

MORPHOMETRIC ANALYSIS OF UMBILICAL CORD IN NORMAL VS HYPERTENSIVE PREGNANCIES IN POPULATION OF LUCKNOW, UTTAR PRADESH, INDIA

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ABSTRACT

Objective: The prime objective of the study is to compare and evaluate the morphological alteration in umbilical cord of normal and hypertensive pregnancies.

Materials and Methods: A total sample of 60 umbilical cord with placentae were collected for the study and various parameters like the length, diameter, site of insertion and the number of vessels were taken and compared between normal (group A) and gestational hypertension (group B) statistically.

Results: It was observed that, in group A we found the length of the umbilical cord, diameter of the cord and number of vessels to be 31.46±10.49, 1.36±0.39, 3±0.12 and in group B the values were 31.03±10.94, 1.36±0.39, 2.95±0.25 respectively. No material variations were seen statistically in terms of length, diameter, site of insertions and the number of vessels between the two groups.

Conclusion: The study reveals that the morphological parameter of umbilical cord shows no significant changes in the dimension of the gestational hypertensive umbilical cords as compared to the controlled cases.

KEY WORDS: Umbilical cord, Hypertensive Pregnancies, gestational hypertension.

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INTRODUCTION

Umbilical cord is defined as "The flexible cord like structure connecting a fetus at the navel with the placenta and containing two umbilical arteries and one vein that transport nourishment to the fetus and remove its wastes. It is also called as funis" [1].

A fully developed umbilical cord is approximately

1-2 cm in diameter and an average of 50-60 cm long at full term. Its length varies from 20- 120 cm.

The well- being of the fetus is influenced by a number of factors all of which are clearly seen in terms of birth weight. Such factors include genetics, maternal characteristics, placental and umbilical cord structure and functions. Again,

various diverse growth factors are observed such as differences in thinness, body length, head and abdominal circumferences all of which account for the weight of the baby [2].

When the pregnancy is complicated by medical problem like hypertension, it affects the maternal health, may also affect the architecture and function of the placenta. Pregnancy induced hypertension is a common obstetrical condition, related to pregnancy and increased risk of mortality and morbidity were proved among fetus with hypertensive mothers [3]. Hypertension in pregnancy is associated with poor blood supply to the intervillous spaces of placenta [4]. The inadequate supply of blood to placenta of PIH group leads to placental abruption IUGR and preterm birth [5,6].

MATERIALS AND METHODS

A total number of 60 umbilical cord (30 normal and 30 with gestational hypertension) with placenta were collected from Dept. of Obstetrics and Gynaecology, Integral Institute of Medical Sciences & Research, Lucknow, Uttar Pradesh after obtaining consent from the individual and ethical committee. Cases like the intra uterine death, prematurity, age of the mother more than 35 yrs. and anaemia were excluded from the study. The duration of study was Oct 2014 - May 2015. The umbilical cords were divided as normal (controlled) group A and with gestational hypertension as group B. The umbilical cords were collected from primi gravid and multi gravid mothers, from both normal and hypertensive pregnancies. The umbilical cords were gently expressed so as to remove its blood content and then washed thoroughly under tap water and mopped with dry cotton pad. The specimen were transported to the Dept. of Anatomy in formalin (10%) filled plastic container.

In the collected umbilical cord we studied the length of the umbilical cord, circumference of the umbilical cord, site of insertion and number of vessels in the umbilical cord. The length of the umbilical cord was measured with the non- elastic measuring tape and 5 cm stump was added to each measurement made. The circumference of the cord was measured from the foetal end by digital vernier calliper. The cord attachment to the placenta was taken by

making a circle of 10cm diameter and attachment was judged on parameters of centric and eccentric. The foetal end of the umbilical cord was longitudinally incised with a surgical blade to count the number of vessels.

RESULTS

It was observed that out of 60 cases of study group where 30 were controlled cases (group A) and 30 with gestational hypertension (group B) shown in Table. 1 the length of the umbilical cord in group A was 31.46 ± 10.49 and in group B it was 31.03 ± 10.94 . The statistical difference between the two groups was not significant. The umbilical cord diameter at the foetal end in group A was 1.36 ± 0.39 and 1.30 ± 0.65 in group B. even though it showed some differences in its value it was not significant statistically. The site of insertion in both the groups A and B shows almost equal number of centric and eccentric insertions leading to the conclusion that no significant difference could be seen between the two groups. The number of vessels in the umbilical cord in the controlled cases i.e. group A was three and so was in group B except for one case which showed two umbilical vessel i.e. one artery and one vein. Rest all the other cases showed presence of three vessels. The mean of the number of vessels in group A was 3 ± 0.12 and in group B was 2.95 ± 0.25 . The statistical difference between the two groups is not significant.

Table 1: Showing the Morphometric parameters.

Total No Of Cases (60)	Length Of The Cord	Diameter Of The Cord	No. Of Vessels
Controlled Cases	31.46 ± 10.49	1.36 ± 0.39	3 ± 0.12
Gestational Hypertension	31.03 ± 10.94	1.30 ± 0.65	2.95 ± 0.25

DISCUSSION

Peter Kwabena Appiah reported the average length of the cord to be 44.8 ± 12.0 and $44.3 \text{cm} \pm 9.2$ respectively [7]. Study done by AsraAnjum et al reported that the average length of the umbilical cord was between 40-60cms [8].

Muhammad Yasoob et al reported that the mean of the length of umbilical cord in control and PIH group was 57.4 and 52.9 respectively. The

experimental group (PIH) were affected but there was no significant statistical difference in the mean length of the PIH group Vs. control group [9]. In the present study the average length was between 30-60 cms. No statistical difference was observed between the two group i.e. control group and PIH group. In the study done by Rita Rani Saha the mean diameters of the control group and PIH group was 1.16 ± 0.36 and 1.04 ± 0.17 . No significant differences were found between the two groups [10].

Bhavina.k and Manirul Islam studied 40 cases each of hypertension and reported the diameter of the umbilical cord on the foetal end to be $1.16 \pm .22165$ and $1.16 \pm .2217$ the diameters were not compared with the normal group [11, 12]. The present study was done on 60 cases (group A and group B) showed that the mean diameter was 1.36 ± 0.39 in group A and 1.30 ± 0.65 in group B. There was no significant difference seen between the two groups. Alka Udania and Mehta found that the commonest type of umbilical cord insertion in PIH was eccentric (70.6%) whereas central and marginal insertion were 12% and 14.67% respectively [13]. Prabhjotkaur et al did the study on 75 cases of hypertension. The study reveals that common sites of insertion are central or eccentric in both normotensive and PIH cases.

The details of the study shows 25% of central, 23% of eccentric, 11% of lateral and 16% of marginal insertion [14]. The study done by Muhammad Yasoob et al reveals that the attachment of umbilical cord with placenta (central, battledore and velamentous) was not significantly affected in PIH as compared to the control group [9]. The study done by Bhavina.k et al and Manirul Islam on 40 cases each shows that the mean of site of insertion was 1.45 ± 0.50383 and 1.45 ± 0.5029 respectively [11, 12]. In our study there were equal numbers of centric and eccentric insertions in both the groups. We also did not find any significant difference between both the groups. In the study done by Asra Anjum et al found that the umbilical cord had two arteries and one vein in 50 specimen, which included 39 normal pregnancies, 5 hypertensive pregnancies and 2 multiple pregnancies. The single umbilical arteries and vein were observed in two umbilical cords i.e. sirenomelia and

anencephalic foetus [8]. Peter Kwabena Appiah during his study found the occurrence of two vessel cords in 1.13%, 3 vessels in 95.85% and 4 vessels in 2.64% respectively. Indicating that the large majority of cords has 3 umbilical cord vessels and 0.38 % showed single umbilical artery [7]. Study done by Rita Rani Saha et al found that the number of umbilical vessels, 2 arteries and 1 vein were found in all the samples of her study [10]. Study done by Muhammed Yasoob found that the single umbilical artery is a relatively rare finding. He says that the number of arteries was affected in the patients of PIH group, however the difference was not significant compared to the normal group [9].

CONCLUSION

The present study showed the prominence of 3 umbilical vessels in both the groups (group A and group B) except for 1 case which had 2 umbilical vessel i.e. one artery and one vein. The mean of the number of vessels are group a 3 ± 0.12 and group B 2.93 ± 0.25 . In our study also we found no significant difference between the two groups. The lean diameters were observed in hypertensive pregnancy but no significant changes have been observed in the umbilical cord dimension.

Conflicts of Interests: None

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