

MORPHOMETRY OF EQUINE PLACENTA

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ABSTRACT

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The Growth and development of fetus is dependent upon placenta of individuals functional capabilities. In this study morphometry of placenta of fifty six thorough breed mares aged between 9 to 13 years were studied after normal foaling in which the foals born were alive. The prototype of expulsion, gross morphology, morphometry, placental expulsion time, and umbilical cord length was studied. All placenta were expelled with the allantoic side (non-villous surface) of allantochorion outermost. The mean placental expulsion time was 66.89 ± 3.90 min. The mean length of pregnant horn, non-pregnant horn, total body, posterior body and anterior body of pregnant horn were 63.49 ± 0.81 , 56.63 ± 0.81 , 132.64 ± 0.98 , 67.52 ± 1.11 and 107.93 ± 1.02 cm respectively. The umbilical cord length was 60.30 ± 1.04 cm. The mean weight of the total placenta was 4.70 ± 0.11 kg. Morphometry of placenta can be used as a determinant of foals well being.

Key Words: Equine, Placenta, Morphometry

INTRODUCTION

The dependence of the equine fetus on the placenta has been appreciated since many years and it is generally accepted that the growth and development of the fetus is dependent upon placenta of adequate functional capabilities. Therefore it is important to evaluate the placental membrane which yields valuable information about the Mare's uterus and the neonatal foal. Studies on normal morphometry of the placenta is lacking. Hence the present study was taken up with the objective to study the morphometry of the placenta and to correlate with the foal's well-being.

MATERIALS AND METHODS

Placentas collected after normal foalings from fifty six thoroughbred mares aged between 9 to 13 years, with gestation ranging from 320 to 365 days, maintained at Chettinad Stud and Agricultural farm, Soorapet were utilised for this study. Placentas were collected along with the cut stump of the umbilical

cord immediately after expulsions and examined morphologically. The prototype of expulsion either with the allantoic side (non-villous surface) of allantochorion outermost or with chorionic side (villous surface) outermost was observed. The placental expulsion time was recorded in minutes

Morphological examination of the allantoamnion, allantochorion and the umbilical cord was carried out as described by Asbury and Leblanc (1993). The allantochorion of both the horns and the cervical star were identified and spread out on a clear flat surface in the form of rough 'F' Configuration and the tissues were smoothed out but not stretched (Fig.1). The allantoic (avillous) surface (Fig.2) of the allantochorion was reoriented to examine the chorionic (Villous) surface (Fig. 3). The gross appearance, colour, areas of thickening, presence of exudate and distribution of villi were observed. The lengths of the allantochorion of the pregnant horn, non- pregnant horn, total body, Posterior body and anterior body of pregnant horn were measured in cm as described by whitwell and Jeffcott (1975). The entire placenta was weighed after draining all the fluids using electronic balance.

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The umbilical cord was examined morphologically for the presence of edema and twists. The length of the cord was measured in cm from the proximal severed end to the distal urachal opening into allantoic cavity, after the twists if any were unwound as described by Whitwell and Jeffcott (1975).

RESULTS AND DISCUSSION

In all the fifty six foalings studied all the placentas were normal and all the foals born were alive and survived. All fifty six placentas were expelled with the allantoic side (non-villous surface) of allanto chorion outermost (Fig. 2). Whitwell and Jeffcott (1975) observed that expulsion with chorionic (Villous) surface outermost was more common when the allanto chorion of the non-pregnant horn was longer than the pregnant horn. In this study the length of the allanto chorion of the non-pregnant horn was less than the pregnant horn, which could possibly be the reason that all the placenta were expelled with the allantoic (non-villous) surface outermost. In all the 56 placentas studied, the amnion appeared whitish blue in colour with numerous tortuous blood vessels radiating across it from the cord. The allantoic surface of the allanto chorion was smooth, shiny, bluish in colour with prominent blood vessels (Fig.2). The chorionic surface was bright red velvet in colour and the villi were present throughout the chorionic surface except at the regions of the oviductal papilla, the endometrial cup sites, yolk sac attachment site and the cervix

(Fig. 3) which was in agreement with the reports of earlier workers (Whitwell and Jeffcott, 1975; Asbury and LeBlanc, 1993; Carleton, 1995; Immegart, 1997; and Fogarty, 2000a). The mean linear measurements of the allanto chorion and umbilical cord presented in Table. The present findings concurred with the observations of Whitwell and Jeffcott (1975) who also reported that the mean lengths of allanto chorion of pregnant horn, non-pregnant horn, total body, posterior body and anterior body of pregnant horn to be 66.00 ± 0.49 , 60.00 ± 0.66 , 130.00 ± 0.77 , 67.00 ± 0.65 and 109.00 ± 0.71 cm, respectively in the normal placenta. The placental expulsion time ranged from 25 to 172 min with a mean of 66.89 ± 3.90 which agrees to the reports of Sevinga *et al.* (2002)

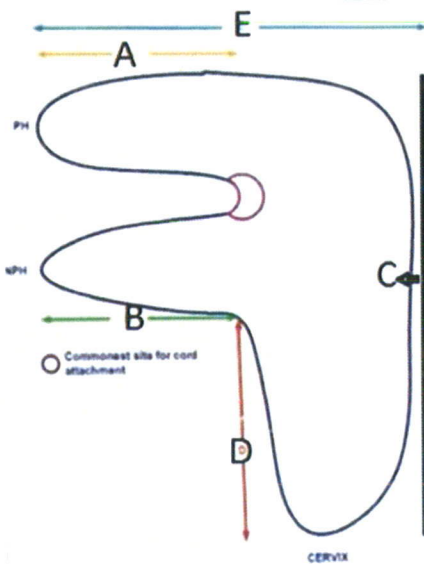
The length of the umbilical cord ranged from 47 to 78 with a mean of 60.30 ± 1.04 . Caslick (1932) reported that the umbilical cord length in equine varied from 30 to 135 with a mean of 66 cm. Cottrill *et al.* (1991) reported that long umbilical cords of >70 cm were associated with fetal malformation and demise. In the present study all the foals survived and no fetal malformation was observed. The total placental weight ranged from 3.80 to 7.25 Kg with a mean of 4.70 ± 0.11 which agreed with earlier reports of Prickett (1970). The Morphometry of the equine placenta provide information regards the expulsion pattern, time morphometry of different region which can be used as a determinant of foal well being.

Table.

The Mean linear measurements (cm) of allanto chorion and umbilical cord of fifty six placentas from thoroughbred mares with normal foaling.

Sl.No	Measurements(n =56)	Mean \pm SE	Range
1.	Length of Pregnant horn	$63.49^a \pm 0.81$	54-80
2.	Length of non-pregnant horn	$56.63^a \pm 0.81$	45-72
3.	Total body length	$132-64^a \pm 0.98$	116-147
4.	Posterior body length	$67.52^a \pm 1.11$	51-82
5.	Anterior Body-Pregnant horn length	107.93 ± 1.02	94-127
6.	Umbilical cord length	60.30	47-78

Means bearing superscript a and b within the row differ significantly ($P \leq 0.01$)



- A. Length of Pregnant horn
- B. Length of non pregnant horn
- C. Total Body Length
- D. Posterior body length
- E. Anterior body-Pregnant horn length

Fig 1: Schematic Representation of linear measurements of allantochorion

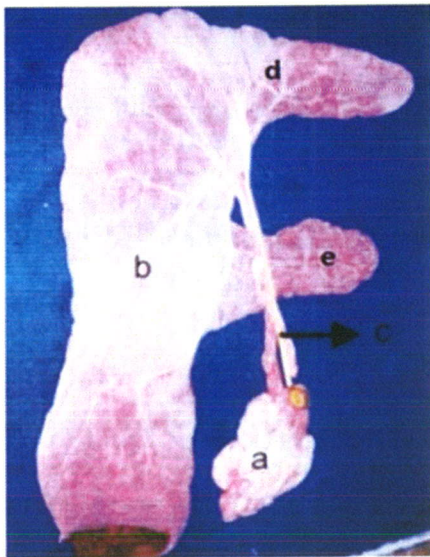


Fig 2: Normal Equine Placenta
 a. Allantoamnion
 b. Allantochorion
 c. Umbilical Cord
 d. Pregnant Horn
 e. Non Pregnant Horn

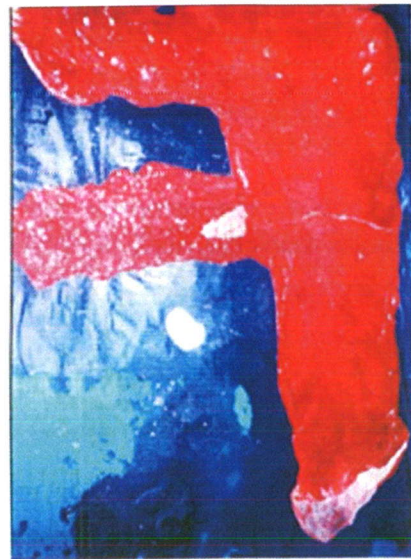


Fig.3 Normal allantochorion with chorionic Surface
 Outer most

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