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## Study of length, diameter of umbilical cord and morphology of placenta in normotensive, and preeclamptic patients

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### Abstract

**Introduction:** The placenta is a vital organ which is absolutely essential to the survive, growth, development of the foetus. It forms the morphological record of anatomical condition, intrauterine events and intrapartum events of gestation. Pregnancy complications like hypertension are reflected in placenta in a significant way both macroscopically and microscopically. Several studies have shown that uteroplacental blood flow is decreased in Pregnancy induced Hypertension due to maternal vasospasm.

**Aims:** To study of length, diameter of umbilical cord and Histology of Placenta in normotensive and preeclamptic patients.

**Material and Methods:** 75 placentas, umbilical cords and antenatal record of patients constitute the study.

**Result and discussion:** In the present study the total length of the umbilical cord from the fetal end to placental end were measured. The maximum length was 74.2 cm and minimum length was 18.5 cms. The maximum transverse diameter of the cord was 2.8cm and minimum was 1.2 cm. The placenta of eclamptic patients were significantly smaller in weight, diameter and thickness. **Conclusion:** Knowledge about the variation in the length and diameter of umbilical cord and morphology of placenta is important for, obstetricians, radiologist for predicting early risk factors in pregnancy which in turn reflects on the outcome of pregnancy.

**Keywords:** Placenta, umbilical cord, length of the cord, morphology

### Introduction

Placenta was referred to as “after birth”, “external soul” of life in ancient Egyptian, Indian and Biblical texts. Umbilical cord is usually 1-2 cm in diameter and 30-90 cm in length (Moore K.L. 2003) [3]. Human placenta is expelled as a flattened discoidal mass with an approximately circular or oval outline, with an average weight about 500 gms (range 200-800 gms), average diameter 18.5 cms (range 1.5-2 cms) average thickness 2-3 cms (1-4 cms). The contents of umbilical cord are left umbilical vein, right and left umbilical arteries with differentiation of nerves in the extra embryonic mesoderm. The allantois and vitello-intestinal duct are incorporated at its fetal end. It is thick at the center and rapidly diminishes in thickness towards the periphery. The human placenta is chorio-allantoic since it is vascularized by vessels. Haemo-choroidal because of nature of its membrane, villous because of its villi, deciduous because maternal deciduas is shed after birth. According to Tropin (1965) [4] almost all discoidal placentas at term cover one fifth to one fourth of the area of uterine cavity wall. The complication during antenatal period especially pregnancy induced hypertension is attributed to the umbilical cord abnormalities and placental morphology. Any variation in length, diameter, morphology may lead to intrauterine growth retardation and other congenital abnormalities.

### Material and Methods

75 placentas, umbilical cords and antenatal record of the patients constitute the material for the study. The mothers delivered at Kamla Raja Hospital, Gwalior, associated with G.R. Medical College, Gwalior were considered for the study. Every minor detail was penned down and the code number given. The placentas and the umbilical cord were collected and identified and then brought adequately to the department of Anatomy for detailed study without any loss of time and well preserved. After collection each placenta was examined immediately. It was washed with normal saline.

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On initial examination. The length of the cord, diameter of the cord, cord coiling, presence of knots and the vascular pattern were studied. The length of the cord was measured from the cut end of the cord up to its placental attachment and with this reading 5 cm was added for the umbilical cord which was uniformly left towards fetal end. Diameter of the cord was measured with the help of Vernier caliper. The presence of cord coiling, presence of true and false knots was also observed. The placental morphology was recorded for weight, Diameter, thickness and no. of cotyledons.

**Observation and Result**

**Table 1a:** Showing the length of umbilical cord

Sr. No.	Length (cms)	No. of Umbilical Cord	%
1	70-80	2	2.66
2	60-70	3	4
3	50-60	8	10.66
4	40-50	10	13.33
5	30-40	20	26.66
6	20-30	16	21.33
7	10-20	16	21.33

**Table 1b:** Showing the length of umbilical cord

Length of umbilical cord	In cms
Maximum length of umbilical cord	74.2
Minimum length of umbilical cord	18.5
Mean length of umbilical cord	38.7

The above table shows that the length of umbilical cord was variable from 18.5 cms (shortest cord) to the longest umbilical cord measured was 74.2cms the mean length of the umbilical cord was calculated to be 38.7 cms. Median and mode were 31.65 and 19.2 cms. Standard deviation was 13.34 and standard error was 1.25.

**Table 2a:** Showing the diameter of umbilical cord

S. No.	Diameter in cms	No. of umbilical cord	%
1	2.6-3	2	2.66
2	2.1-2.5	15	20
3	1.6-2.0	38	50.66
4	1.0-1.5	20	26.66

**Table 2b:** Showing the diameter of umbilical cord

diameter of umbilical cord	In cms
Maximum diameter of umbilical cord	2.8
Minimum diameter of umbilical cord	1.2
Mean diameter of umbilical cord	1.72

**Table 3:** Comparing placental morphology in normotensive and preeclamptic patient

Mean placental	Normotensive patient	Eclamptic patient	P value
Weight gm	480+ <sub>2.66</sub> (SE)	268. + <sub>1.77</sub> (SE)	0.001
Diameter cm	21.4+ <sub>0.55</sub> (SE)	12.73+ <sub>0.21</sub> (SE)	0.001
thicknesscm	1.99+ <sub>0.04</sub> (SE)	1.77+ <sub>0.28</sub> (SE)	0.0001
No. of cotyledons	27.4+ <sub>0.54</sub> (SE)	190.47+ <sub>0.34</sub>	0.001

**Discussion**

According to Standring in Gray’s Anatomy 40th edition the mean length of the cord is 50 cm. But the length may vary from 20 to 120 cm (2008). According to Shunji Suzuki *et al.*, [1] the normal length of the umbilical cord was 45-68

cm. (2012). Mean placental weight, diameter, Thickness, No. of Cotyledons were all reduced in eclamptic patients as compared to normotensive patients. Increased coiling and number of Knots were observed grossly in umbilical cord in eclamptic patients

**Conclusion**

Preeclampsia has an adverse effect on the morphology of placenta, placental weight and diameter are reduced significantly in preeclampsia which subsequently reflects in fetal outcome. Knowledge about the variation in the length, diameters of umbilical cord and placental morphology is important for sonologists, obstetricians for predicting risk factors for intra uterine fetal growth and subsequent early diagnosis of risk factors to improve fetal outcome.

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