

## Variations in the Placental Attachment of Umbilical Cord and Its Embryological Significance

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### Abstract

**Background:** Knowledge about the pattern of placental attachment is important for better perinatal outcome.

**Materials and Methods:** A total of 50 placentas with umbilical cord were collected from the Department of Obstetrics and Gynaecology in the Government Rajaji Hospital, Madurai. The study was conducted in the Institute of Anatomy, Madurai Medical College, Madurai. The placentas with attached membrane with umbilical cord were collected immediately after delivery. The morphological variations of the placenta and the attachment of umbilical cord with its blood vessels were studied. The findings were observed in fresh specimens.

**Results:** The pattern of placental attachment of umbilical cord was observed in all specimens. Among 50 specimens, the 35(70%) placenta had eccentric attachment, 11(22%) specimens had central attachment and 4(8%) specimens had marginal attachment. In 1 specimen the placenta was bilobed.

**Conclusion:** Knowledge about the variations in the placental attachment of umbilical cord is important for anatomists, pathologist, obstetricians and embryologists.

**Keywords:** Placenta, umbilical cord.

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### I. Introduction

The placenta is a complex multifunctional organ of mainly fetal origin with pleiotrophic roles during fetal growth (1). Human placenta is a discoid, chorio-decidual organ which connects the fetus with uterine wall of the mother. At full term the placenta is disc like and after separation from uterine wall it has fetal surface, maternal surface and peripheral margin. It consists of chorionic plate on the fetal side, basal plate on the maternal side, stem villi extending between the plates and intervillous space between the stem villi filled with maternal blood. Placenta develops from two sources, fetal part is from chorion frondosum and maternal part from decidua basalis. The placenta can be classified based on the attachment of umbilical cord. Normally the umbilical cord is attached to the center of placenta on its fetal side. Also there is battledore placenta (marginal), furcate and velamentous placentae. Placenta acts in the exchange of gaseous and metabolic products between the maternal and fetal blood streams across the placental barrier (2). Abnormalities in the placental attachment of umbilical cord leads to congenital anomaly in fetus and also associated with intra uterine growth retardation and preterm labour.

### II. Materials And Method

A total of 50 placentas with umbilical cord were collected from the Department of Obstetrics and Gynaecology in the Government Rajaji Hospital, Madurai. The study was conducted in the Institute of Anatomy, Madurai Medical College, Madurai. The placentas with attached membrane with umbilical cord were collected immediately after delivery. The morphological variations of the placenta and the attachment of umbilical cord with its blood vessels were studied. The findings were observed in fresh specimens.

### Observation

The pattern of placental attachment of umbilical cord was studied in all specimens. Among 50 specimens, the 35(70%) placentas had eccentric attachment (Fig-1), 11(22%) specimens had central attachment(Fig-2) and 4(8%) specimens had marginal attachment(Fig-3). In 1 specimen the placenta was bilobed(Fig-4).

**Table 1:** Site of attachment of umbilical cord

Site of attachment of umbilical	Number of specimens	Percentage
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cord		
Eccentric	35	70%
Central	11	22%
Marginal	4	8%

**Table 2:** Comparison with previous studies

Previous Studies	Number of Specimens	Eccentric	Central	Marginal	Furcate	Velamentous
Asra et al (1)	39	54%	36%	8%	-	2%
Arora et al (3)	32	59.38%	18.75%	15.62%	3.12%	3.12%
Yousuf et al (4)	150	66%	24%	8%	-	2%
Manikanta et al(5)	110	75.45%	75.45%	16.36%	7.27%	0.90%
Present Study	50	70%	22%	8%	-	-



**Fig-1** shows the eccentric attachment of umbilical cord



**Fig-2** shows central attachment of umbilical cord



**Fig-3** shows marginal attachment of umbilical cord



Fig-4 shows bilobed placenta

### III. Discussion

Asra Anjum et al stated that in 39 normal pregnancy placentas the 21 specimens showed eccentric attachment, 14 specimens showed central attachment, 3 specimens showed marginal attachment and 1 specimen showed velamentous attachment(1).

Arora et al stated that among 32 placentas 19(59.38%) specimens had eccentric attachment, 6(18.75%) had marginal attachment, 5(15.62%) specimens had central attachment, 1(3.12%) specimens had furcate attachment and 1(3.12%) specimens had velamentous attachment(3).

According to Yousuf et al, among 150 placentas 99(66%) specimens had eccentric attachment, 36(24%) specimens had central attachment, 12(8%) specimens had marginal attachment and 3(2%) specimens had velamentous attachment(4).

According to Manikanta reddy et al, in 110 placentas 83(75.45%) specimens had eccentric and central attachment, 18(16.36%) specimens had marginal attachment, 8(7.27%) specimens had furcate attachment and 1(0.90%) specimens had velamentous attachment(5).

In the present study, among 50 specimens 35(70%) placenta had eccentric attachment, 11(22%) specimens had central attachment and 4(8%) specimens had marginal attachment. In 1 specimen the placenta was bilobed and our finding coincides with the above studies.

### IV. Conclusion

Knowledge about the variations in the placental attachment of umbilical cord is important for anatomists, pathologist, obstetricians and embryologists. Variation in the placental attachment of umbilical cord is associated with various congenital anomalies such as oesophageal atresia, obstructive uropathies, congenital hip dislocation, spina bifid etc. Abnormal placental attachments of umbilical cord can lead to intrauterine death of fetus due to tear of umbilical vessels during labour.

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