



**ORIGINAL RESEARCH PAPER**

**Anatomy**

**MORPHOMETRIC ANALYSIS OF HUMAN PLACENTA AND UMBILICAL CORD IN HUNDRED PATIENTS FROM MALWA REGION OF CENTRAL INDIA**

**KEY WORDS:** Human placenta, Morphometric analysis, Umbilical cord.

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**ABSTRACT**

Examination of placental anatomy has been useful in-utero as well as after parturition. Morphometric features of placenta can be correlated to fetal wellbeing. This study was conducted with the aim of studying placenta and cord of 100 abortus or still born for morphological analysis of placenta and cord. A total number of 100 placentae and their umbilical cords were studied. The maximum number of cases was between 31-40 cm. Maximum mid-thickness of cord seen in 20 cases between 1.0-2.0 cm in 2nd trimester and in third trimester the mid-thickness of cord was more with maximum cases lying between 2.1-3.5 cm with 41 patients out of 59 cases of third trimester. Commonest insertion was Eccentric type (75%), followed by Central (23%) and Battledore only in 2% cases. Shape of placenta was Round (39%), Oval (37%) and rest 24% was of irregular shape. Weight of placenta concern 40% of the third trimester cases were in 300-500 gms weight range. Maximal placental thickness was between 0.4 – 0.9 cm in 32 cases out of 41 cases of second trimester while it increased to 0.7-1.2 cm in 46 cases, out of 59 cases of third trimester.

**INTRODUCTION**

Placenta is an organ that facilitates exchange of nutrients and oxygen between fetal and maternal compartments.<sup>1</sup> Examination of placental anatomy has been useful in-utero as well as after parturition. Morphometric features of placenta can be correlated to fetal wellbeing.<sup>2</sup> The growth of fetus depends on adequate functionality of placenta. It shares same stress and strain to which the fetus is exposed. Thus any disease which affects the mother has a great impact on placenta. Anatomical structure of placenta greatly influences in function. Thus study of placental morphology is considered essential.<sup>3</sup>

This study is planned to study morphometric and anatomical variation in placenta as well as umbilical cord.

**MATERIAL AND METHODS**

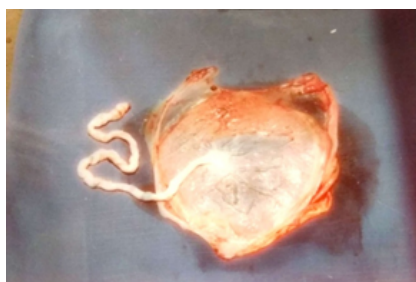
This study was conducted with the aim of studying placenta and cord of 100 abortus or still born for morphological analysis of placenta and cord in the Department of anatomy, M.G.M. Medical College, Indore of Malwa region. The material was consisted of hundred fresh fetuses, placentae and cords, collected at random from the Department of obstetrics and gynecology, M. Y. Hospital, Indore. The cord length, Mid-thickness of cord, type of insertion of cord into placenta, cord vasculature for single artery, false and true knots, shape of placenta, weight of placenta and thickness of placenta was recorded and segregated according gestational trimester and tabulated for analysis of pattern of different recorded morphometric parameters.

The statistical calculations were recorded in percentage using word excel software.

**OBSERVATION AND RESULTS**

A total number of 100 placentae and their umbilical cords (Figure 1) were studied. Number of patient in 2nd trimester was 41 while in 3rd trimester it was 59 patients.

**Figure 1: Placenta with umbilical cord**



The maximum number of cases was between 31-40 cm of cord length with 32% cases followed by 26% cases in 21-30 cm, 21% in 41-50 cm, 12% in 51-60 cm and 5% or less in both extreme arms. Maximum mid-thickness of cord (Table 1) seen in 20 cases between 1.0-2.0 cm followed by 11 cases between 2.1-2.5 cm, rest 10 cases were more than 2.6 cm in 2nd trimester. In third trimester the mid-thickness of cord was more with maximum cases lying between 2.1-3.5 cm with 41 patients out of 59 cases of third trimester.

**Table 1: Mid-thickness of the cord in 2nd and 3rd trimester of pregnancy**

S. No.	Mid thickness of cord in cms	Number of cases (N = 100)	
		2nd Trimester (n =41 )	3rd Trimester (n =59 )
1	1.0-1.5	10	5
2	1.6-2.0	10	9
3	2.1-2.5	11	15
4	2.6-3.0	4	11
5	3.1-3.5	2	15
6	3.6-4.0	4	4

Commonest insertion type of umbilical cord into placenta (Table 2) was Eccentric type (75%), followed by Central (23%) and Battledore only in 2% cases. Most common type of shape of placenta was Round (39%), Oval (37%) and rest 24% was of irregular shape.

False knots were present in 62% cases while only 4 cases had true knots. Thirty four percent umbilical cords were without any knots.

As far as weight of placenta concern 40% of the third trimester cases were in 300-500 gms weight range. Only 5% of the placentae were above that range. Rest 55% placentae were distributed below 300 gms to 40-100 gms in second trimester.

**Table 2: Type of insertion of the umbilical cord**

S. No.	Type of insertion of cord	Number of cases	
		Number	%
1	Eccentric	75	75
2	Central	23	23
3	Battledore	2	2

Maximal placental of thickness was between 0.4 – 0.9 cm in 32 cases out of 41 cases of second trimester while it increased to 0.7-1.2 cm in 46 cases, out of 59 cases of third trimester.

**DISCUSSION AND CONCLUSION**

Different parameters of placenta like length of cord, placental thickness, cord thickness, shape and insertion of cord etc. studied in 100 patients of 2nd and 3rd trimester.

Adinma et al. in a study found cord length between 15 cm and 130 cm with mean being 51.5 cm which was more than our study.<sup>4</sup> In our study maximum number of cases was between 31-40 cm of cord length with 32% cases followed by 26% cases in 21-30 cm, 21% in 41-50 cm, 12% in 51-60 cm and 5% or less in both extreme arms.

Abubakar et al.<sup>5</sup> found placental birth weight ranged from 300 to 890 g with a mean of 590±82 g comparable to 3rd trimester placental weight in our study but more than that of second trimester. Burkhardt et al.<sup>6</sup> found a mean placental weight from vaginal deliveries 545±107 g versus 621±139 g for cesarean deliveries. In our study the third trimester cases were in 300-500 gms weight range while below 300 gms in second trimester.

Kouvalainen et al.<sup>7</sup> found an average diameter of umbilical cord as 1.5 cm, in our study maximum mid-thickness of cord seen in 20 cases between 1.0-2.0 cm which was comparable to our study, while 11 cases between 2.1-2.5 cm rest 10 cases were more than 2.6 cm in 2nd trimester. In third trimester the mid-thickness of cord in our study was 2.1-3.5 cm with 41 patients out of 59 cases of third trimester was more than Kouvalainen et al.<sup>7</sup>

Commonest insertion type of umbilical cord into placenta was Eccentric type (75%), followed by Central (23%) and Battledore only in 2% cases. Yetter<sup>8</sup> reported that 7% of umbilical cord insertions occur at the placental margins. Londhe and Mane<sup>9</sup> found that in 93% of the cases, there was central attachment of cord while the remaining 7% had marginal attachment.

Panuganti and Boddeti<sup>10</sup> observed 50 placentae, central attachment was observed in 60% of the cases, eccentric in 20%, and marginal attachment in 20%. In our study, we also found battledore insertion of cord in 2% of cases. This battledore insertion is important because these cases may lead to an increased risk of fetal hemorrhage due to the unprotected vessels as well as vascular compression and thrombosis. Battledore cord insertion is also associated with advanced maternal age, diabetes mellitus, smoking, a single umbilical artery, and fetal malformations.<sup>8</sup>

Most common shape of placenta in our study was Round (39%), Oval (37%) and rest 24% was of irregular shape. Kishwara et al.<sup>11</sup> found placenta of oval, round, and irregular shape in 38.3%, 36.6%, and 25% of cases, respectively, which was comparable to our study. Raghunath et al.<sup>12</sup> found that 94/101 were circular in shape and 7/101 were oval in shape. Kulandaivelu et al.<sup>13</sup> found that out of the 51 placentae, 48 were circular and 3 were oval in shape. Irregular-shaped placentae are mostly seen in premature deliveries that occur due to toxemia.

Maximal placental thickness was between 0.4 – 0.9 cm in 32 cases out of 41 cases of second trimester while it increased to 0.7-1.2 cm in 46 cases, out of 59 cases of third trimester. Raghunath et al.<sup>12</sup> and Kulandaivelu et al.<sup>13</sup> found the mean thickness of the placenta to be 2.1 cm and 1.42 cm, respectively. Panuganti and Boddeti<sup>10</sup> found that the thickness of the placenta varied from 1.8 cm to 3.8 cm. In our study, the thickness of the placenta was 0.9-1.2 cm, which was less the studies of Raghunath et al. and Panuganti and Boddeti. Thin placenta less than 2 cm associated with unfavorable outcome and more than 4 cm are usually associated with maternal diabetes mellitus.<sup>8</sup>

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