



## ABNORMAL DEVELOPMENT OF HEAD AND FACE IN A PIG FOETUS – A CASE STUDY

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A Large White Yorkshire (LWY) male pig foetus weighing 1.6 kg that was born with abnormal development was procured from the Centre for Pig Breeding and Research, Mannuthy. The foetus had apparently normal body, but the head and face were incompletely developed (Fig. 1). The cranial cavity and brain were totally absent. The mouth was in an opened up position (Fig. 2) and the upper and lower jaws presented incompletely developed parts. The foetus was blind, ears were ill-developed and eyes were represented by small narrow projections on either side of the rudimentary neck.

On examination of the mouth cavity, hard and soft palates were found as rudimentary structures. Anterior half of the hard palate presented six ridges, but the posterior half had ill-developed grooves which faded centrally. Caudally, the hard palate reduced in width and merged with the ill-developed soft palate. The mammalian palate is a device for separating the mouth from the nasal (respiratory) passages. It helps the young one to suck (and later, to chew) and breathe at the same time. In the present case study, it was an anomaly due to the developmental arrest, *viz.* incomplete development of the palate, where the primordium is present but the progressive development had fallen short of its normal completion. The teeth were absent. The gums on both upper and lower jaws were thickened caudally, but narrowed in front to fuse together representing the rudimentary maxillary process and mandibular process respectively. The nasal cavity and nostrils were totally absent, but a slight thickening at the rostral end represented the rudimentary snout.

The tongue presented a median

ridge and two lateral expansions rostrally and a central swelling caudally (Fig. 2) on floor of the rudimentary mouth cavity. The features represented improper fusion of its two sets of primordia resulted due to the developmental arrest of the tongue. In the present case study, the anterior median ridge was indicative of the tuberculum impar and the lateral expansions were the lateral swellings forming the anterior primordia, originating from the first branchial arch. The caudal swelling was the copula, the median posterior primordium arising from the mesoderm of second, third and part of fourth arches (Noden and de Lahunta, 1985).

The condition was diagnosed to be due to the developmental arrest of the face accompanied by the developmental failure *viz.* acrania (agenesis of cranial cavity) with anencephaly or absence of brain (Noden and de Lahunta, 1985). The partial presence of tongue and neck and complete form of body parts thereafter indicated a normal progressive development advancing caudal to the level of branchial arches.

In the present study, the embryonic growth had failed to arrive at the normal state at the cephalic end, cranial to the level of primitive streak. The defect involved all the germ layers at the head end. Construction of the face and neck, which is closely bound up with the history of the branchial or pharyngeal arches was also defective. Eventually, the pig foetus could not survive as a result of inadequate respiration and inhalation due to the total absence of nostrils and nasal cavity and improper development of mouth cavity. The condition could be correlated with the genetic reasons associated with a defective autosomal gene.



**Fig. 1.** The new born LWY piglet with acrania and anencephaly. Lateral view.

1. Rudimentary eye 2. Rudimentary ear 3. Rudimentary snout



**Fig. 2.** The new born (LWY) piglet with acrania and anencephaly. Rostral view of the head.

1. Hard palate 2. Soft palate 3. Copula 4. Tuberculum impar  
5. Lateral swelling 6. Maxillary Process 7. Mandibular process

## References

Noden, D.M. and de Lahunta, A. 1985. *The Embryology of Domestic Animals-Developmental Mechanisms and Malformations*. Williams and Wilkins, Baltimore. p. 367. ■

**S. Maya<sup>1</sup>, A.P. Usha<sup>2</sup>, V.R. Indu<sup>3</sup>,  
A.R. Sreeranjini<sup>4</sup>, J.J. Chungath<sup>5</sup> and  
N. Ashok<sup>6</sup>**

Department of Veterinary Anatomy and Histology,  
College of Veterinary and Animal Sciences,  
Mannuthy, Kerala – 680 651.

1. Professor & Head, Department of Veterinary Anatomy & Histology, CVAS Pookode, Wayanad- 673 576, Kerala  
2. Professor and Director (Farms), KVASU  
3 & 4 Assistant Professors  
5. Professor & Head (Retd.)  
6. Professor & Head