

Notomelia with Supernumerary Hindlimb in a Korean Native Calf

Sung-Ho Yun, Jung-Eun Kim*, Seung-Joon Kim**, Young-Sam Kwon and Kwang-Ho Jang¹

Department of Surgery, College of Veterinary Medicine, Kyungpook National University, Daegu, Korea

**Department of Pet Management, Suseong College, Daegu, Korea*

***Department of Obstetrics, College of Veterinary Medicine, Kyungpook University, Daegu, Korea*

(Accepted: February 14, 2015)

Abstract : A 1-month-old female Korean native calf was referred to the Veterinary Medical Teaching Hospital, Kyungpook National University. The chief complaint was a supernumerary limb on the dorsal thoracic region. The ectopic limb was smaller than normal limbs and it was partially attached on the ribs. Surgical excision was performed to remove the supernumerary ectopic limb and notomelia was successfully corrected. Supernumerary ectopic limb is defined as the presence of accessory limb or limbs attached to various body regions. This study reports macroscopic and radiographic features of notomelia in a female Korean native calf.

Key words : supernumerary ectopic limb, polymelia, Korean native calf, notomelia.

Introduction

The congenital malformation in musculoskeletal system of bovine has relatively higher incidence than anomalies in other parts (4,14). The congenital anomalies in bovine were appeared as various forms and it could be classified as lethal, sub-lethal and non-lethal. Although severe anomalies of embryos could lead lethal consequence such as death before birth, most of musculoskeletal malformations are belong to sub-lethal or non-lethal category (10).

Supernumerary ectopic limb (SEL) is defined as the presence of accessory limb or limbs attached to various body regions. Polymelia, according to the affected site, is divided into cephalomelia, thoracomelia, notomelia, pygomelia. SEL was reported in human, lamb, domestic cattle, mouse, pig, and amphibian (1,8,11,12,13,15).

Although exact mechanism of formation is still unknown, SEL could be occurred by genetic factors, environmental factors (viral infections, toxins, nutrition and management) and interactions of these factors (1).

Case

A 1-month-old female Korean native calf was referred to the Veterinary Medical Teaching Hospital, Kyungpook National University. The chief complaint was accessory limb on the dorsal thoracic region. On physical examination and blood test (complete blood count, blood chemistry test), the condition of calf was normal and clinically healthy, except the ectopic limb on the dorsal thoracic region. The ectopic limb did not make any gait abnormality.

In gross findings, the ectopic limb was smaller than nor-

mal limbs, and had almost same structures of hind limb (Fig 1). In radiographs, it was partially attached over the spines of 7th ~ 10th ribs, and there was no joint structure between SEL and trunk. Dysplastic femur-like bone, tibia and fibula could be seen in radiographs (Figs 2 and 3).

Surgical correction was performed to amputate the supernumerary ectopic limb. The calf was sedated with 0.1 mg/kg of intravenous xylazine hydrochloride (Rumpun[®], Bayer Korea Ltd., Korea) and 2% lidocaine hydrochloride (Lidocaine HCL Injection 2%[®], Jeil Pharm Co., Ltd, Korea) was used for intraoperative local anesthesia. The animal was placed in lateral recumbency. The skin shaved and prepared aseptically was circularly incised around the bond between trunk and proximal part of the ectopic limb (Fig 4). An irregular femur-like bone was loosely connected with the ribs and had abnormal bony density. After amputation of the accessory limb, a penrose drain was placed and maintained for 3 days. Routine postoperative antibiotics were administered for 7 days. Skin suture was removed after 1 week. No complications were observed during follow-up period of 3 months.

Discussion

The supernumerary ectopic limb could be arise not only single defect, but also complex type. Reported multiple anomalies concurrent with the ectopic limb include ectopic lung and ectopia cordis and atresia ani. Although multiple or severe congenital defect could lead death before birth, the ectopic limb as isolated defect is typically not fatal (1).

While polymelia caused by symmetric or asymmetric conjoined twins, so called siamese twins, tends to have more than 2 legs, heterotopic polymelia shows 1 or 2 legs, therefore polymelia has been considered to have different developmental mechanisms according to the number of ectopic legs (6). The identified causes of limb duplication include retin-

¹Corresponding author.
E-mail : khojang@knu.ac.kr



Fig 1. Supernumerary ectopic limb.

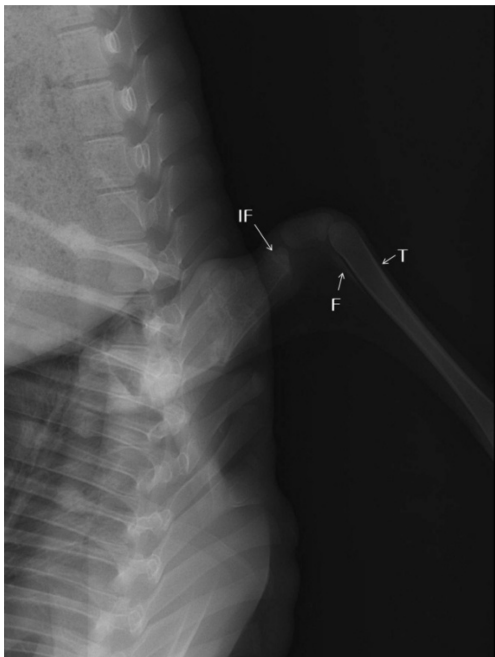


Fig 2. Radiographic image of an extra limb. IF: irregular femur-like bone, F: fibula T: tibia.

oic acid in mouse (12), vitamin A in tadpole (7), parasite infection in amphibians (13) and chromosome break in calf (2,9). Nevertheless, precise etiology of SEL is still not clarified.

According to the previous reports, the cases of polymelia were reported in limited breeds including Korean native, Hereford, Holstein, Brahman (9), and polymelia has been shown sex-linked frequency and predominantly occurred in female calf (14). In Korean native calves, including this case, polymelia cases were also mostly female (1). The regions of ectopic limb include the right scapular region, cervical vertebra, ventrolateral thorax. In this case, SEL was on the caudodorsal region of the right thorax. All reported SEL in Korean native calves were attached on the right side of the body, but correlations between cases could not be identified (6). Polydactyly defined as the presence of extra digits, and duplication of distal part in ectopic limb are commonly accompanied with polymelia, but it was not observed in this case.

Supernumerary ectopic limb as the isolated defect could successfully be correctable by surgical excision and proper



Fig 3. Radiographic image of an extra limb. S: scapula, SEL: supernumerary ectopic limb.



Fig 4. The amputated ectopic limb (median view).

postoperative management (3,10). This report is described macroscopic, radiographic features and successful surgical treatment of heterotopic notomelia in a Korean native calf.

References

1. Alam MR, Lee JI, Lee HB, Ko JJ, Lee KC, Kim NS. Supernumerary ectopic limbs in Korean indigenous cattle: four case reports. *Veterinari Medicina* 2007; 52: 202-206.
2. Albarella S, Ciotola F, Dario C, Iannuzzi L, Barbieri V, Peretti V. Chromosome instability in Mediterranean Italian buffaloes affected by limb malformation (transversal hemimelia). *Mutagenesis* 2009; 24: 471-474.
3. Buhari S, Yakubu A, Jibril A, Adeyanju J, Sonfada M, Garba H, Chafe U, Usman S, Opara Q. Management of supernumerary limb in an Ouda lamb: A case report. *Sokoto J Vet Sci* 2008; 7: 5-8.
4. Čitek J, Řehout V, Hájková J. Congenital disorders in the cattle population of the Czech Republic. *Czech J Ani Sci* 2009; 54: 55-64.
5. Islam MR, Roh YS, Cho A, Park H, Heo SY, Lee K, Lee HK, Lim CW, Kim B. Multiple congenital anomalies in a Korean native calf (*Bos taurus coreanae*). *Korean J Vet Res*

- 2011; 51: 55-59.
6. Kim C, Yeo S, Cho G, Lee J, Choi M, Won C, Kim J, Lee S. Polymelia with two extra forelimbs at the right scapular region in a male Korean native calf. *J Vet Med Sci* 2001; 63: 1161-1164.
 7. Mahapatra PK, Mohanty-Hejmadi P and Dutta SK. Polymelia in the tadpoles of *Bufo melanostictus* (Anura: Bufonidae). *Current Science* 2001; 80: 1447-1451.
 8. Monfared AL. A Case Report of Supernumerary Ectopic Limbs in a Lamb: Anatomical and Radiological Aspects. *Global Veterinaria* 2013; 10: 424-426.
 9. Nowacka J, Urbaniak K, Antosik P, Jaskowski JM, Frackowiak H, Switonski M. Polymelia associated with frequent chromosome breaks in a heifer. *Vet Rec* 2007; 161: 276-277.
 10. Rahman MM, Khan MS, Biswas D, Sutradhar BC, Saifuddin AK. Pygomelia or supernumerary limbs in a crossbred calf. *J Vet Sci* 2006; 7: 303-305.
 11. Reiner G, Hecht W, Burkhardt S, Kohler K, Haushahn P, Reinacher M, Erhardt G. A complex malformation in a pig: case report and review of the literature. *Deutsche Tierärztliche Wochenschrift* 2008; 115: 194-197.
 12. Rutledge JC, Shourbaji AG, Hughes LA, Polifka JE, Cruz YP, Bishop JB, Generoso WM. Limb and lower-body duplications induced by retinoic acid in mice. *Proc Natl Acad Sci USA* 1994; 91: 5436-5440.
 13. Sessions SK, Ruth SB. Explanation for naturally occurring supernumerary limbs in amphibians. *J Exp Zool* 1990; 254: 38-47.
 14. Shojaei B, Masoudifard M, Asadi A. Notomelia and ulnar dimelia in a calf: Radiographical anatomic aspects. *IJVS* 2007; 2: 83-88.
 15. Zhao L, Li MQ, Sun XT, Ma ZS, Guo G, Huang YT. Congenital lumbosacral limb duplication: a case report. *J Orthop Surg (Hong Kong)* 2006; 14: 187-91.

한우 송아지에서 등다리증

윤성호 · 김정은* · 김승준 · 권영삼 · 장광호¹

경북대학교 수의과대학, *수성대학교 애견관리학과

요 약 : 10개월령 한우 암송아지가 경북대학교 동물병원에 진료 의뢰되었다. 주증상은 가슴 등쪽에 다리 하나가 더 있는 것이었다. 판곳 다리는 정상다리에 비해 작고 부분적으로 갈비뼈와 유착되어 있었다. 수술로 절제하였으며 등다리 증은 효과적으로 치료할 수 있었다. 여러다리증은 신체 특정 부위에 하나 이상의 다리가 더 있는 것을 의미한다. 본 증례에서는 암송아지 등다리증의 형태학적 소견과 방사선 특징을 관찰해 보았다.

주요어 : 판곳다리증, 여러다리증, 등다리증, 한우송아지