

Short communication

Possible aetiology of the posterior presentation in Perosomus elumbis

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(Submitted 18 June 2022; Accepted 28 November 2022; Published 9 July 2023)

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Abstract

The aetiology of foetal presentation in cattle is still unresolved. The hind legs are the main source of propulsive movement in cattle, which provides changes in foetal presentation. The assumption is that in the absence of hind leg movements of the foetus, as in the case of the congenital malformation, Perosomus elumbis, the incidence of the anterior and posterior presentation will be the same. The Scopus database, the world wide web (www), and the list of article references were searched using the keyword, Perosomus elumbis. Manuscripts with data about the foetal presentation were included and 21 cases in 16 articles were identified. There were 11 cases of anterior presentation and 10 of posterior presentation. The Chi-square test didn't show a statistically significant difference between the incidence of anterior and posterior presentation. This finding supports the assumption that the posterior presentation is the result of the random occupying of the intrauterine space with the same probability of anterior and posterior presentation. To confirm or exclude at random the occupant of the intrauterine space with the same probability for anterior and posterior presentation as a general mechanism for posterior presentation in cattle fetuses, it is necessary to determine the incidence of foetal presentation at birth in various veterinary entities accompanied by an increased incidence of posterior presentation. The aim of the paper was to investigate the incidence of posterior and anterior presentation in Perosomus elumbis.

Keywords: birth, cattle, foetal presentation, Perosomus elumbis

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At the end of a singleton pregnancy, 95% of cattle fetuses are in the anterior presentation. Posterior presentation in this species does not allow full dilatation of the birth canal and is accompanied by dystocia, with increased offspring morbidity and mortality (Holland *et al.*, 1993). The aetiology of the physiological anterior presentation in cattle at birth, as well as the aetiology of the posterior presentation, is not explained.

The hind legs in cattle are the main source of the propulsive force of movement. The foetus changes its presentation and intrauterine position to intrapartum position by active movements (Ginther, 2022). Perosomus elumbis is a congenital malformation characterized by a partial or complete agenesis of the lumbar, sacral, and coccygeal vertebrae, hypoplasia, or aplasia of the spinal

cord that ends in the thoracic region. Consequently, hind legs are paralyzed (Habermehl, 1954). As a result of the absence of normal foetal mobility, the foetus is prevented from intentionally assuming anterior (cephalic) presentation, and the probability for anterior and posterior presentation should be the same. The foetus occupies the intrauterine cavity at random (Sekulic *et al.*, 2010; Petrovic *et al.*, 2017; Ginther, 2022).

The aim of the paper was to investigate the incidence of posterior and anterior presentations in *Perosomus elumbis*. The assumption was that, in the absence of propulsive movements of the hind legs, the probability of posterior and anterior presentations would be the same.

The study was carried out in the Department of Neurology, Medical Faculty Novi Sad, University of Novi Sad, Serbia, and it was approved from Institutional Ethical committee. Research was carried out during 2021. A search of the Scopus database as well as world wide web (www) with keywords: *Perosomus elumbis*, cattle, was performed from 1946–2021. The search was further extended to involve references of the identified articles for additional cases of *Perosomus elumbis*. The study included published works with data on the presentation of a foetus at delivery, regardless of the publication language. Besides the description of the presentations, the statement "normal delivery" was considered as anterior presentation. The exclusion criterion was missing data on presentation at delivery. Three subjects independently reviewed the literature to exclude errors. SPSS version 20 (IBM Corp., Armonk, New York, USA) was used for data analysis.

The research covered the period from 1874–2021. By searching the SCOPUS database, 35 articles were identified. Additionally, 16 articles were identified in www and 8 in the list of references. In total, 59 articles were processed. Based on the title and abstract, 12 articles were excluded. Nine articles were unavailable. According to the text, 22 articles were inappropriate due to missing data about foetal presentation at delivery. A total of 21 cases in 16 papers with the data of presentation or indication that delivery was normal were identified. Statements about the anterior presentation were present in eight cases (Helms *et al.*, 2020; Joest, 1911; Megahed & Mervat, 2021; Patil *et al.*, 2017; Selvaraju *et al.*, Singh, 2020; 2012; Tiwari *et al.*, 2011; Williams, 1931). In three cases, an anterior presentation was assumed based on the statement 'normal delivery' (Habermehl, 1954; Hartmann, 1874; Son *et al.*, 2008). Posterior presentation occurred in 10 cases (Williams, 1931; Agerholm *et al.*, 2014; Bezek *et al.*, 1994; Ghuman *et al.*, 2016; Sharma *et al.*, 2017; Zietschmann, 1911). The correspondence was 100%.

The Chi-square test did not show statistically significant differences between the incidence of anterior and posterior presentation ($\chi^2 = 0.095$, $P = 0.757$, $P < 0.05$). Assuming that 5% is the incidence of posterior presentation in cattle foetuses at birth, the distribution of presentations, in that case, would be 20 in anterior presentation and 1 in the posterior presentation. The Chi-square tests indicated differences in the incidence of anterior and posterior presentation in our study (11 vs 10 cases) compared to the distribution of presentations with an incidence of 5% (1 vs 20 cases) ($\chi^2 = 9.976$, $P = 0.001$, $P < 0.05$).

The results of the study confirm the assumption that in the absence of adequate mobility of the foetus, the incidence of anterior and posterior presentation is the same. When the physiological motility of the foetus is prevented than the foetus occupies intrauterine space at random. Posterior presentation is not a consequence of the accommodation of the foetal shape in the shape of the intrauterine cavity (Sekulic *et al.*, 2010).

All existing knowledge about the management of posterior presentation and postnatal outcome of this presentation was gained by direct comparison of foetuses/newborns with anterior and posterior presentation (Patterson *et al.*, 1987; Kalbe & Schultz, 2000; Linhares & El-Sheikh, 2021). However, random occupying of the intrauterine cavity with the same probability for anterior and posterior presentation indicates that the group of foetuses in anterior presentation could be heterogeneous. The number of foetuses which are random in anterior presentation is same as number of foetuses in posterior presentation. Foetuses in posterior presentation have poor physical characteristics, indicating that they are *per se* (excluding complication related to mode of birth) a vulnerable group with higher incidences of stillbirth, neonatal morbidity, and mortality (Patterson *et al.*, 1987). Because of this, a direct comparison of foetuses of anterior and posterior presentation has a bias that reduces the difference between these two groups. In order to avoid this bias, it is necessary to subtract from the group of foetuses with anterior presentation, the exact number of foetuses with identical characteristics to those in the posterior group and add them to the group of foetuses in posterior presentation, and then make a comparison. In this way, the data obtained would shed new light on the perinatal period and the outcome of delivery with foetuses in posterior presentation.

For cattle data on posterior presentation, incidences in various veterinary entities are absent. To confirm or exclude random occupation of the intrauterine space with the same probability for anterior and posterior presentation as a general mechanism for posterior presentation in cattle

foetuses, it is necessary to determine incidence of foetal presentation at birth in various veterinary entities accompanied with increased incidence of posterior presentation. If it is shown in further studies that in cattle foetuses the maximum incidence of posterior presentation is 50% for any given veterinary entity, it could be assumed that in this species, the aetiology of posterior presentation is random occupation of the intrauterine cavity with the same probability for anterior and posterior presentation, which is the same as in human species (Sekulic *et al.*, 2010).

Acknowledgements

This study was supported by the Ministry of Education, Science and Technological Development of the Republic of Serbia, Grant Number 451-03-68/2022-14/200114.

Authors' contributions

S.S., Dj.P., A.B., I.P., and B.T. conceptualized the manuscript; S.S., Dj.P., A.B., I.P., and J.Dz. wrote the manuscript; I.S., J.S. and K.G.B. collected and reviewed the data. All authors reviewed the manuscript and consented to its publication.

Conflict of interest declaration

We have no conflict of interests.

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