

Aplasia of the Right Pinna in a Cross-Bred In-Gilt in Nigeria: A Case Report

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Abstract

Congenital anomalies of the auricle in domestic animals are rarely characterized, in contrast to the relatively well-documented literature on microtia and aural aplasia in humans, where reports remain scarce and largely limited to isolated case descriptions in dogs and pigs. This report describes a case of unilateral (right-sided) pinna aplasia with complete absence of the auditory orifice, observed in a cross-bred gilt during a routine visit to a communal piggery in Olorunsogo, Ona-Ara Local Government Area, Oyo State, Nigeria. The gilt was examined physically and its birth and growth history obtained from the farm owner, with no clear record of the parents' identity and origin. The animal presented with total absence of the right pinna and no visible orifice; it was otherwise healthy, and showed no other physical deformities; it had already been used for breeding. To the best of our knowledge, this is the first report of pinna aplasia in a pig in Nigeria, and only the second documented worldwide after a case in India. Given the possibility of a heritable basis, we recommend that the sire, dam, and littermates be traced and evaluated, and that affected breeding lines be reviewed within the farm's breeding programme.

Keywords: Congenital Anomaly, Aural Aplasia, Cross-Bred and Microtia and Gilt

1.Introduction

Congenital anomalies are structural or functional defects that are present at birth, arising from genetic, environmental, or combined genetic-environmental factors that disrupt normal embryonic development (Sağlam et al., 2021, cited in Quigley and Mee, 2025). They may affect a single organ system or occur as part of a broader syndrome, and their causes in livestock are frequently unknown or under-recorded (Mee et al., 2024). Anomalies of the ear are comparatively uncommon in farm animals relative to humans. Microtia, meaning "small ears", refers to a deformity of the ear characterized by hypoplasia or an underdeveloped auricle or pinna (Tekes et al., 2013). Its severity ranges from partial to complete aplasia of the external auditory canal, and it may be associated with middle-ear abnormalities (Wang et al., 2019). Microtia can be unilateral or bilateral, and can occur independently or as part of a clinical syndrome associated with other congenital malformations. It is more common in males and primarily affects the right ear in humans (Wang et al., 2001; Sanchez et al., 1997). This condition is known to have a genetic predisposition, involving autosomal dominant or recessive genes, many of which are homeobox genes active during early embryonic development (Alasti and Van Camp, 2009). More than 80% of human microtia cases are unilateral, with the right ear affected in approximately 60% of unilateral cases; the unaffected ear usually has normal hearing (Castilla and Orioli, 1986; Harris et al., 1996; Jafek et al., 1975; Mastroiacovo et al., 1995). In bilateral cases, affected individuals often have hearing impairment and require surgical ear reconstruction. The reported prevalence

of microtia in humans varies from 0.83 to 17.4 per 10,000 births across different ethnic populations, and the disorder is estimated to be more common in males, with a sex ratio of approximately 1.5 (Canfield et al., 2009; Forrester and Merz, 2005; Harris et al., 1996; Shaw et al., 2004; Suutarla et al., 2007). More recent nationwide data from Taiwan report an average incidence of 57.7 per 100,000 infants over ten years (Guo and Zhang, 2021), while a 2025 systematic review confirms that the etiology of microtia continues to involve both genetic and environmental factors, with tissue-engineering approaches now being explored for reconstruction (Hellies et al., 2025). Equivalent epidemiological data in domestic animals are lacking. What veterinary data do exist come almost entirely from general congenital-defect surveillance rather than microtia specifically: for example, a ten-year Irish national survey recorded congenital defects in 0.5-1% of calves, most commonly intestinal atresia, with genetic, non-genetic, and unknown causes reported (Mee et al., 2024; Quigley and Mee, 2025). This absence of species-specific incidence data for aural anomalies in livestock underscores the value of documenting individual cases such as this one. The etiology of the wide variability and gender differences observed in humans remains largely unknown, and comparable explanations for livestock have not been established [1-10].

1.1. Case History and Observation

On a routine farm visit to a communal pig farm which accommodated about 126 farmers and 3746 pigs, an in-gilt was observed with total absence of the right pinna; no

orifice was observed. The gilt was farrowed about a year ago; the owner could not give a precise date, as no record was kept. There were seven piglets in the litter, with the gilt being the only one with any congenital anomaly. All other piglets were sold, except for the one with the deformity. The gilt was active and apparently healthy, and had been mated

for breeding; it was left with the boar for about 5 days, after which it was separated. Its estimated body weight was 47kg using the Webo belt measurement, and it was identified as a crossbred, Large White × Landrace, in the absence of farrowing records. There were no other physical deformities observed on the gilt [11-15].



Figure 1: Complete Absence of The Right Pinna, With No Visible Auditory Orifice, In the Affected Crossbred Gilt

2. Discussion

Microtia is a congenital malformation of the external ear ranging from mild structural underdevelopment to complete absence of the pinna and auditory canal (Tekes et al., 2013; Hellies et al., 2025). Congenital anomalies generally, including microtia, arise from genetic mutations, environmental teratogenic exposure, or an interaction of both during embryonic development (Alasti and Van Camp, 2009; Sağlam et al., 2021, cited in Quigley and Mee, 2025), and reported human incidence ranges widely from roughly 1 in 6,000 to 1 in 12,000 live births depending on population and diagnostic criteria (Hellies et al., 2025). Microtia can occur as an isolated condition or in conjunction with other abnormalities, most often in bilateral cases. The most common associated malformations include oral clefts, eyelid defects, facial asymmetry, renal abnormalities, cardiac defects, polydactyly, and vertebral deformities (Harris et al., 1996; Mastroiacovo et al., 1995; Wang et al., 2001), and microtia patients have also been reported to show a higher incidence of hematuria and electrocardiographic abnormalities on further screening, suggesting broader systemic associations worth considering even in isolated-looking cases (Sun et al., 2023; Yang et al., 2024). These anomalies are also associated with a spectrum of syndromes, including the oculo-auriculo-vertebral spectrum (Tasse et al., 2005). Although the causes of microtia and its associated syndromes are poorly understood, strong evidence supports the contribution of genetic and environmental components. Various familial cases with Mendelian modes of inheritance have been reported (Alasti et al., 2008; Bicknell et al., 2011; Guernsey et al., 2011; Schaefer et al., 2014; Tekin et al., 2008;

Tischfield et al., 2005). Mouse-model studies have identified genes associated with microtia and illustrated several signaling pathways, including BMP, WNT, FGF, and retinoic acid, that play a role in outer-ear development (for a review, see Luquetti et al., 2012). However, few genes and disease-causing variants responsible for human microtia have been unequivocally identified to date (Luquetti et al., 2012). Naturally occurring mutations with hereditary defects in domestic animals provide an opportunity to identify further genetic causes of human congenital anomalies. Successful examples have been illustrated in a wide variety of genetic defects in, for example, dogs (Grall et al., 2012; Safra et al., 2013), cattle (Charlier et al., 2008; Mee et al., 2024), pigs (Milan et al., 2000), and horses (Rosengren Pielberg et al., 2008). The pig is an important biomedical model for human disease; humans share more similar physiological and anatomical features of the hearing system with pigs than with mice [16-22].

3. Conclusion

This is, to the best of our knowledge, the first report of aplasia of the pinna in a pig in Nigeria, and probably only the second documented worldwide, following a case in India (Arul Prakash et al., 2021). It can be concluded that the congenital microtia with aural atresia seen in this in-gilt could be due to genetic abnormalities of specific or combined gene effects. Although the farm is communal, hosting close to 126 farmers, there remains a possibility of inbreeding among the animals, and no breeding records were kept. There is a need to trace the sire, dam, and other piglets (both normal and those with microtia) for genomic analysis, particularly of the HOXA1

gene implicated in porcine microtia. Because congenital abnormalities are generally heritable, the responsible sire and dam line may need to be culled or excluded from the breeding programme, especially if further cases occur. The affected gilt is growing normally and is currently being used for breeding. This report emphasizes the need for congenital ear abnormalities such as microtia to be carefully evaluated within breeding programmes, alongside routine physical and otoscopic examination at the time of farrowing [23-32].

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