

REPAIR OF CLEFT PALATE IN A COW-CALF USING BI-PEDICLE MUCO-PERIOSTEAL FLAP THROUGH COMMISSUROTOMY

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SUMMARY

This report describes an attempt to surgically repair the secondary cleft palate involving the whole of the hard and soft palates in a 3.5-month-old, 45 kg female Holstein-Friesian crossbred calf under general anaesthesia. The calf had a history of nasal regurgitation of milk while nursing and bilateral mucoid nasal discharge since birth. The calf was very weak and had evidence of aspiration pneumonia on chest radiographs. A bilateral commissurotomy was done to enhance visualization of the palatal defect that involved hard and soft palate. Bi-pedicle mucoperiosteal flaps were made and were sutured in the centre just above the cleft using polydioxanone no. 1. Post-operative care included antibiotics, analgesics, and fluid therapy for the next 3-5 days. Milk feeding was advised in a bowl. The calf showed improvement with no regurgitation after milk intake on follow-up but was reported dead on day 10.

Keywords: Bi-pedicle flap, Cleft palate, Commissurotomy, Cow-calf, Regurgitation

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A cleft palate is a developmental anomaly with an opening between the oral and the nasal cavities due to failure of closure in facial processes such as the frontonasal, maxillary and mandibular processes (Smolec *et al.*, 2010). Cleft palate is common in cow calves and lambs but their repair is difficult due to the small oral opening leading to difficult access to the cleft, and is therefore, less attempted. The present report describes the surgical correction of a secondary cleft palate involving the whole hard and soft palate in a Holstein Friesian crossbred cow calf.

A 3.5-month-old, 45 kg Holstein-Friesian crossbred female calf was presented with a history of regurgitation of milk from the nose after suckling since birth. For the last 2 months, frequent mucoid nasal discharge was recorded. The calf was very weak and dehydrated on clinical presentation. Oral examination revealed a longitudinal cleft involving the hard palate; however, the soft palate abnormality could not be detected.

The respiration and heart rates of the calf were mildly elevated, but, the rectal temperature was within the normal physiological range. Chest auscultation revealed harsh sounds, particularly in the lower chest of both sides. The chest radiograph showed an alveolar pattern in the cranial and accessory lung lobes, suggesting aspiration pneumonia (Fig. 1a). No apparent congenital abnormality was recorded on the echocardiography (Fig. 1b). The prognosis and the risk involved with the surgical intervention were explained to the owner and the owner gave consent for the surgery.

After 3 hours of fasting, the calf was administered

with a combination of inj. Diazepam @ 0.2 mg/kg and inj. Ketamine @ 5 mg/kg for induction. A topping with inj. Propofol (@ 2 mg/kg) till effect was administered for endotracheal intubation using No. 14 ID tube. Anaesthesia was maintained with Isoflurane mixed in oxygen using a partial rebreathing circuit. Injection cefotaxime 1g was administered intravenously.

The calf was restrained in a ventro-dorsal position. Elongated oral cavity with short commissures was the major limitation for access to the oral cavity, so it was decided to perform bilateral commissurotomy for surgical exploration of the palatal defect. Bilateral commissurotomy was done (Fig. 2a) under aseptic preparations and the oral cavity was opened with the help of bandages to visualize the extent of the palatal defect which was extensive involving both the hard and soft palates.

Two parallel incisions were made on the mucosa of the hard palate on either side of the entire length of the defect just close to the dental arcade to create flaps for bi-pedicle grafting (Fig. 2b). The flaps were undermined, reflected and elevated, and sutured in the centre over the defect starting from the caudal end in a lock-stitch suture pattern using Polydioxanone loop No. 1 (Fig. 2c). The continuous pattern was made interrupted at few places by applying knot and continuing further. It was not possible to approach the entire soft palatal defect, satisfactorily, for surgical closure. The bite taking and tightening of the sutures was difficult deep inside and even a few bites were repeated as they were tearing off the flap when tightened. The commissurotomy incisions were closed in two layers apposing mucous membrane using polyglactin 910 No. 1-0 in a simple continuous pattern followed by skin using

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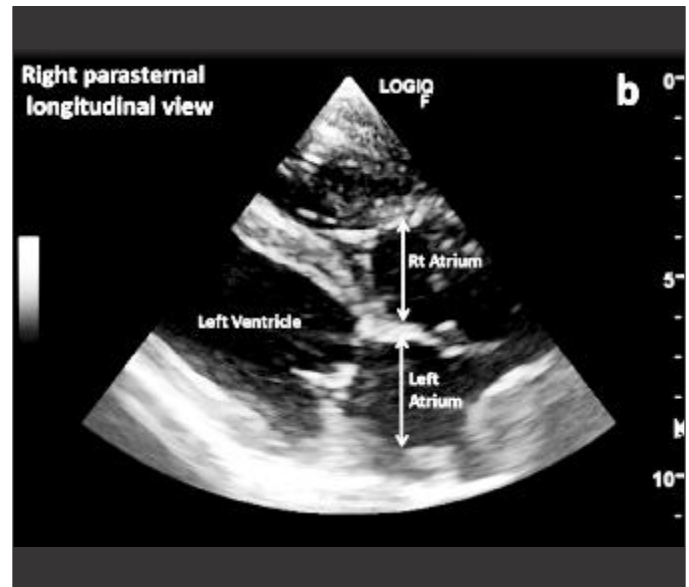
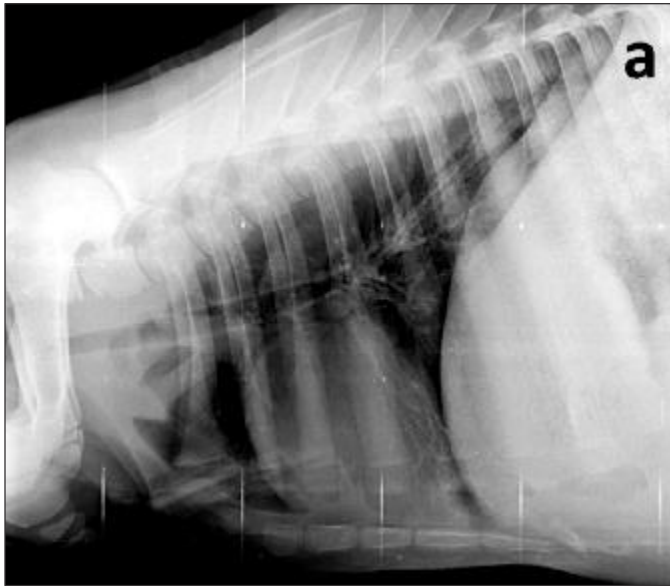


Fig. 1. Chest radiograph of the calf suffering from secondary cleft palate showing mild alveolar pattern in caudal and accessory lung lobes (a). The echocardiogram of the same calf in right parasternal longitudinal view showing no apparent congenital abnormality (b).

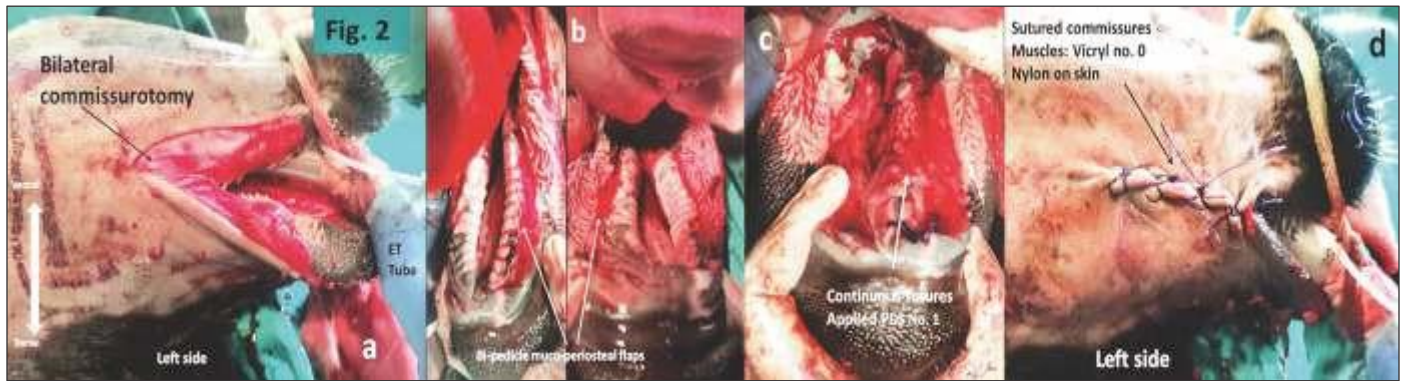


Fig. 2. Serial photographs of the surgery of calf suffering from secondary cleft palate. (a) The photograph showing commissurotomy. (b) The bi-pedicle mucoperiosteal flap. (c) Sutured bi-pedicle flaps. (d) Sutured commissurotomy incisions.

nylon in an interrupted pattern (Fig. 2d).

The calf recovered from anaesthesia smoothly. The post-operative prescription included antibiotic cefotaxime @20 mg/Kg body weight, twice daily for 5 days, analgesic inj. Meloxicam @0.2 mg/kg, once a day for 3 days and fluid therapy with inj. DNS 5% 1 litre twice a day for 3 days till the calf started taking milk. Milk feeding/sucking was allowed in a bowl from the elevated platform. The telephonic follow-up on day 7 revealed that the calf was taking milk after surgery with no regurgitation; however, the calf was reported dead on day 10.

Cleft palate is associated with embryological failure of the lateral palatine processes to fuse on the midline (Nelson and Stashak, 1983). Surgical access to the cleft is most difficult if it involves the caudal hard palate or the soft palate. Multiple approaches through the oral cavity, bilateral buccotomy, pharyngotomy, mandibular symphysiotomy and their various combinations have been tried for cleft palate closure (Keeling and Moll, 1995). If the defect is large and cannot be opposed with flaps, the use of polypropylene

mesh with the palatal mucosal flap has also been reported in calf with short-term successful outcome (Smolec *et al.*, 2010).

The technique used in the present case was successful in repairing the defect in the hard palate but could not be applied to the soft palate due to its unapproachability even after bilateral commissurotomy. Such surgeries, particularly of the oral cavity become so extensive that general anaesthesia using inhalant gases becomes a must. Though, surgical success was achieved in the present case; the calf could not survive for long may be due to the secondary affections of pneumonia and dehydration. It could be anticipated that early presentation and repair could have been more prognostic for this calf.

Feeding through nasogastric or pharyngostomy tube with the head down has been reported in the literature following the cleft palate repair (Nair *et al.*, 2019) but normal feeding milk in a bowl from the elevated platform was also found successful on short-term follow-up in the present case.

CONCLUSION

The present case study concludes that the cleft of hard palate in a cow calf can be successfully repaired using bi-pedicle flap method under general anaesthesia but requires bilateral commissurotomy to approach the cleft. However, the soft palate may not be approached. Moreover, the surgery should be conducted early in life so that the secondary affections of pneumonia and chronic dehydration can be avoided.

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