and … has increased among pregnant women compared to the past. This matter has caused increase in the rate of maternal mortality during pregnancy. Regarding this matter that the rate of maternal mortality is one of the indicators of measuring general health care and a few studies have been also done on this subject, we decided to investigate the placenta samples sent to the department of pathology during the years between 2009 and 2016, in a pathological study.

Methods:

The present study is a cross-sectional study which was done on placenta samples sent to the department of pathology during the years 2009-2016 taking a census. All of the placenta samples sent to the department of pathology which had met the inclusion criteria for the study was surveyed and subsequently, the samples with incomplete information were excluded from the study. The method of collecting data was a pre-prepared checklist which consisted of two parts: The first part was the demographic profile of patients including age and number of pregnancies, the second part was related to the pathology of the samples sent including microscopic and macroscopic findings of placenta and umbilical cord,

placental length, placental width, placental thickness, placental weight, the length of umbilical cord and the thickness of umbilical cord. The data were collected by the above-mentioned checklist and were entered in SPSS version 17. The results were presented in the form of frequency distribution tables.

Findings:

The results of our study showed that mean age of mothers was 27.7 ±6.4 and average number of pregnancies was 3. Concerning the frequency distribution of placental and umbilical cord findings (macroscopic and microscopic) based on patients' age in four age ranges, the results showed that there were 6.1 % macroscopic changes (clot, hemorrhage, bleeding, hematoma, prominent vessels, vesicular) in age range of 15-24-year-old, 11.2 % in age range of 25-29-year-old, 11.5 % in age range of 30-34-year-old, 13.8 % in age range of 35-47-year-old but there was no significant statistical differences between macroscopic placental findings and age (P. value=0.183). Considering microscopic placental changes, the results showed that there was a significant statistical difference between microscopic placental findings (normal, vascular and necrotic changes, inflammatory changes, tumor and mole, abnormal site of placenta or umbilical cord, multi-gestational and miscellaneous samples) and age (P-value=0.000). The result of study showed that there was no significant statistical differences between umbilical cord changes based on macroscopic findings (normal, marginal and with abnormalities) and age (P-value=0.928). At last there was no significant statistical difference between umbilical cord changes based on microscopic findings (normal and vascular changes) and age. (P-value=0.841) (table.1)

The results from the study of frequency distribution of placental and umbilical cord findings (macroscopic/microscopic) based on the number of pregnancies in patients in three categories showed that there are 4.2 % macroscopic changes in first pregnancy, 7.5 % in second and third pregnancy and 16.2 % in fourth to ninth pregnancies. Considering macroscopic placental changes the results of the study showed that there was a significant statistical difference between macroscopic placental findings and number of pregnancies.(p-value=0.001) Considering microscopic placental changes, the results showed that there was a significant statistical difference between microscopic placental findings (normal, vascular and necrotic changes, inflammatory changes, tumor and mole, abnormal site of placenta or umbilical cord, multi-gestational and miscellaneous samples) and number of pregnancies (P-value=0.012). The result of study showed that there was no significant statistical differences between umbilical cord changes based on macroscopic findings (normal, marginal and with abnormalities) and number of pregnancies (P-value=0.937). At last there was no significant statistical difference between umbilical cord changes based on microscopic findings (normal and vascular changes) and number of pregnancies. (P-value=0.624). (table.2)

According to ANOVA test, results showed that there was no significant statistical differences in age range and placental weight, the length of umbilical cord, the thickness of umbilical cord and placental size between the groups (P-value>0.05).

Discussion:

The current study showed that 54.4 % of placentas were unremarkable , 28.3 % of samples had vascular and necrotic changes, 5.3 % had inflammatory changes, 1.6 % were tumors and moles, 3.2 % had abnormal site of placenta or umbilical cord, 1.6 % were multi-gestational and 5.5 % were miscellaneous samples (large placenta and …). The results of the study conducted in Nigeria showed that 44.7 % had evidence of placenta malaria, 17 cases (44.7%) had chorioamnionitis , 23.7% had villitis, 5.3% had vasculitis and 10.5% had no abnormality (8).Regarding that the prevalence of malaria is high in Africa, it can be expected that malaria includes the highest rate of histological changes in placenta in countries of this continent. The comparison between the results of two above-mentioned studies also shows that in Nigerian study, the frequency of inflammatory changes (Chorioamnionitis, villitis) is higher than that of vascular changes and this shows no compatibility with the result of our study in which vascular changes includes the higher percentage. The other study which was done by Wintermark on premature infants showed that 39 % of them had been diagnosed with umbilical cord lesions, 35 % with chorioamnionitis, 22 % with fetal vasculitis, 30 % with meconium in chorionic membrane and 26 % with placental thrombotic vascular disorders. It also showed that 48 % of total placentas were with intrauterine growth restriction (IUGR) (9).The mentioned study was representative of higher frequency in inflammatory changes (Chorioamnionitis) compared to vascular changes which showed no compatibility with the results of our study but it showed compatibility with the results of Nigerian study. The results of another study conducted in China showed that the frequency distribution of placental lesions was such as following: 84.6 % hemorrhagic vasculitis, 75 % fetal thrombotic vasculopathy, 68.4 % massive peri villous fibrin deposition, 66.7 % placental infarction, 60.6 % retroplacental hemorrhage, 57.1 % intervillous thrombus, 33.3 % decidual angiopathy, 25.4 % placental infarction, 22.7 % acute chorioamnionitis and 21.7 % chronic villitis (10).The result of the above-mentioned study is representative of higher frequency in vascular changes compared to inflammatory changes and shows compatibility with the result of our study. Considering overlaps, the result of another study conducted in Columbia showed that there was inflammatory (chorioamnionitis) in 30.4 % of placentas, degenerative vascular changes in 55.7 % of placentas, retroperitoneal hematoma in 23.8 % of placentas, intraparenchymal thrombus in 19.7 % of placentas, parenchymal infarction in 10.9 % of placentas, fibrin deposition in 9.2 % of placentas, vascular thrombosis in 23 % of placentas, nonvascular villous in 7.6 % of placentas and finally hydrops in 6.4 % of placentas (11). The results of the mentioned study also showed higher frequency in vascular changes compared to that in inflammatory changes which is in compatibility with the results of our study.

This difference in frequency rate of changes especially inflammatory and vascular changes in different studies can be attributed to the studied population. The countries in which the level of hygiene is low, infection and inflammatory disease are the leading cause of death. It is expected that inflammatory changes be with the highest frequency in placental changes. On the other hand, in countries with a good level of

hygiene, vascular changes include the highest frequency in placental changes.

Conclusions:

The most prevalent microscopic changes of placenta have been after normal findings, vascular and necrotic changes (such as ischemia, infarction, bleeding and …). Regarding that vascular changes are somewhat preventable and treatable, holding educational classes for pregnant women about signs and symptoms of vascular diseases and their periodic health check-ups can decrease the rate of disease incidence. And regarding that, there is a meaningful statistical relationship between placental microscopic findings and age, and between placental microscopic and macroscopic findings and the number pregnancy, it can be concluded that age increasing and number of pregnancy are two main factors associated with an increase in the risk of placental changes.

Conflicts of Interest

The author(s) declare(s) that there is no conflict of interest regarding the publication of this paper.

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Tables and Charts:

Table.1: frequency of placenta and umbilical cord findings according to the patients' age

samples	findings	age				p. value
		15-24	25-29	30-34	35-47	
Placenta macroscopy	No	93.9%	88.8%	88.5%	86.3%	0.183
	Yes	6.1%	11.2%	11.5%	13.8%	
Placenta microscopy	normal	58.9%	58.2%	50.4%	42.5%	0.000
	vascular and necrotic changes	25	25.9	32.1	35	
	inflammatory changes	6.7	5.3	6.9	0	
	tumor and mole	0.6	2.4	1.5	2.5	
	abnormal site of placenta	0	4.7	3.8	6.3	
	multi-gestational	3.3	1.8	0	0	
	miscellaneous samples	5.6	1.8	5.3	13.8	
umbilical cord macroscopy	Normal	9.8	3	9.7	8.7	0.928
	marginal	61	71.7	64.5	65.2	
	abnormalities	29.3	24.2	25.8	26.1	
umbilical cord microscopy	Normal	58.5	66.7	67.7	65.2	0.841
	vascular abnormalities	6.1 %	11.2 %	11.5 %	13.8 %	

Table.2: frequency of placenta and umbilical cord findings according to the number of pregnancies

samples	findings	numbers of pregnancies			p. value
		1	2-3	4-9	
Placenta macroscopy	No	95.85%	92.5%	83.8%	0.001
	Yes	4.2%	7.5%	16.2%	
Placenta microscopy	normal	57	59	46	0.012
	vascular and necrotic changes	28.1	24.7	33.3	
	inflammatory changes	5.2	6.4	4	
	tumor and mole	0	1.9	2	
	abnormal site of placenta	0	2.6	5.6	
	multi-gestational	4.2	1.5	0.5	
	miscellaneous	5.2	3.7	8.1	

	samples				
umbilical cord macroscopy	Normal	12	6.7	7	0.937
	marginal	64	66.7	65.1	
	abnormalities	24	26.7	27.9	
umbilical cord microscopy	Normal	56	65	67.4	0.624
	vascular abnormalities	44	35	32.6	