ORIGINAL ARTICLE

Complication of gestational preeclampsia and the differences between tunica media and internal area of spiral artery by image j.

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ABSTRACT

Aim: The study's objectives were to explain the most common fetal complication in preeclampsia. Understand the different between tunica media and internal area of spiral artery by image J. Mode of delivery associated with PE and Period of pregnancy associated with PE.

Methods : A total of thirty placentas were examined, of those fifteen were taken from healthy mothers and fifteen from mothers with hypertension (preeclampsia). Placentas were collected from the Labor Room and Operation Theatre of Babylon maternity and Paediatric hospital. Transverse cuts were made through the maternal surface at a distance of 2 cm of tissue from the center of each placenta and fixed at 10 per cent of the formal saline content. The tissue was processed and paraffin embedded, and using the rotator microtome, 5 micron serial sections were produced. Hematoxylin and eosin (H&E) stained the tissue parts for analysis. then read the difference between tunica media and internal area by image J program.

Results: The histomorphological study of the placenta spiral artery of pregnant women with preeclampsia showed a significant in different of internal area and tunica media of the spiral artery with P value of 0.04 , 0.015 respectively. There was a significant association between low weight at birth (fewer than 2.5 kg) and the mode of natural delivery of the control group when p value (<0.001) comparative with the disease group.

Conclusions: Cesarean section is the most common mode of childbirth for women with preeclampsia; the observed and comparative histomorphological changes suggest a decrease in all aspects of the Preeclampsia placenta, as well as an impact on the baby's body weight (less than 2.5 kg) after birth, and dilation of the internal region and tunica media of the spiral artery in the PE placenta.

Keywords: placenta, internal area, tunica media, spiral artery, body weight , mode of delivery , preeclampsia

INTRODUCTION

One of the most important factors in maintaining normal blood flow of the uterine, which is essentially for development and growth of the fetus in the uterus. During this operation, the perfusing spiral arterioles of the inter villous space go through major changes in morphologic, with uterine vasculature changes result in a five- to ten-fold dilation to meet the needs for placental unit of the fetus [1]. Recognizing the connection between Placental growth and flow of blood in the uterine arteries are essential to comprehending regular placentation and how it is disrupted in fetal growth restriction and preeclampsia, two conditions that can occur during pregnancy. In this study explores the relationship between the internal area of the diameter of the tunica media of the uterine artery, as well as the consequences for the baby's body weight in preeclampsia and the form of parturition.

Preeclampsia and Placental Histology: Preeclampsia is caused by maternal placental bed vascular malperfusion, and is the condition of Myometrial/decidual clinical features (Spiral artery remodeling in the mother is incomplete or missing) and, more generally, placental villous lesions such as accelerated villous maturation, distal villous hypoplasia, increased syncytial knots, and villous infarction are all symptoms of this condition[2].

Preeclampsia and Fetal Size: Preeclampsia is a frequently observed symptom of advanced prenatal growth restriction, and it occurs as a consequence of the disorder's primary cause, placental dysfunction. Fetal growth limitations and related hypoxemia are linked to increased risk of complications of the fetus, neonatal and long term [3-5]. Preterm preeclampsia causes fetal development restriction in the great majority of instances according to epidemiological reports. Even after diabetic pregnancies are removed, over 80% of preeclampsia occurs at a time when large-for-gestational-age births are as common as small-for-gestational-age births (15%) and the majority of neonates are of average size [6,7].

MATERIAL AND METHOD

Sample: A total of thirty placentas were researched, of those fifteen were taken from healthy mothers and fifteen from mothers with hypertension(preeclampsia). Placentas were collected from the Labor Room and Operation Theatre of Babylon maternity and Paediatric hospital.

Tissue preparation: Twenty placentas were obtained from mothers of pregnancy – Induced Hypertension(preeclampsia). Transverse cuts were made through the maternal surface at a distance of 2 cm of tissue from the middle of each placenta, observing the site of cord of the umbilical insertion on the placental surface of the fetus. And then was fixed at 10 per cent of the formal saline content. The tissues were treated and paraffin embedded, and using the rotator microtome, 5 micron serial sections were produced. Hematoxylin and eosin (H&E) stained the tissue parts for analysis. then read the difference between tunica media and internal area by image J program.

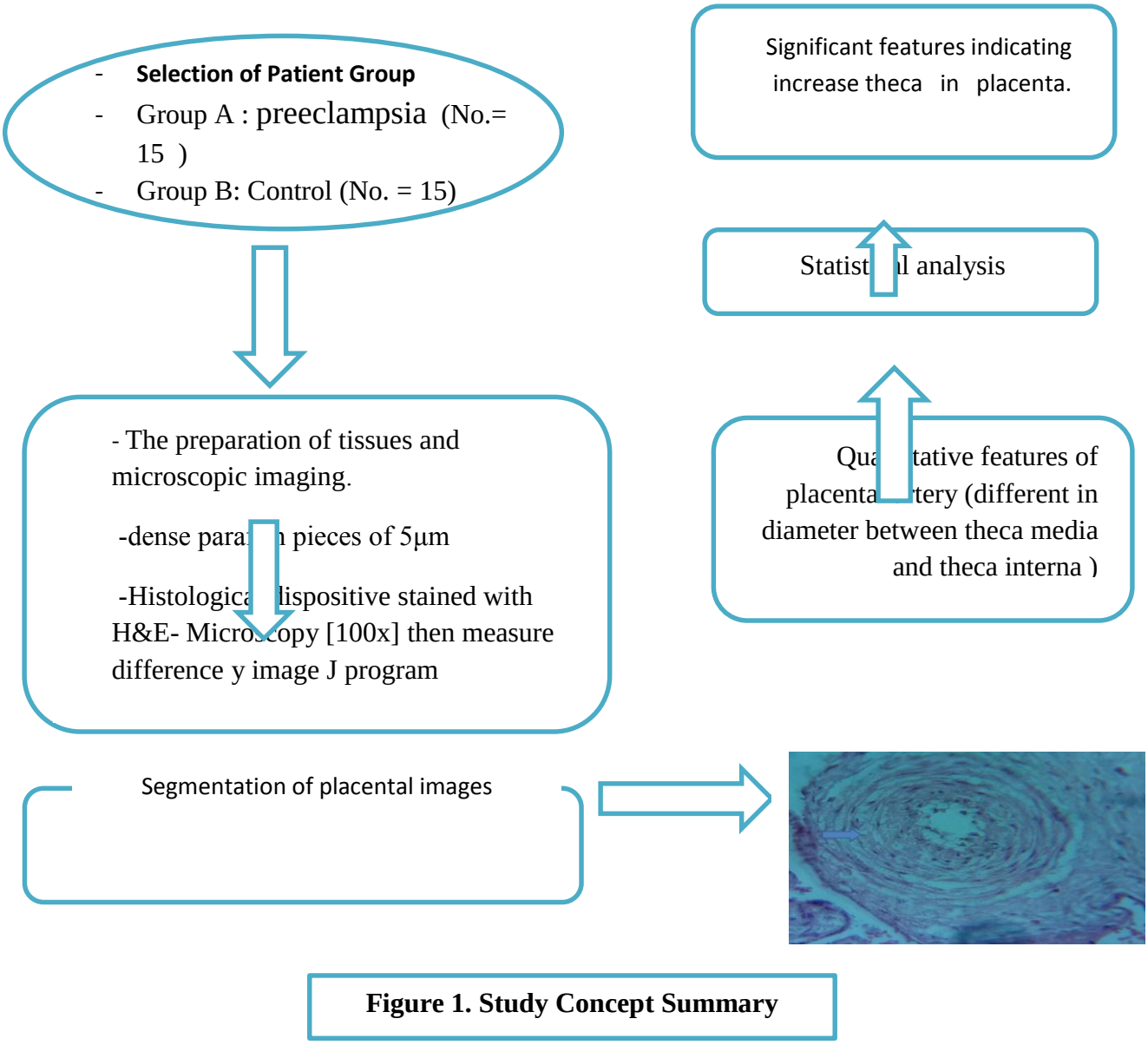


Figure 1. Study Concept Summary

Statistical Analysis: The numerical analysis used mean and standard deviation for variables, while the categorical analysis employed percentage and frequency. The association between disease status and mother, father age, baby weight, gestational age, internal media, tunica media were examined by independent t test. All analyses were performed using SPSS version 24.

RESULTS

Table (1) represents the socio-demographic patient characteristics .The mean mother age was 25.13±5.65. father age was 30.97±7.51. The mean weight of the baby was 2.90±0.61 Kg. The mean gestational age was 37.40±1.95 weeks.

Table 1: Socio-demographic and clinical characteristics

Variables				
	Min	Max	Mean	SD
Mother age	18	35	25.13	5.65
Father age	19	50	30.97	7.51
Baby weigh	1.20	3.50	2.90	0.61
Gestational age	30	41	37.40	1.95

Table 2: Histological features

Variables				
	Min	Max	Mean	SD
Internal area	1396	39854	12415.90	11887.78
Tunica media	30552	792262	154145.33	161272
Difference	26375	757738	187310.90	174391.24
Ratio	3.133	36.38	11.91	7.33

Table 2 represents histological features. The mean internal area was 12415.90±11887.78. tunica media was 154145.33±161272. The difference mean was 187310.90±174391.24. The mean ratio was 11.91±7.33.

Table 3: Association between disease status (control and disease) with mother, father age, baby weight, gestational age, internal media, tunica media

	Control	Disease	P Value
	Mean ±SD	Mean ±SD	
Mother Age	22.87 ±4.92	27.40 ±5.56	0.025*
Father Age	29.13 ±7.62	32.80 ±7.19	0.186
Baby weight	3.28 ±0.20	2.52 ±0.66	<0.001*
Gestational age	37.53 ±1.12	37.27 ±2.57	0.716
Internal area	16755.93 ± 13166.51	8075.87±8888.95	0.04*
Tunica media	223882.60± 201358.39	84408.07±53932.20	0.015*

* A separate t test was used, as a significant level of P0.05.

Table 3 represents the association between disease status (control and disease) with mother, father age, baby weight, gestational age, internal media, tunica media. There was a significant association between mother age, baby weight, internal area and tunica media between control and disease P value 0.025, <0.001, 0.04, 0.015 respectively .

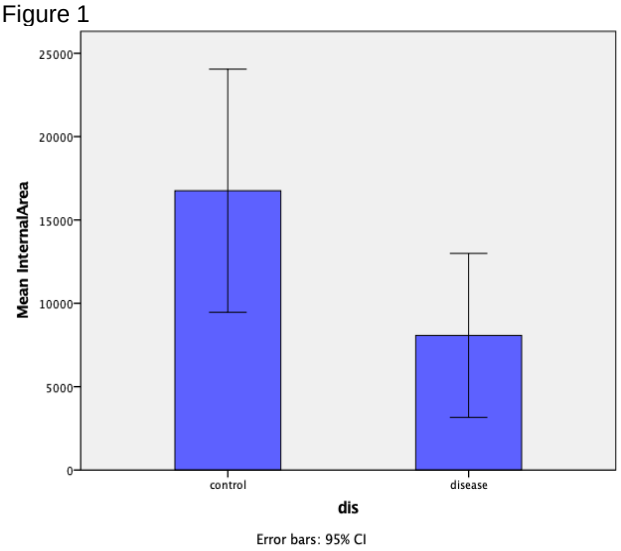
Table 4 Association between disease status (control and disease) with type of delivery

	Control	Disease	P value	
DELIVERY	N (%)	N (%)		
Natural	15 (83.3)	3 (16.7)	<0.001*	
CS	0	11 (100)		
Artificial	0	1 (100)		

*Fisher exact test was performed , Significant level at P<0.05

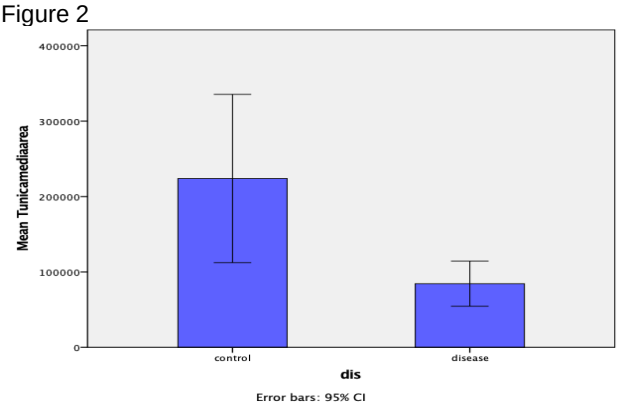
Table 4 represents the association between association between disease status (control and disease) with type of delivery. There was a significant association with P value <0.001.

Figure 1



The figue above reprents the association between internal area among patients and controls. There was a significant association between internal area and whether patient or control with P value 0.04.

Figure 2



The figue above reprents the association between tunica media among patients and controls. There was a significant association between tunica media and whether patient or control with P value 0.015.

DISCUSSION

The placenta is an important structural organ in the development of a fetus. It gave the fetal organs the nutrients, oxygen, and steroids they needed to grow [8]. The placenta and fetus received nutrients via the uterine spiral arteries. A significant contributor to successful pregnancy

event is placental redirection of maternal blood One way to accomplish this mission is to convert the spiral arteries of the uterine (the vessels that supply maternal blood to the placenta) vessels with low flow to high-capacity conduits. The smooth muscle and elastic laminae that surround the spiral arteries are destabilized and removed during remodeling [9]. As a result, the Internal luminal diameter increases as tonic contraction and resistance to vasoactive compounds are lost in vessels. Remodeled spiral arteries can provide an enhanced and consistent flow of maternal blood to the placenta, ensuring that the fetus receives enough nutrients and gases to grow and develop [10,11] .

Since delivery is the only conclusive treatment for preeclampsia, it is one of the most important explanations for the clinical interruption of pregnancy [12]. Even though foetal vitality is high, many obstetricians tend to perform Caesareans in these patients, As a result, it is estimated that the global incidence of caesarean sections is high (around 70 percent or more in preterm pregnancies) [13,14]. In the current study, patients with serious preeclampsia had a high rate of caesarean parts of nearly 100%, which is higher than rates recorded in previous research. ; In another study, patients with serious preeclampsia had a high caesarean section rate of nearly 70% [15,16]. Live births weighting less than 2.5 kg are classified as low birth weight. It is a crucial factor in infant survival, development, and health. Low birth weight babies are more likely to have disabilities and develop disorders like cerebral palsy, vision difficulties, learning disabilities, and respiratory issues. Our observations of low body weight (2.520.66) corroborated previous research that found pre-eclampsia to be a major maternal factor in low-birth-weight babies [17-20].In preeclampsia, several studies have found a similar proportion of non-dilated vessels or abnormal Physiological alterations in the spiral arteries of the myometrium . These adjustments that seen in 74 percent of preeclampsia cases, according to Hanssens et al. [21] 71 percent was also recorded by Sagol et al. [22]. In hypertensive pregnancies, Guzin et al. found that 65 percent of cases had defective spiral arteries, i.e. non-dilated vessels [23,24]. The percentage of non-dilated spiral arteries in normotensive pregnancies in these studies is also very different from our research using imag J; when the p value (0.04*) (0.015*) different between the control and preclampsia group of the Internal region and Tunica media of the spiral artery, respectively.

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Conflict of interest: This research did not have any potential conflicts of interest.

Ethical approval: The research was carried out in compliance with the values of the Helsinki Declaration.

Patient consent: Patients' written informed consent.

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