

Technical session VII

Bovine Papillomatosis, Canine Thelaziasis and Therapeutic Management of Congenital Goitre

Speaker

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Venue: NVH Conference Hall
Date and time: 07/11/25 at 3:15pm



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Technical Session on Bovine Papillomatosis, Canine thelaziasis and Congenital goiter

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Introduction

- ❖ Papillomaviruses are the cause of **papillomas (warts)**, which have been recognized in animals for centuries.
- ❖ Papillomavirus virions are non-enveloped, spherical, 55 nm in diameter, with icosahedral symmetry.
- ❖ Virions are composed of 72 hexavalent (six-sided) capsomers arranged in pentameric (five-sided) arrays .
- ❖ The genome consists of **circular double-stranded DNA**.

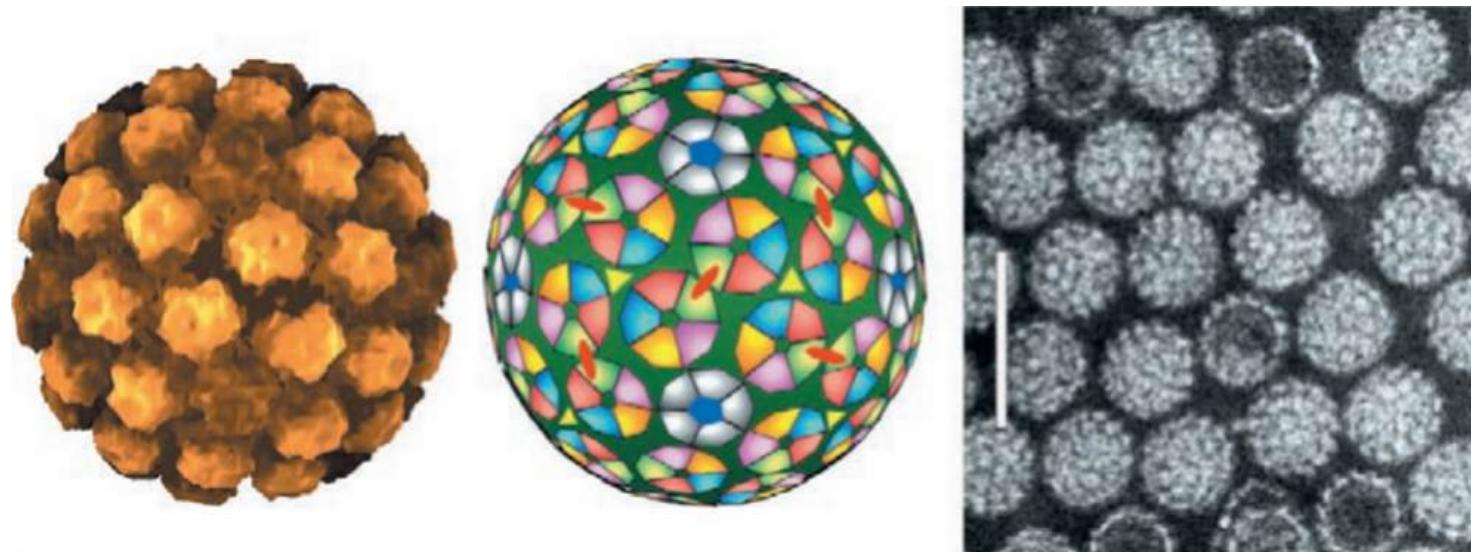
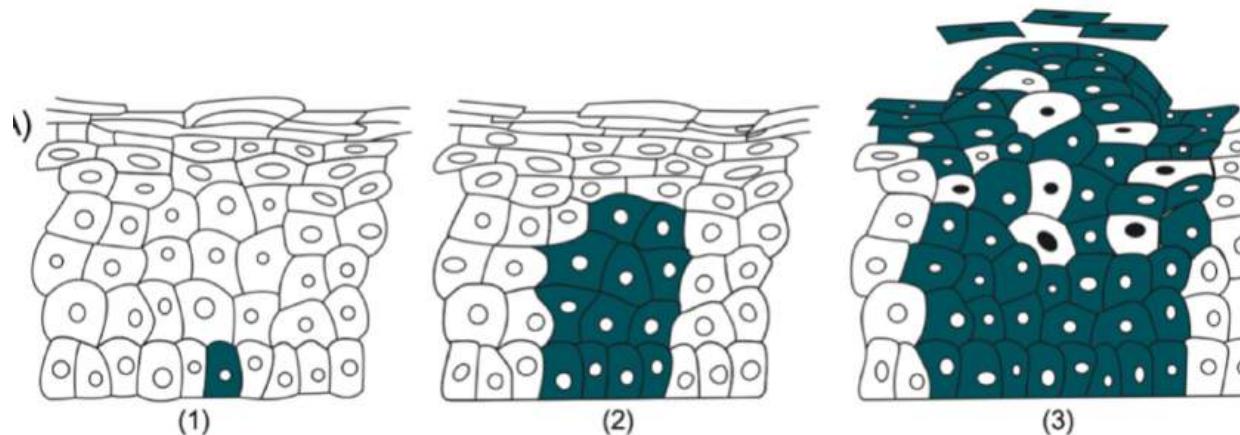


Fig 1. Structure of papillomavirus virion.

Introduction

- ❖ Papillomas develop after the introduction of virus through abrasions of the skin, or by activation of viruses already present.
- ❖ Infection of epithelial cells results in hyperplasia, with subsequent degeneration and hyperkeratinization. These changes begin usually 4–6 weeks after exposure.
- ❖ In general, papillomas persist for 1–6 months before spontaneous (immune-mediated) regression; multiple warts usually regress simultaneously.



1. The primary infection occurs in a cell of the stratum basale, with the virus gaining entry via an abrasion, etc.
2. This results in a proliferating clone of infected cells that spreads laterally in association with virus-induced delay in the maturation of infected cells.
3. Cellular differentiation occurs eventually and large numbers of virions are produced in association with the formation of a papilloma. This is most pronounced in the stratum granulosum. Virions are shed with exfoliated cells of the stratum corneum.

Study Area

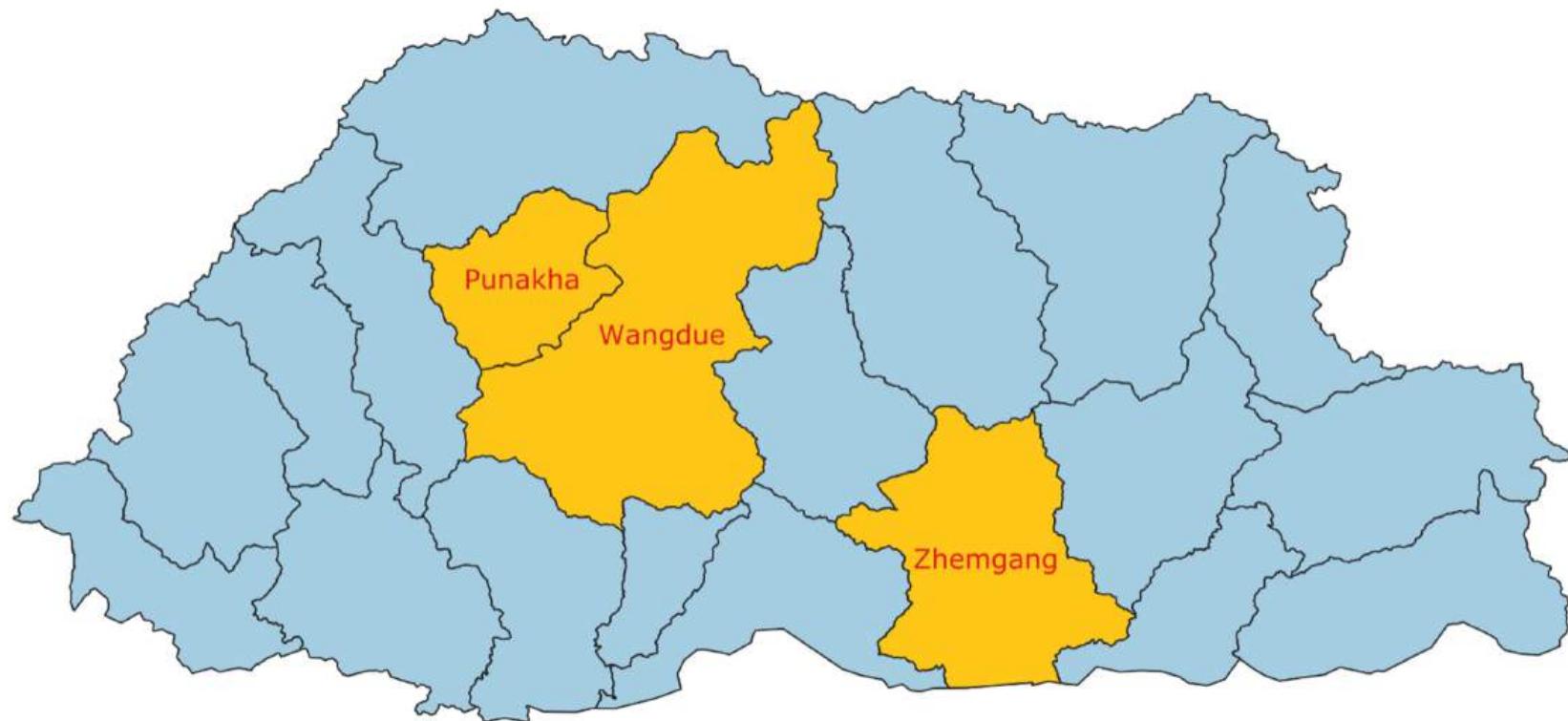


Fig 2. The study on comparing clinical efficacy of different treatment regimes for bovine papillomatosis

Methodology

Table 1: Treatment Allocation and details

Groups	Treatment	Route	Dose of administration
T1 (n=8)	Levamisole	SC	2.5 mg/kg body weight weekly till 35 th day or until recovery, whichever is earlier.
T2 (n=8)	Ivermectin	SC	0.2 mg/kg body weight weekly till 35 th day or until recovery, whichever is earlier.
T3 (n=8)	Autohemotherapy	IM	20 mL of venous blood was collected through venipuncture of the external jugular using a manual tourniquet and immediately injected intramuscularly. Done every week until the 35th day or until recovery, whichever comes first.
T4 (n=8)	Levamisole + Ivermectin + Autohemotherapy	IM/SC	Levamisole 2.5mg/kg body weight IM + 0.2 mg/kg body weight SC + 20 mL of venous blood injected IM weekly till 35 th day or until recovery, whichever is earlier.

Clinical classification of warts



Fig 3. Cauliflower type warts on the neck.



Fig 4. Filamentous type warts on the teat.



Fig 5. Round type warts on the teat.

Results and Discussion

Table 2: Case Description (n=32)

Variables		Percentage (Frequency)	Variables		Percentage (Frequency)
Sex	Female	78.12% (25)	Number of sites	Single site	65.62% (21)
	Male	21.88% (7)		Multiple site	34.38% (11)
Breed	Jersey	87.5% (28)	Wart Site	Head	25% (8)
	Local	12.5% (4)		Neck	21.88% (7)
Lactation Stage	Dry	31.25% (10)		Dewlap	6.25% (2)
	Early	6.25% (2)		Abdomen	28.12% (9)
	Mid	12.5% (4)		Thoracic	3.12% (1)
	Late	9.37% (3)		Udder	34.38% (11)
Age		Median: 4 years, Mean: 4.28, range: 1-12 years		Teat	59.38% (19)
Duration of Onset Mean: 1.77 years, Range (1-4 years)	<1 year	50% (16)	Wart shape	Reproductive organ	9.38% (3)
	>1 year	50% (16)		Cauliflower shaped	25% (8)
Parity	<2	43.77% (15)		Round and Flat	78.12% (25)
	>2	12.49% (4)		Filamentous	43.75% (14)

Result and Discussion

Table 3: Cox proportional-hazards regression results for selected animal and wart-specific factors and time to recovery.

Parameter	Hazard Ratio	95% CI	p-value
Duration of Onset	0.54	(0.28, 1.02)	0.05
Filamentous type	0.49	(0.15, 1.58)	0.23
Round Flat type	1.62	(0.36, 7.35)	0.52
Cauliflower type	0.50	(0.11, 2.24)	0.36
Breed	2.08	(0.57, 7.56)	0.26
Age	0.86	(0.63, 1.16)	0.31
Single location infection	0.51	(0.14, 1.87)	0.31
Teat Infection	1.80	(0.55, 5.85)	0.33
BCS	0.74	(0.27, 2.05)	0.56

- ❖ Among the wart-specific factors which effects the time to recovery; duration of the onset was negatively associated with clinical recovery i.e. longer duration of onset was associated with lower likelihood of recovery.
- ❖ This may be due to more sophisticated immune clearance evasion in chronic lesions (O'Brien & Saveria Campo, 2002).
- ❖ Difference in tumour immune microenvironment(Binnewies et al., 2018).

Result and Discussion

Table 4: Recovery rate of subjects in four treatment groups

Treatment group	Days						Overall
	15	30	45	60	75	90	
T1 (Levamisole)	-	1	-	-	-	1	25.0% (2)
T2 (Ivermectin)	1	3	-	-	-	-	50% (4)
T3 (Autohemotherapy)	-	3	-	-	-	-	37.5% (3)
T4 (Combination)	-	2	-	-	-	3	62.5% (5)

- ❖ The difference in clinical recovery rate highlights that effectiveness of different treatment regime is not universal and may be influenced by the immunocompetence of the animal and chronicity of the infection.
- ❖ Papillomavirus prevent clearance by the host immune system by restricting replication to epithelial cells, low level of viral protein expression and absence of inflammation (O'Brien & Saveria Campo, 2002) . These mechanisms to evade immune clearance may be more sophisticated in case of chronic papillomatosis.
- ❖ Moreover, the recent advancement in tumor immunity studies suggest the clinical response to immunotherapeutic intervention is influenced by tumor immune microenvironment (Binnewies et al., 2018).

Treatment Recommendation

- ❖ Treatment strategy recommendation:

- a. Inj. Ivermectin 0.2 mg kg^{-1} SC every week/ every two weeks for 3-4 times.
- b. Autohemotherapy: 20 ml blood from jugular vein; 10 ml IM and 10 ml SC every week for 3-4 times.
- c. Inj. Levamisole 2.5 mg kg^{-1} SC every week/ every two weeks (Optional).



Fig 6. Draw 20 ml blood from jugular vein



Fig 7. Inject 20 ml deep IM



Fig 8. Inject 10 ml SC

Treatment advice

- ❖ Treat the cases as early as possible.
- ❖ Use deltamethrin to prevent reoccurrence (finding from literature review and not our finding).



Treatment Outcomes



Fig. 9. Representative images of treatment subjects from different groups at day 0 and the end of the trial (day 90). Subjects in T4 with round and flat-type warts on the neck and head at day 0 (A & C) showed complete regression by day 90 (B, D). A subject in the T2 with filamentous-type warts on all four teats (E) showed no improvement on day 90 (F). A subject in T3 with round, flat, and cauliflower-type warts on the teats and udder at day 0 (G) showed complete regression by day 35 (H). The left fore-teat with cauliflower-type warts at day 0 (I) displayed complete regression by day 35 (J).

Canine Thelaziasis: Introduction

- ❖ *Thelazia callipaeda* (oriental eye worm) is a vector-borne zoonotic nematode.
- ❖ Infects the orbital cavity causing thelaziasis (carnivores, lagomorphs, and humans).
- ❖ Vector-zoophilic secretophagous male Drosophilid flies (*Phortica spp.*).
- ❖ Fox is main reservoir of Thelaziasis in European wildlife.
- ❖ Thelaziosis due to *T. callipaeda* is reported in companion animals, wildlife, and humans.
- ❖ Vector of *Thelazia callipaeda*- *Phortica variegata* in Europe; *Phortica okadai* in China.
- ❖ The vector in Bhutan is not known.
- ❖ Human cases: China (643), India (14), Nepal (4); Bangladesh (2).*
- ❖ Europe reported: 1343 cases in dog; 20 cases in cat, 11 human cases & 38 wildlife cases in 10 host species.

Clinical history and Diagnosis

- ❖ Case history: excessive lacrimation, redness and blepharospasm of the left eye for three days.
- ❖ Ophthalmic examination following administration local anesthetic.
- ❖ Retrieval of worms from conjunctival sac in physiological saline.
- ❖ The worms are cleared with lactophenol & observed under microscope (10 X)
- ❖ Morphological identification based on proposed identification key.



Fig 11. Three worms on the corneal surface (One worm moving in typical serpentine motion)

Lifecycle and transmission of thelaziasis

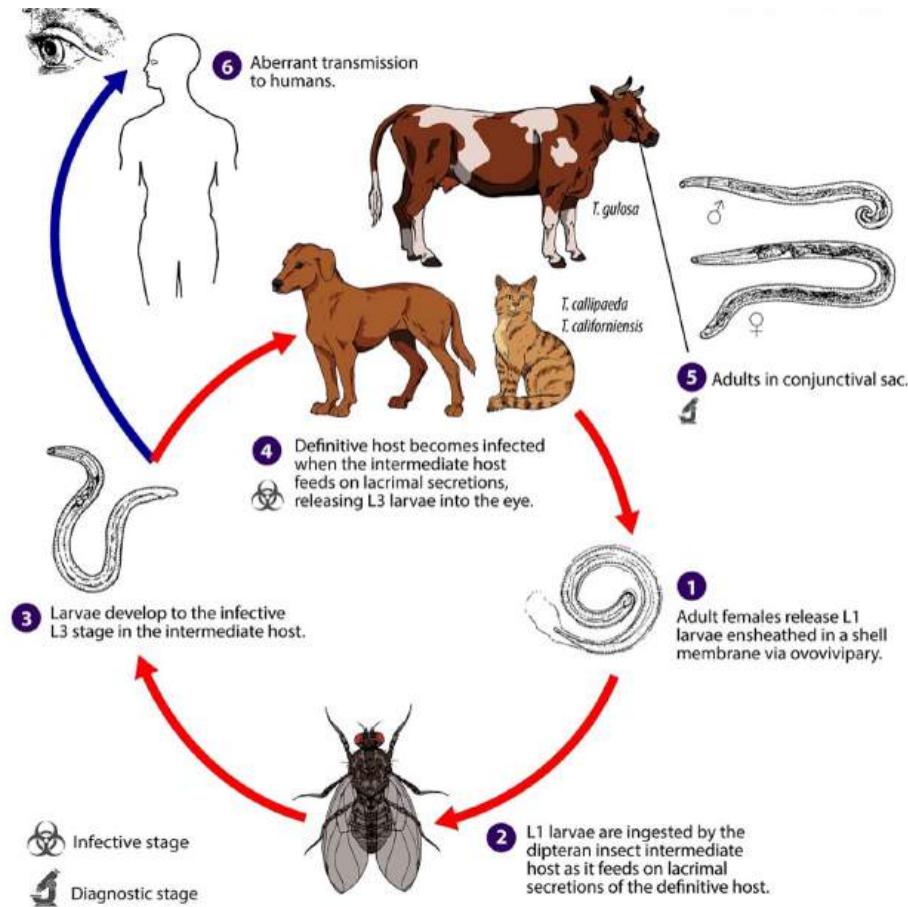


Fig 10. Three worms on the corneal surface (One worm moving in typical serpentine motion)

Canine Thelaziasis: Introduction

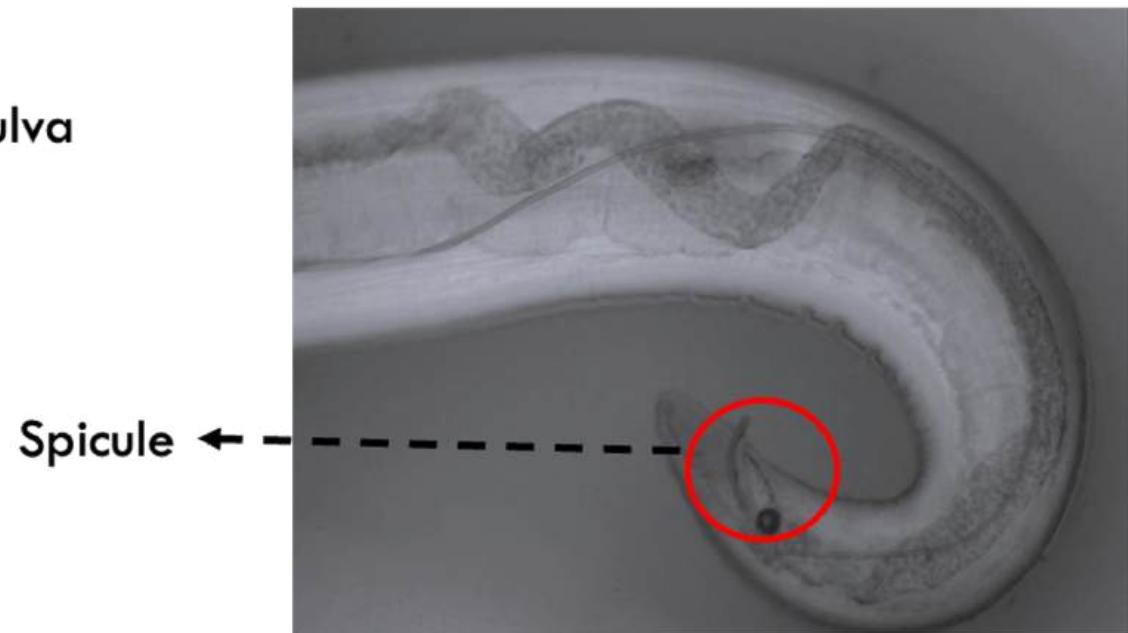
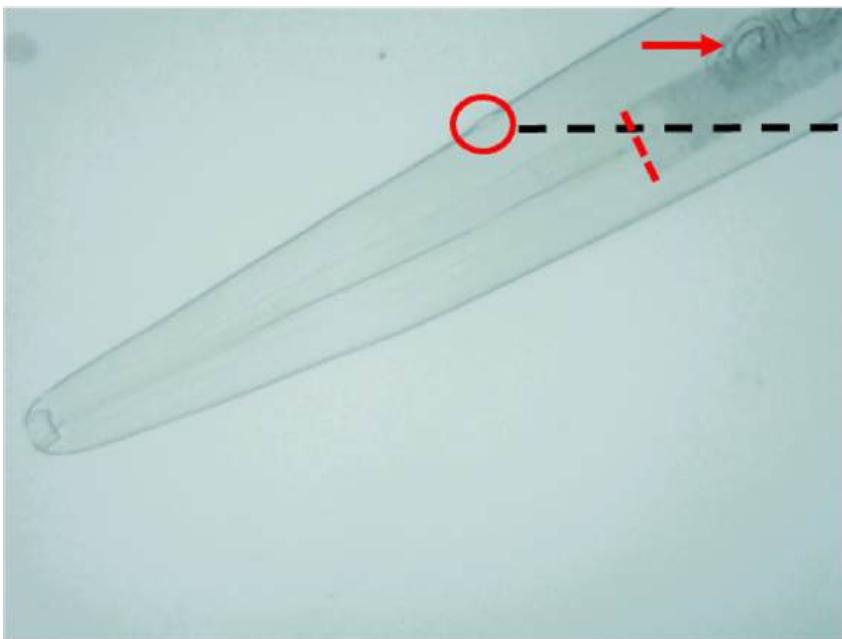


Fig 12. (a) Female *Thelazia Callipaeda* with vulva located anterior to esophagus-intestinal junction (red dotted line); (b) Male *Thelazia Callipaeda* curved tail and longer left spicule (taken at 10 X Olympus microscope.

Treatment

Table 5: Review of different treatment regimes

Drug	Dose	Route	Frequency	Duration
Moxidectin 2.5% and imidacloprid 10% spot on	Minimum dose: 2.5 mg/kg moxidectin and 10 mg/kg imidacloprid.	Topical	Single administration	
Milbemycin and Praziquantel	Minimum dose of 0.5mg/kg milbemycin oxime and 5mg/kg praziquantel.	Oral	Every week	2 weeks
Milbemycin oxime	0.86mg/kg	Oral	Every week	1-2 weeks
Mebendazole	20mg/kg	Oral	Once daily	3 days
Ivermectin	0.2 mg/kg	Subcutaneous	Single Dose	

Congenital Goiter: Introduction

- ❖ The enlargement of thyroid gland due to hyperplasia of follicular cells in cattle called goiter.
- ❖ It is caused by persistent stimulation of thyroid stimulating hormone on the follicular cells in response to low serum triiodothyronine (T3) and thyroxine (T4) due to iodine deficiency.
- ❖ Calves born with congenital goiter are weak, unable to stand and nurse for several days after birth, stillborn and rarely born with partial or complete alopecia.
- ❖ The cases of goiter were treated with thyroxine, iodized salt, or potassium iodide.



Fig 13. Case of congenital goiter in jersey calf.

Case History, Clinical Examination and Diagnosis

- ❖ A seven day old female jersey-cross calf was presented to District Veterinary Hospital, Punakha, with a history swelling in the upper neck and difficulty in breathing. The owner reported that the newborn calf was healthy and nursed successfully after it was born. The dam was fed turnip without any mineral supplementation during the gestation period.



Fig 14. A non-inflamatory, hard swelling approximately 150 mm in length was palpated caudal to the mandible in the upper neck

Treatment and Clinical Response

- ❖ The calf was treated with $40 \mu\text{g kg}^{-1}$ levothyroxine, orally, once daily for 15 days.
- ❖ Levothyroxine was found effective against goiter in calves when compared to both iodized salt and tincture iodine.
- ❖ The enlarged thyroid began to decrease in size within ten days of levothyroxine administration with complete regression observed by day fifteen in our case.



Fig 15. Decrease in the size of enlarged thyroid gland ON THE 10th day.

Prevention and Control

- ❖ Dietary intake of 0.8 to 1.2 mg/kg dry matter of feed iodine is recommended for lactating and pregnant cows to prevent outbreak of iodine deficiency in neonates.
- ❖ We advised the owner to discontinue feeding cruciferous plants to pregnant animals; instead recommended supplementation with iodized salt and mineral mixture containing selenium and other essential trace minerals for optimal thyroid function and fetal development

Questions

