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RESEARCH ARTICLE

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CRANIOTHORACOPAGUS (MONOCEPHALUS DIPYGUS TETRABRACHIUS) IN TWIN PIGS

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ABSTRACT

The objective of this study was to report a case of craniothoracopagus, monocephalus, dipyugus, tetrabrachius in swine, created in anthropized areas of the Amazon forest for the implementation of livestock. During the physical examination, we observed that lesions were characterized by monocephaly and presence of a midline that became more evident in the nose region, with two snouts and four nostrils. The oral cavity was unique with total duplication of the lower jaw and tongue. The anterior region of the body had two sets of limbs (four in total), one in a normal spatial position and the second pair positioned dorsally. In the posterior region, we observed complete duplicity of the pelvis, pelvic limbs and genital organs. There are few reports on craniothoracopagus in pigs, thus it is essential to describe reports like these to collaborate with Veterinary Teratology, this being the first case to be described in the literature in Rondônia.

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INTRODUCTION

Embryonic development comprises a series of processes that occur in an orderly manner, so that the individual, at birth, is similar to the rest of the species (JUNQUEIRA; ZAGO, 1982). However, when such fetal development does not happen properly, morphological abnormalities called congenital malformations occur (MOORE; PERSAUD, 2004). The etiology of these malformations has been associated with infectious agents (PANTER *et al.*, 1985), nutritional deficiency, toxic plants, chemical substances, genetic factors (ABBASI *et al.*, 2009), and physical agents (DANTAS *et al.*, 2010). In pigs, this change is associated with the high number of fertilized and implanted eggs during the breeding period, that is, with the high production of the sows associated with short generation intervals, resulting in an increase in the number of breeding stock and farrowing (SOCARRÁS *et al.*, 2014). Conjugated monozygotic twins also known as Siamese twins is an example of a congenital anomaly, which consists of the union of both through one or more parts of the body, in general, this anomaly is due to the incomplete division of a single fertilized egg (SOCARRÁS *et al.*, 2014). The classification of united twins is based on the location of the

fusion and the number of members (SOCARRÁS *et al.*, 2008), which are classified as cephalothoracopagus (union of fetuses in the cephalic, thoracic or abdominal regions); parapagus (union in the lumbosacral region); craniopagus (fusion only in the cranial region); monocephalus (animal with only one head); dipyugus (duplicity in the pelvis and pelvic limbs) and tetrabrachius (individual with 4 thoracic members) (SADLER, 2000; SPIERS *et al.*, 2010). As explained above, this study aimed to describe the congenital malformations observed in a case of Monocephalus dipyugus tetrabrachius in swine.

CASE REPORT

The birth of monozygotic twins with congenital malformation associated with failure to separate structures was reported in a pig farm in the city of Novo Horizonte D'Oeste/RO. According to the producers, the piglets with the congenital lesions belonged to a litter with six animals, all born alive. The parents were originated from the crossing between the Piau (female) X Pietrain (male) breeds. The three-year-old female was multiparous and was acquired from another rural property. As reported, in previous deliveries, no clinical changes were observed, as well as birth defects in piglets. In addition, no

treatment was performed during the gestation period, and the pigs were fed with commercial feed according to the category, and grazing was allowed during the months of gestation. Upon physical examination, we observed the pig presented fusion of the head, trunk and anterior thoracic region. Despite being monocephalic, we observed a midline that became more evident in the region of the nose where there were two snouts and four nostrils. The oral cavity was unique, with total duplication of the lower jaw and tongue, which was superimposed, and the presence of a fibrous tissue of hard consistency in the posterior region of the palate. The anterior region of the body had two sets of limbs (four in total), one in a normal spatial position and the second pair positioned dorsally (Figure 1).



Figure 1. Swine, Siamese twins, males, with duplication of the thoracic limbs and total separation of the pelvic region, both limbs presenting onychoglyphosis

In the posterior region, we observed complete duplicity of the pelvis, pelvic limbs and genital organs; however, the umbilical cord was shared. Both limbs had onychoglyphosis.

DISCUSSION

The united monozygotic twins arise, generally, due to an error in blastogenesis resulting from the incomplete fission of a single zygote (SPENCER 2001; SADLER, 2011) and has been reported in humans (Prieto *et al.* 2004, Al Alayet *et al.* 2014), birds (Corbera *et al.* 2012, Hirschberg *et al.* 2012), sheep (Mazaheriet *et al.* 2014), cats (Seavers 2009) and goats (Buhari *et al.* 2008, Freicket *et al.* 2014), being more common in cattle (Masoudifard *et al.* 2008, Freicket *et al.* 2014) and more rarely in pigs. The diagnosis of craniothoracopagus was made by observing the lesions characterized by the union of the fetuses, with a head (craniopagus or monocephalus) and a thorax (thoracopagus), tetrabrachius for having four forelimbs and dipygus for the symmetrical duplication of hindlimbs. A similar report was described by Socarrás *et al.* (2014), in Colombia, where almost all the characteristics described coincide with this report, with the exception of the forelimbs. In Socarrás' report, the animal had only one pair of thoracic limbs (Dibrachius). Another similar case was described by Júnior *et al.* (2005), in the state of São Paulo, with a difference in the appearance of a third ear in the occipital region, when an incomplete face has only one middle ear. The possible causes of these changes vary and may be associated with mutant genes, drugs, medications, microorganisms and the

consumption of teratogenic plants in certain stages of fetal development (Prestes *et al.* 2013). We could not determine the cause of the malformation, but the etiology may be associated with the use of pesticides for the control of weeds or unknown teratogenic plants, since the property is located in an anthropized region of the Amazon rainforest, with a vast and still unknown biodiversity. Socorrás *et al.* (2014) also suggested a similar hypothesis, in which he reported similar conditions, and the animals were raised close to a cotton plantation, where the use of pesticides could reach the waters offered to the farm animals. There are few reports on craniothoracopagus in swine, thus it is essential to describe reports like these, to collaborate with Veterinary Teratology, this being the first case to be described in the literature in anthropized areas of the Amazon forest for the implantation of livestock. The disclosure of these data are important for the knowledge of Veterinarians and for pig farmers.

CONCLUSION

According to the subdivisions of the body malformation and the macroscopic findings, the animal presents congenital malformation compatible with craniothoracopagusmonocephalus dipygus tetrabrachius.

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