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Vet Prism



Vet Prism Journal



Aims and Scope of Journal

"VET PRISM" – an official publication of JKVDA, a print and open access journal shall encompass scientific knowledge in the field of livestock health and production. It shall publish fully referred articles, review papers, short communications and case reports covering aetio-epidemiological studies, socio-economic implications, laboratory & clinical studies and therapeutic management of animal diseases. Articles containing innovative ideas with practical conceptual interventions would be special attraction of the journal. The journal aims at publishing evidence based field oriented scientific observations in the field of veterinary science. Success stories elucidating and highlighting the multi-faceted role and contribution of veterinarians towards society shall be covered.

VET PRISM accepts papers on a range of different animal species and topics including:

- Livestock health and management.
- Companion animal health
- Poultry and Game birds
- Wildlife species
- Infectious diseases
- Public health and Zoonosis
- Pharmacology and Vaccination
- Livestock economy

VET PRISM shall publish original articles, case reports, review articles and innovative concepts in animal science and research.

The journal operates on a blind review policy.

The detailed guidelines of submission for author's are available on official website of JKVDA www.jkvda.org and all communications may be sent on email editorialjkvda1987@gmail.com.

VET PRISM



The official organ of the Jammu & Kashmir Veterinary Doctors Association (JKVDA)-Kashmir

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MESSAGE

I commend Jammu and Kashmir Veterinary Doctors Association Kashmir (JKVDA-K) for its meticulous work in bringing together such a diverse range of scholarly articles in the second Volume of the "VET PRISM" Journal. This publication reflects both the challenges and dedication of the professionals who are leading from the front in addressing the pressing issues. This publication stands as a testament to the unwavering commitment of veterinary professionals, researchers and academicians who continue to advance the field through innovation, dedication and compassion in order to benefit the agriculture and livestock driven economies. This journal serves not only as a platform to share scientific research and clinical advancements but also as a space to foster collaboration and inspire future generations of veterinarians and researchers. I wish the readers an insightful and enriching reading experience.

This journal serves as a vital platform for researchers, practitioners and academicians to promote knowledge, disseminate new findings and inspire future advancements. The diverse range of articles featured in this edition reflects the depth and dynamism of the vets from clinical break-throughs to sustainable livestock practices and zoonotic disease prevention. Let us continue to uphold the highest standards of excellence and ethics in our collective pursuit of animal health and welfare.

I wish Jammu & Kashmir Veterinary Doctors Association all the best in its future endeavors.

Minister,
Agriculture Production,
Rural Development & Panchayati Raj,
Cooperatives and Elections
Govt. of Jammu & Kashmir





MESSAGE

It gives me immense pleasure to know that The Jammu & Kashmir Veterinary Doctor Association, Kashmir (JKVDA-K), is bringing out second volume of Veterinary Journal "VET PRISM". The journal is expected to initiate new milestones in the advancement of the veterinary profession in this UT. This endeavor would go a long way in highlighting working of veterinary fraternity in the field; highlight new concepts and technological approaches being followed by the veterinarians at different levels, create awareness among rural masses about various developments, advancements/achievements made by the department and also to highlight need to adopt the latest practices and innovation in livestock farming and health at ground level.

I wish Jammu & Kashmir Veterinary Doctors Association all the success in their future endeavor.

Principal Secretary,
Agriculture Production Department
Govt. of Jammu & Kashmir

Message



It gives us immense pleasure to launch the second volume edition of the journal "Vet Prism". This Journal represents all the veterinarians especially the field veterinarians of twin departments of Animal and Sheep Husbandry, Jammu and Kashmir. The Vet Prism Journal is the scientific organ of the Jammu and Kashmir Veterinary Doctors Association (JKVDA) and has a mandate to serve as a platform for Veterinary professionals to present their research work, studies and scientific observations in the field of Veterinary Sciences, Animal Health and Production.

At this juncture, I would like to congratulate all the members who have contributed for the cause. Besides JKVDA executives, it happened with the dedicated efforts and contributions of Chief-editors, Editor, Associate Editor, the editorial board and Reviewers.

I salute you all.



Dr. Reyaz Nazir Reshi

President
Jammu and Kashmir Veterinary Doctors
Association

From Chief Editors Desk

Owing to ever changing challenges, emerging diseases, growing livestock product demands and challenging economic conditions, the veterinary medical practices are undergoing tremendous expansion in research & development. Realizing the significance of knowledge sharing and keeping the fellow professionals abreast through this technical bulletin is envisaged to contribute positively.

It is expected that "VET PRISM" will provide a platform for exchange of knowledge and ideas to deal with emerging challenges in improving livestock health and productivity to address the issue of unemployment and economical recession.

We express my reverential feelings to Dr. Reyaz Nazir Reshi, President JKVDA and other executive members of JKVDA including Dr. Zahoor Ahmad Khanday, Dr. Shabir Ahmad Dar and Dr. Syed Arshid Hussain for their sympathetic attitude and incessant help in publication of the journal,

The counsel and the extraordinary services rendered by the editorial board, especially the Editor Dr. Mubashir Ali Rather, Associate editor Dr. Khalid Bashir, is highly acknowledged, without their valuable suggestions and dedication this may not have been possible.

We would like to place on record sincere thanks to all contributors for their overwhelming response and timely valuable contributions.

It is expected that the journal succeeds in spreading good quality and useful technical knowledge through its publication and continues to flourish and improve upon in the days to come.

With Best regards!

Dr. Shabir Ahmad Teli
Dr. Muhammad Marof Shah
Editors-in-Chief

Vet Prism Journal

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Successful surgical management of rostral maxillary and mandibular fractures in a male pony

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Abstract: Fractures of the maxilla and mandible in equines present significant challenges due to their direct impact on feeding and overall health. This report describes the successful surgical management of rostral maxillary and mandibular fractures in an adult male pony following trauma. Interdental cerclage wiring was employed under general anesthesia to stabilize the fractures. The pony was monitored postoperatively for two months and exhibited a complete return to normal function. This case highlights the efficacy of timely surgical stabilization and the value of simple, cost-effective fixation methods in equine practice.

Introduction: Maxillofacial fractures in equines are commonly caused by traumatic incidents such as falls, kicks, or collisions¹. These injuries can severely compromise the animal's ability to prehend and masticate food, potentially leading to further systemic complications if left untreated (Henninger et al., 1999). Several fixation techniques have been used for the correction of these fractures including interdental and circumferential wiring, intramedullary pinning, compression plates, lag screws, and intraoral splints depending upon the fracture configuration and surgeons' choice (Naddaf et al., 2015; Beard., 2009)). This case report details the successful surgical intervention and recovery of a pony with rostral maxillary and mandibular fractures using simple interdental cerclage wiring, a minimally invasive, efficient, and economical approach, for stabilizing rostral fractures in the maxilla and mandible.

Case Description

History and clinical examination

An adult male pony was presented to Veterinary Hospital Pahalgam with the history of trauma resulting from an accidental fall involving both

the rostral maxilla and mandible. Clinical examination revealed avulsion or incisor fracture of the mandible involving intermediate (302,303) and corner incisors (304) (Fig.1a) along with the maxillary fractures and gingival wound (Fig.1b). The pony had profuse salivation, difficulty in prehension of food and mild hemorrhages in the oral cavity.



Fig.1a

Fig.1b

Treatment and discussion

The pony was sedated using xylazine (1.1 mg/kg BW IV) followed by induction with ketamine (2.2 mg/kg IV) and diazepam (0.2 mg/kg BW IV) given immediately after ketamine. Anesthesia was maintained with intermittent IV administration of ketamine at 1.1 mg/kg BW as required (Tranquilli et al.,

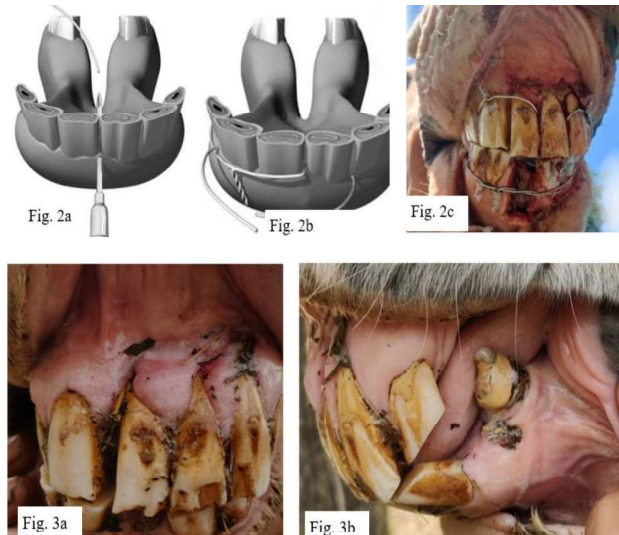
2013). The oral cavity was prepared for the procedure by thoroughly washing with sterile normal saline to remove debris and saliva followed by diluted povidone-iodine. A 1.2 mm K-wire was inserted with the help of a chuck between the teeth at the gingival level to fix the unstable with stable teeth. After the creation of holes the K-wire was removed and a 16 gauge needle was inserted to guide the cerclage wire through it (Fig.2a). The wire ends were twisted at the ventral side and the sharp ends of wire knots were bent and covered with PVC tubing to prevent any soft tissue irritation (Fig.2b, 2c). A similar procedure was performed for stabilization of the maxillary fracture.

Postoperatively, the pony was administered with injection ceftriaxone (20 mg/kg BW IV) for 5 days and injection flunixin meglumine (1.1 mg/kg BW IV) for 3 days. The owner was advised to keep the pony on a soft diet for four weeks. The wires were monitored for stability and signs of infection during the entire postoperative period. The pony showed a gradual improvement and regained normal feeding behavior within 10 days of operation. Complete healing was observed 42 days post-operation and the cerclage wires were subsequently removed (Fig.3a, 3b). The pony recovered fully without any long-term complications.

Maxillary and mandibular fractures in the equines necessitate prompt and appropriate management to restore function and prevent secondary complications. Interdental cerclage wiring offers a practical and accessible solution, especially in resource-limited settings (Jena et al., 1999). It provides adequate stabilization while maintaining normal occlusion and mandibular motion (Rizk et al., 2017). This technique avoids the need for advanced equipment, reduces surgical time, and minimizes soft tissue trauma (Rizk et al., 2017).

Conclusion

The current case demonstrates that interdental cerclage wiring is an effective method for managing rostral maxillary and mandibular fractures in ponies.



Early intervention, appropriate surgical technique, and proper post-operative care are crucial for favorable outcomes.

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Prevalence and distribution of ovine Footrot in Kashmir

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Footrot,
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Abstract: Ovine footrot is a well-defined contagious disease of sheep caused by *Dichelobacter nodosus*. The disease is enzootic and at times epizootic in Jammu and Kashmir (J and K). Hence, a study was undertaken to study its distribution pattern and prevalence in Kashmir valley. Therefore, data pertaining to Footrot maintained at 10 district sheep organizations of Kashmir were collected. In the present study an overall prevalence of 14.90% for Footrot was observed in Kashmir valley for the year 2020. Highest and lowest prevalence of 16.92% and 14.27% was observed in North and south Kashmir, respectively. Highest, number of cases observed from October to December may be attributed to the high rain fall during month of October last year (2020). It is concluded that Footrot is highly prevalent in Kashmir valley.

Introduction

Footrot is one of the major five globally important diseases of sheep (Nieuwhof et al., 2005; Rather et al., 2011; Stewart et al., 1989), causing lameness, poor health and welfare (Goddard et al., 2006) issues and decreased productivity (Nieuwhof et al., 2008; Wassink, 2010). It is a well-defined contagious disease of sheep caused by *Dichelobacter nodosus* (Dewhirst et al., 1990). *D. nodosus* is slow growing; anaerobic, Gram-negative rod with characteristic knobs at each end (Sharma et al., 2013). The infected animal presents symptoms of lameness, loss of body condition, decreased in wool production and decreased growth rate (Sharma et al., 2013). The disease is prevalent in all sheep rearing countries and disease expression is highly influenced by soil moisture. The disease exhibits differently in different climates (Graham et al., 1968; Smith et al., 2014). It is enzootic and at times epizootic in Jammu and Kashmir (J&K) (Sharma et al., 2013). Therefore, a study was under taken to understand the prevalence of footrot in Kashmir.

Material and Methods

For the present study, data were collected from 10 district sheep organizations of Kashmir. The Kashmir valley has a temperate climate with four well defined seasons of winter, spring, summer and autumn. The climate during summer (June to August) experiences maximum of 25 to 36° C. Springs are rainy whereas summer rains are uncertain. During winter (November to March) temperature falls as low as -20°C at places with heavy snowfall (5-10 feet), severe cold, mild rainfall and snowstorms etc. The autumn season is usually dry. The data were classified based on the basis of months in 12 groups and based on location in 3 groups i.e., north Kashmir (Baramulla, Kupwara and Bandipora), central Kashmir (Ganderbal, Srinagar and Budgam) and south Kashmir (Anantnag, Pulwama and Shopian).

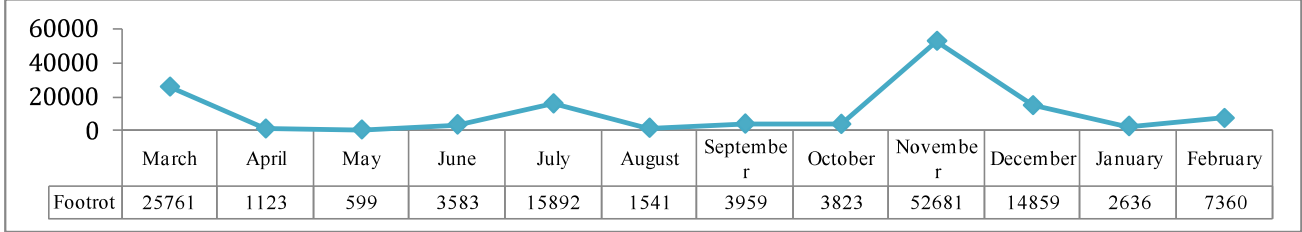
Results and discussion

In the present study, an overall prevalence of 14.90% for Footrot was observed in Kashmir valley (Table 1, Fig 1). Highest and lowest

prevalence of 16.92% and 14.27 % was observed in North and south Kashmir, respectively. The results of the present study

were in close consonance with findings of Farooq et al. (2010).

Fig 1. Month wise graphic representation of reported case of Footrot during 2020



Further, the authors reported prevalence of 18.65 and 17.45% for footrot in district Anantnag and Shopian, respectively. In the present study highest and lowest number of cases was observed in the months of November (53681) and May (599), respectively. Highest number of cases observed from October to December may be attributed to the high rain fall during month of October last year (2020) predisposing the sheep population of Kashmir to footrot during these months.

Clinical signs: The clinical signs and lesions of footrot varied from mild interdigital dermatitis (Fig 2) (benign footrot), underrunning of the heel, to separation of the sole and abaxial wall, resulting in under running of the toe including complete separation (Fig 3) of the hoof capsule (Zanolari et al., 2021). Lameness may be first sign in sheep, although the affected animal does not always present lameness (Zanolari et al. 2021). The severity of lameness depends on number of hooves and digits of each hoof involved (Beveridge, 1941). Usually more than one hoof, with both digits, is affected. Chronic lesions cause deformities of hoof (Fig 4).

Table 1. Prevalence of Footrot in Kashmir

Area	Total sheep population	Total foot rot cases	Prevalence (%)
South Kashmir	685000	98136	14.33
North Kashmir	698000	99602	14.27
Central Kashmir	413000	69896	16.92
Overall	1796000	267634	14.90

Inflammation of the interdigital skin is first sign of footrot. The inflammation may progress to invasion of the germinal layer of the hoof, which

Sheep suffering from footrot present symptoms of inappetence, decreased wool production and average daily gains (Buller et al., 2014).



Fig 2. Interdigital dermatitis



Fig 3. Hoof deformity

Conclusion: It is concluded that Footrot is highly prevalent in Kashmir valley and proper reporting system to frame proper control program is highly recommended.



Fig 4. Footrot leading to deformity of hoof

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Awareness regarding deworming in low lying and marshy areas of Kashmir Valley

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Abstract: A cross section of breeders across seven areas falling in already selected low-lying and marshy areas of Kashmir valley were interviewed on spot through a predesigned questionnaire based on parameters like frequency and season of dosing, awareness of parasitic diseases in their animals and perception regarding role of extension activities of the development departments. Awareness regarding need of periodical dosing appears to be quite high but with regard to precise knowledge of dosing calendar still much needs to be done at the village level. Very few farmers reported about morbidity and mortality from parasitic diseases. The developmental departments continue to be primary source of both inputs and services, especially in low lying and marshy areas.

Introduction

Gastrointestinal parasitism constitutes one of the major health problems limiting the productivity of animals in the Himalayan and other hilly regions of India (Jithendran and Bhat, 1999.). Health threat and losses to the productivity of livestock are due to the associated morbidity, mortality, and cost of treatment and control measures (Nwosu, et al., 2007; Raza et al., 2010 and Lashari and Tasawar, 2011). Helminth infections in small ruminants, can significantly impact their productivity and health, causing stunted growth, poor weight gain, and poor feed utilization (Pedreira et al., 2006). These infections can also lead to various adverse effects, including hematological and biochemical disturbances, anorexia, weight loss, poor reproductive performance, and increased mortality rates among lambs (Khajuria and Kapoor, 2003; Hussain and Usmani, 2006). Given parasitism

as key concern in the development of livestock sector, the development departments have taken up extensive extension campaigns for deworming, especially in low lying and marshy areas diseases like haemonchosis, fasciolosis (Sofi, 2020) etc has been key contributor to mortalities. In fact deworming strategies were oriented to controlling fasciolosis to a great extent. However, the precise diffusion and impact of extension activities needs to be studied and as such the present study was conducted amongst the cross section of breeders across seven areas falling in selected low-lying and marshy areas of Kashmir valley.

Methodology

Respondents chosen from select low lying and marshy areas of Kashmir valley were interviewed on spot through a predesigned questionnaire based on parameters like frequency and season of dosing, awareness of parasitic diseases in their animals and

perception regarding role of extension activities of the development departments. Farmers from seven areas, representing one third of mapped marshy/low lying areas, as representative of whole scenario, were chosen on the basis of recommendations by local vets and ease of access to interview. Results are depicted below.

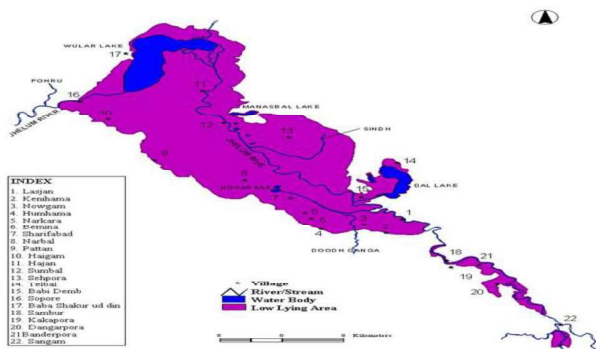


Fig 1. Fasciola prone areas in Kashmir

Table 1. Attributes of deworming

Frequency	N	Frequency	N
1to2 times/annum	20	Morbidity	
3to4 times/annum	48	70-100%	14
5to6 times/annum	24	not known	86
Need based	8	Mortality	
Season of dosing		Less than 5%	6
Spring only	4	More than 5%	2
Autumn only	10	Not known	60
Spring and autumn	24	None	32
Spring, autumn and winter	42	Age of animal affected	
Need based	20	Upto 1 year	16
Dosing conducted by		1to2 year	10
Owner himself	0	All ages	18
Veterinary	82	None	56
Owner/veterinary	18	Status of treatment	
Parasitic diseases Encountered		Yes	44
Helminths only	30	Don't require	56
Helminth+mange	14		
Take preventive measures (thus none)	56		

Analysis of questionnaire based Study:
Awareness regarding need of periodical dosing

appears to be quite high but with regard to precise knowledge of dosing calendar still much needs to be done at the village level. Breeders hardly report about summer dosing because it is either covered under need based regimen or livestock, especially small ruminant group, is at highland pastures during this period. Wide acknowledgment of the services rendered by development department is especially noteworthy. Very few farmers reported about morbidity and mortality from parasitic diseases. This could be attributed to lack of awareness of farmers. Also, the low mortality can be attributed door to door services provided by department of Sheep Husbandry Kashmir departments. Since most of the farmers are still far from being educated they couldn't be expected to clearly differentiate parasitic diseases from other diseases or individually identify major parasitic groups. Most reports regarding spring as season of disease occurrence may be explained by post-winter overcoming of hypobiosis (Rather, et al., 2025). Local farmers may misattribute certain spring-related health issues in their livestock, such as grass poisoning and diarrhea, to parasitic infections, highlighting the need for accurate diagnosis and disease management. A significant fraction of farmers abide by the schedule of dosings recommended in dosing calendar issued by the developmental departments in consultation with Division of Veterinary Parasitology, Shuhama. The developmental departments continue to be primary source of both inputs and services, especially in low lying and marshy areas. Drugs are made available and there is door to door campaign by Sheep Husbandry Department for ensuring mass dosing. There is a separate wing for liver fluke control in Animal Husbandry Department that provides drugs and services.

The data obtained is validated by observations of vets and number of publications showing fasciolosis has been greatly controlled; while as nematodes, especially haemonchosis, has been on the increase, especially in small ruminants due to drug resistance despite door to door

service availability besides extensive extension programme throughout year including during summer migration in highlands. This is a validation of the results showing success of extension and deworming campaigns. This shouldn't however be construed as a license to lax vigil and we need to equally focus on deworming against nematodes. Field practices reflect to a great extent an awareness of the fact that weather conditions & geographical differences play a dominant role in determining the timing of strategic treatments (Barger *et al.*, 1999). Lower prevalence figures might reflect the interplay of better managemental conditions. Animal shed are mostly well ventilated and lighted to maintain required humidity and air circulation as recommended. Mixed species grazing is often practised, not intentionally but by default. This practice is effective in particular for small ruminants to limit the populations of *Haemonchus contortus* (Marley *et al.*, 2006). It was also observed that animals are generally well nourished, even during winters when stall feeding is practiced. It is well known that well nourished animals cope better and overcome infection with parasites quicker than malnourished ones (Wells, 1999). Our findings regarding lesser degree of encounter with parasitic diseases by farmers or lesser morbidity or mortality figures or overall lowered prevalence figures for all the parasites recorded in the study reflect not only more attention to dosings but also more attention to housing, hygiene, feeding and other managemental inputs, thanks to better income of farmers rearing livestock besides certain shift in the livestock rearing population that is no longer restricted primarily to poor classes. Most of the owners interviewed had sizeable populations of sheep (over 20) reflecting more conscious farmers who adopt sheep farming for not only supplementing livelihood base but for more ambitious economic motive. Since cost of livestock and feed/fodder has much escalated in last decade or two, there has been certain natural selection with regard to farmers choosing

livestock rearing. People are more ready to purchase quality medicine from private market and this also shows certain heightened awareness regarding costs and benefits of livestock rearing.

Our findings are consonant with the observation that majority of cattle, especially high producing dairy cattle, are generally kept indoors and not allowed to graze in marshy areas and thus infection is avoided. Besides there being much thrust on periodical mass dosing in sheep and the fact of their migration to high land pasture during peak larval season (summer) reduces the infection rate.

Conclusion

There has been a notable increase in awareness among farmers about the dangers of parasitism and the importance of preventive measures. However, this heightened awareness has sometimes led to over-dosing, with some breeders reporting more than the recommended 3-4 treatments per year, potentially contributing to drug wastage and resistance. Further systematic studies over an extended period are necessary to fully understand this phenomenon, which was beyond the scope of the present study.

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Prevalence of ovine footrot in sub alpine pastures of Central Kashmir, India.

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Abstract: Footrot is an economically important and contagious disease of sheep and goats caused by the mixed action of several bacterial species, of which *Dichelobacter nodosus* is the main causative agent. This study determines the occurrence of ovine footrot at Sub Alpine Pastures (SAPs) of central Kashmir, India by molecular techniques followed by serogrouping and isolation of *Dichelobacter nodosus*. Overall prevalence of 20.55% (520/2530) in ovine was observed at sub alpine pastures (SAP) of Central Kashmir. Out of 2530 samples collected from foot lesions of animals suspected for footrot at different SAPs in Central Kashmir, 520 samples were found positive for *D. nodosus* by PCR. Out of these, serogroup B was detected in 372 samples (71.53%) and serogroup E was detected in 59 samples (11.34%) while 89 samples (17.11%) revealed presence of multiple serogroups viz B, E and I. The present study revealed that the *Dichelobacter nodosus* was responsible for 20.55% foot affections in sheep at subalpine pastures of central Kashmir.

Introduction

Ovine footrot, an economically important contagious disease causing lameness in sheep, is caused mainly by the Gram negative obligate anaerobic bacterium, *Dichelobacter nodosus* (DeWhirst *et al.*, 1990), formerly *Fusiform nodosus* (Beveridge, 1941) or *Bacteroides nodosus* (Dewhirst *et al.*, 1990; Moore *et al.*, 2005). Exposure of interdigital skin to a moist environment (maceration) and the activity of typical environmental microorganisms are crucial prerequisites for the development of footrot. According to Roberts and Egerton (1969), footrot is a mixed bacterial infection with the faecal bacterium *Fusobacterium necrophorum* necessary for the development of the disease condition. The disease is characterized by exudative inflammation / interdigital dermatitis of foot with strong characteristic foul odour initially then slowly progressing to necrosis of the epidermal tissues of the interdigital skin of foot and hoof matrix

resulting in separation of hoof from underlying soft tissue. The affected animals exhibit lameness, loss of body condition and reduced wool/mutton production (Stewart, 1989; La Fontaine *et al.*, 1993). Based on fimbrial antigen, Claxton *et al.*, 1983; Claxton, 1986 and Ghimire *et al.*, 1998 classified *D. nodosus* into ten serogroups (A-I and M) and 18 serotypes. Currently identification of *D. nodosus* is carried out by polymerase chain reaction (PCR) developed by La Fontaine *et al.*, 1993 using 16 SrDNA specific primers. Serogrouping is carried out by Multiplex PCR developed by Dhungyel *et al.*, 2002 using serogroup specific primers.

Transmission:

Affected animals spread *D. nodosus* to the surrounding environment (pasture or paddock) by lesions directly. Also, the infected objects (swab, scissor or forcep) can infect the feet of other animals. Successful transmission requires exposure to *F. necrophorum* and adequate maceration of the

stratum corneum of the interdigital skin of foot at ambient temperature (Radsma and Egerton, 2013)

Material and methods

Place and Time period of study: The sample collection for current study was done from affected Sheep at sub alpine pastures of Central Kashmir viz., District Budgam, Ganderbal and Srinagar over the period of four months from June to September 2021.

Collection of clinical samples:

Foot swab samples (Fig 1) were collected in sterile 1.5 ml microcentrifuge tubes, anaerobically cultured, stored at -20°C and analyzed at the Disease Investigation Laboratory in Nowshera, Srinagar. Out of 2530 sheep examined 520 were clinically affected with foot affections.

Extraction of Bacterial DNA

100µl of sterile PBS was added to foot swabs collected in microcentrifuge tubes and suspension was made by gentle vortexing. The DNA was extracted from suspension using snap chill method (boiling for 5min, cooling on ice for 10 min and centrifugation at 10,000g for 10 mins). Supernatant (2µl) was used as template in PCR.

Detection of 16S rDNA gene of *D. Nodosus* by PCR

16SrDNA specific primers were used for detection of 16SrDNA gene of *D. nodosus*. The amplification program (La Fontaine *et al*, 1993) in Thermocycler (Takara, Japan) consisted of 94°C for 2 min followed by 5 cycles of 94°C for 30s, 60°C for 30s & 72°C for 30s and 25 cycles of 94°C for 30s, 58°C for 30s, 72°C for 30s and final extension at 72°C for 4 min. PCR products were analyzed and visualized under UV Transilluminator (Fig.4).

Table 1: Prevalence of ovine Footrot at different SAPs of Central Kashmir India

S.No	District	Sub Alpine Pasture	Sheep examined/ samples collected	Samples positive for D.Nodosus	Prevelance (%)
1.	Budgam	Tosamaidan	581	115	19.79
		Shalkani	322	70	21.73
		Doodpathri	475	97	20.42
		Gogaldara	230	45	19.56
		Anzivora	275	50	18.18
2.	Ganderbal	Minimarg	160	35	21.87
		Thajwas	65	13	20
		Sarbal	100	21	21
3.	Srinagar	Dagwan	122	28	22.95
		Hoksar	100	21	21
		Katpathri	100	25	25
Grand Total			2530	520	20.25

Serogrouping of *D. nodosus* Isolates by Multiplex PCR

D. Nodosus positive samples were serogrouped by multiplex PCR using ten (A-

I&M) serogroup specific primers (Dhungyel *et al*, 2002).

Isolation of *D. Nodosus* from clinical samples

Foot swab samples were collected immediately and were quickly inoculated on TASH (Trypticase, Arginine, Serine, Hoof) agar plates (Fig.3) and were placed in anaerobic condition at 37°C. After 7-8 days of incubation suspected colonies were subcultured on same medium to obtain pure culture of *D. Nodosus* (Fig.3). After three to four continuous subculturing, pure colonies were obtained which were confirmed by PCR.



Fig 1.Collection of foot swab samples from footrot affected sheep



Fig 2.Inflammation and Necrosis of the interdigital area of the hoof of sheep

Microscopy: Samples yielding the amplified product of the expected size of 783 bp were simultaneously put to gram staining to confirm its gram negative nature. (Fig 5).

Results

Out of 2530 samples collected, 520 (20.25%) samples revealed amplified product of the expected size of 783 bp (specific for 16S rDNA ₃ *D. nodosus*) (Fig 4). The multiplex PCR for serogrouping of 520 samples yielded a single band of 283 bp characteristic of serogroup B in 372 samples, serogroup E specific 363 bp in 59 samples, and serogroups B (283bp), E (363bp), I (189 bp) in 89 samples. Almost all cases were observed among adult sheep. Samples yielding the amplified product of the expected size of 783 bp produced pink color gram negative rods upon gram staining (Fig 5).

Discussion

The initial studies on footrot in kashmir valley revealed 12-16% prevalence of ovine footrot in low lying areas of Kashmir valley. However the present study revealed 20.25% prevalence at high land pastures of Kashmir valley (Central Kashmir) which is much higher than that recorded at low land areas of Kashmir Valley. The multiplex PCR for serogrouping of 520 samples yielded characteristic of serogroup B in 372 samples (71.53%), serogroup E in 59 samples (11.34%) and mixed serogroups B, E, I in 89 samples (17.11%). Findings are in consonance with Kabili *et al.*, 2014 from north Kashmir who reported overall prevalence of serogroups B, E and I of *D. nodosus* was 92.7%, 32% and 26%, respectively. Rather *et al.*, 2011, from central Kashmir reported overall prevalence of 66%, 2.5% and 0.5% for serogroup B, E and I, respectively while 26.5% revealed mixed infection. Similarly, Farooq *et al.*, 2010, from south Kashmir revealed overall prevalence of 82.58%, 1.33%, 9.37%, 2.23% for serogroup B, C, E and I, respectively while 4.46% revealed mixed infection of serogroup B and E.

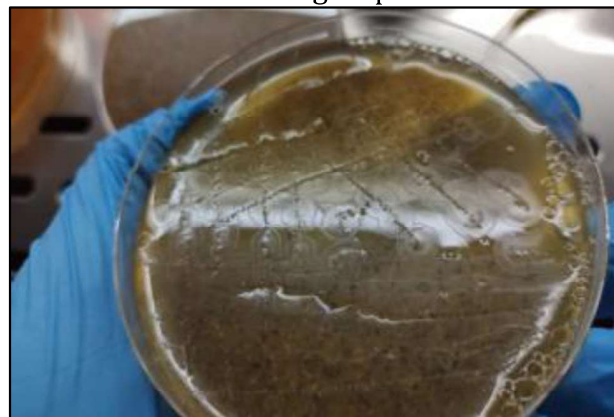


Fig 3.Isolation of *D. nodosus* on TASH Agar

The sheep flocks in Jammu & Kashmir being migratory, migrate to highland pastures during summers where they are exposed to other predisposing factors like rocky terrains leading to injury of feet, muddy pastures,

frequent rains and temperate climate which make disease transmission all the more



Fig.4. Amplification of 16sr DNA gene of *D. Nodosus* Lane 1 to 5: Samples positive for 16srDNA (783 bp)

possible. Also during migration, different flocks intermingle thereby facilitating the spread of infection from animal to animal and from flock to flock. The prevalence may be much higher in the whole valley so it is essential to conduct wide field survey and update knowledge of serogroup and strain diversity of *D. Nodosus* prevalent in the field for developing effective vaccine against footrot. Further the present study revealed the presence of Serogroup E which was relatively uncommon. The detection of serogroup B in majority of samples suggests that strain(s) of serogroup B could be an appropriate candidate for development of an effective vaccine.



Fig.5. Gram stained Rods of *D. nodosus* 1 2 M 3 4

Conclusion

It is concluded that Footrot is highly prevalent at Sub Alpine Pastures of Central Kashmir and

proper reporting system needs to be framed for effective control program. The detection of serogroup B in majority of samples indicate that the strain(s) of serogroup B could be an appropriate candidate for development of an effective vaccine. Similar studies need to be conducted to collect necessary information. The vital information generated can be used to frame strategy for development of effective vaccine against footrot.

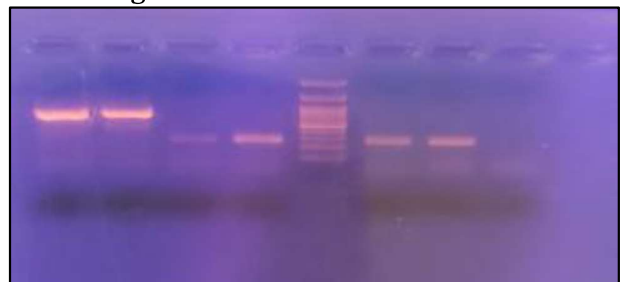


Fig.6. Detection of serogroup B of *D. nodosus* from lesion of ovine footrot by Multiplex PCR Lane 1 -4 PCR product specific for serogroup B (283 bp)

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Accelerating breed improvement programme through sexed semen: prospects, challenges and possible solutions

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Abstract: Dairy farming is a vital economic sector in Jammu and Kashmir, but low productivity and high maintenance are major challenges in the sector. Traditional natural service (NS) has been replaced by artificial insemination (AI) long back, and introduction of sexed semen technology at the field level has opened a new opportunity for farmers to selectively breed female calves, thus enhancing herd productivity and returns. This article will cover the principles, advantages, and disadvantages/ challenges of sexed semen technology and its contribution in increasing the efficiency of dairy farming. Although it has its benefits, adoption is still low owing to high costs, reduced conception rates, and logistical difficulties in cold chain storage. The GOI sponsored Accelerated Breed Improvement Programme (ABIP) under the Rashtriya Gokul Mission (RGM) seeks to counter these obstacles through subsidies, training, and field demonstrations. A case study in Pahroo and nearby villages illustrates the technology's efficacy, with a 90.4% success rate of female calf births from 1,368 sexed semen artificial inseminations from 2023-2025. The study shows enhanced herd genetics, accelerated maturity of female calves, and improved farmer profitability. Although initial expenses and awareness gaps are significant obstacles, selective policy interventions and government assistance can help ensure widespread adaptation. This case study highlights the sustainable dairy farming transformative power of sexed semen technology and necessitates scalable upscaling to support rural livelihoods and dairy productivity.

Introduction:

Dairy farming is a vital source of livelihood for millions of farmers across India, but low productivity and high maintenance are still major issues. Traditionally natural service (NS) with community bulls was the main breeding method in dairy animals. However with the advancement of technology, such as artificial insemination (AI) and, more recently, sexed semen technology, dairy sector has witnessed rapid transformation. Artificial Insemination enables farmers to choose better genetics, minimize disease risks (Seidel G.E., 2007), and enhance herd management (Yata V.K., et al., 2022). Conventional semen is regular preserved semen, providing equal opportunity for

either sex calves, which is economically less productive for dairy industry. The world's demand for high-quality livestock products has fueled the development of reproductive technologies, and sexed semen has been a major innovation. Farmers have developed special preference for sexed semen over the recent years expands their female stock at the cost of male (Patel S.B. and Jethva P.C., 2019). Since, male calves are not economically viable, a typical dairy farmer yearns for more heifer replacements from his best cows by use of high genetic merit sexed semen. The decline in draught purpose use of animals because of farm mechanization has potentially boosted the adoption of sexed semen technology in dairy sector with the

consequent dairy farm mechanization because of rapidly expanding dairy farm sizes.

Today the government of India is more inclined towards productivity rather than mere production and has come up with the "Accelerated Breed Improvement Programme" (ABIP) under the Rashtriya Gokul Mission (RGM) for development and conservation of native cattle and buffalo breeds, genetic improvement of bovine population, enhanced milk yield and productivity.

Principles of Sexed Semen Technology

Sexed semen technology makes it possible to produce semen that contains only Y-chromosome carrying sperm, or X-chromosome carrying sperm. The semen is routinely collected from the high quality proven bulls and then further processed in a laboratory to remove as many 'Y' chromosomes as possible by different processes. Among several methods of sorting X and Y bearing sperm, flow cytometry is the best method, as it doesn't induce significant changes in morphology of the sperms, when compared to other methods (Talokar A.J., et al., 2017). As much as genetics is involved, the female or male status of the offspring of a calf will be determined by the chromosomes they possess. The 'X' chromosome sperm will result in a female, while the 'Y' chromosome sperm will result in a male. With the reduction of Y chromosome cells from the semen, there is an increased chance of birth of female calves which has been attained as high as 95% for flow cytometry method (Talokar A.J., et al., 2017).

Advantages of Sexed Semen

Field condition based use of sexed semen technology provides revolutionary benefits to the dairy farmers, producing more female calves against the conventional ratio, thus speeding up herd improvement and milk production (Patel S.B. and Jethva P.C., 2019). Field evidence has shown more lactation yield in offspring, consequently leading to substantial economic returns—such as extra annual revenue per heifer and cost savings on male calf rearing. Operational farm costs are also reduced vis a vis reduced dystocia (Fetrow J. et al., 2007), space requirements, herd size and herd management, with economic benefits by producing

fewer and more productive animals. Government programs such as ABIP-SS initiative by the animal husbandry department propagates the use of sexed semen, farmer training, and strategic timing, which can potentially double herd quality in half the timeframe, and this can be a game-changer for sustainable dairy farming.

Challenges in Adoption

Despite its proven benefits, the widespread adoption of sexed semen technology faces several challenges, particularly among small and marginal dairy farmers. Though it has the potential to transform the dairy sector, sexed semen technology has a number of limitations and challenges in field conditions. Conception rates are still lower compared to conventional semen because of the damages in the sperm architecture during processing, sorting, and preservation, with reduced dosage of sperms per straw (Kumar N., et al., 2017 ; Seidel G.E., 2014). The additional cost (5-6 times higher) of sexed semen doses acts as a major adoption barrier for small and marginal farmers, even after substantial subsidies from the government agencies and animal husbandry department. A portion of the small holder dairy farmers are not yet willing to pay for sexed semen. However the commercial dairy farmers are willing to pay for per sexed semen straw more than double the value identified by small holder dairy farmers (Verma K.V. et al., 2020), probably due to the long term benefits. Short shelf life (half of that of conventional semen) necessitates proper cold chain and thawing facilities, which is difficult to maintain in field conditions. Limited use on only healthy, cyclic animals (best in heifers and non-repeat breeders) limits its application in lactating cows with reduced fertility. Operator dependence necessitates experienced AI technicians, since incorrect handling further reduces conception rates. Genetic diversity issues arise when overused on high-quality bulls. Though the programs such as ABIP-SS by animal husbandry department alleviates some of the challenges through subsidies and training, these constraints still limit large scale adoption, especially among resource-poor farmers with no infrastructure for effective implementation.

ABIP-SS Program: Implementation and Impact a Case Study

In the rural cluster of Pahroo and adjoining villages (population ~ 4000), the Animal Husbandry Department implemented a transformative intervention under the ABIP-SS program (Rashtriya Gokul Mission) to introduce sexed semen technology, minimizing conventional breeding practices. The results have been striking: out of 1,368 artificial inseminations (AIs) performed, 219 confirmed births were recorded, with an exceptionally high proportion (90.4%) female calves (198 females vs. 21 males), with some twin female births. This marks a dramatic shift from the near 60:40 male-female ratio seen in conventional breeding programme. While the exact number of pending calvings remains undocumented yet, early data suggests a continuation of this high female-bias trend. Notably, female calves born through this intervention exhibited superior body condition scores and reached breeding age earlier (a few successfully inseminated at 11-14 months versus the traditional 16-18 months), demonstrating accelerated genetic improvement. The success is attributed to rigorous field implementation, with farmers reporting accelerated herd improvement and reduced unproductive male calf births, which is determined to enhance milk productivity directly and double the farm incomes.



Conclusion

Despite persistent challenges, including limited awareness among smallholders about the technology's benefits and higher costs compared to conventional semen, in spite of ABIP-SS subsidies by the Animal Husbandry Department. The successful implementation of sexed semen technology in Pahroo and adjoining villages under the ABIP-SS program demonstrates its transformative potential for rural dairy economies, with remarkable 90.4% female calf births significantly boosting herd productivity and reducing unproductive male cattle. While challenges like initial cost barriers and awareness gaps persist, the intervention proves that with targeted subsidy by animal husbandry, proper training, and government support, sexed semen can revolutionize smallholder dairy farming. This case study underscores the need for scaled-up policy interventions to replicate such success across similar rural clusters, ensuring sustainable income growth and genetic improvement in dairy sector. This model offers a blueprint for enhancing milk yields, optimizing farm economics, and empowering rural communities through advanced breeding technologies.

Conflict of Interest Statement:

The communication and data presented herein are intended solely to provide insights into the sexed semen technology based on field experiences and cluster-level observations. The authors declare no financial or commercial conflicts of interest related to the Implementing Authorities or sexed semen technology providers. While the data demonstrates positive trends (e.g. Good BCS, around 90.4% female calves, early breeding at 11-14 months), results may vary across regions due to differences in farm management, infrastructure, or breed-specific responses. This article does not endorse specific products and should not be construed as promotional material. All interpretations are limited to the studied cluster, with personal experience over time period (2023–2025), with no guaranteed extrapolation to other contexts. The Author provides all credits of implementation of

this technology to Animal Husbandry Department Kashmir.

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Field study on therapeutic management of calf scours: integrating Metronidazole, Ringer's lactate, and supportive care with Flunixin Meglumine, B vitamins and oral electrolytes.

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Metronidazole;

Ringers Lactate;

Calf Scours

Oral electrolyte solution

This two-year field study evaluated the therapeutic efficacy of a multimodal treatment protocol for calf scours involving 34 affected calves. The protocol combined metronidazole, Ringer's lactate, oral electrolyte solution, flunixin meglumine, and B-complex vitamins (B1, B6 and B12) to address the multifactorial nature of neonatal calf diarrhoea. Pathogens such as *E. coli*, *Salmonella*, rotavirus, and protozoa like *Cryptosporidium* and *Giardia* were considered primary causative agents. Treatment targeted dehydration, electrolyte imbalance, infection, inflammation, and metabolic acidosis. Of the 34 calves treated, 28 recovered, 5 succumbed to the disease, and 1 case remained unreported, yielding an 82.35% recovery rate. The study found that early intervention with intravenous infusion of metronidazole and Ringer's lactate combined with supportive care significantly improved survival outcomes. The study concludes that this integrative treatment protocol is highly effective under field conditions and highlights the need for farmers education, diagnostic support, and further research to refine dosing strategies and improve long-term outcomes.

Introduction

Calf scours (neonatal diarrhoea) is a leading cause of morbidity and mortality in calves with major economic and health impacts (Foster & Smith, 2020). Usually calves less than four weeks of age are affected (Smith and Jones, 2021). The condition is multifactorial, with common pathogens including *Escherichia coli*, *Salmonella* spp. (Mangal et al., 2023; Paul et al., 2019), viral (rotavirus, coronavirus), and protozoal (*Cryptosporidium*, *Giardia*) pathogens (Cho & Yoon, 2014). The primary concern in scouring calves is dehydration, acidosis, and electrolyte imbalance, which can quickly lead to hypovolemic shock and death if left untreated (Smith, 2019). Effective management requires a combination of fluid therapy (e.g., Ringer's

lactate), antimicrobials (e.g., metronidazole for specific pathogens), and supportive therapies such as flunixin meglumine and B-complex vitamins (Lorenz, 2023). This field study evaluates the combined use of metronidazole, Ringer's lactate, flunixin meglumine, vitamins B1, B6, B12 and oral electrolyte solution in managing calf scours. Metronidazole is used to target anaerobic bacteria and protozoa, while Ringer's lactate and oral rehydration solution help restore hydration and electrolyte balance. Supportive therapy with flunixin meglumine and vitamins B1, B6, and B12 aids in reducing inflammation and improving metabolic recovery.

Clinical Observations

Calf scours arise from intestinal damage caused by viral, bacterial, or protozoal pathogens, leading to secretory diarrhoea (e.g.,

enterotoxigenic *E. coli*), malabsorptive diarrhoea (e.g., rotavirus-induced villous atrophy), and inflammatory diarrhoea (e.g., *Salmonella* or *Clostridium* spp.).

These mechanisms result in severe dehydration, electrolyte imbalances (hyponatraemia, hypokalaemia), metabolic acidosis (often D-lactic acidosis), and systemic endotoxemia. Failure of passive transfer of colostral immunity exacerbates disease severity (Smith, 2019; McGuirk, 2008).

In all the thirty-four calves, the primary indicator was diarrhoea presented as watery stools that varied in colour from brown to grey. In some cases, faeces contained blood or mucus with a foul odour; dehydration manifested as sunken eyes, dry mouth, and skin tenting; dry mucous membranes, especially gums; lethargy; and weight loss due to prolonged diarrhoea in 12 calves was observed. In some calves, there was a loss of appetite as there was no desire to suckle. Twenty-four calves out of thirty-four calves showed fever, while the rest were having normal to subnormal temperatures, especially in cold weather. Most of the calves showed rapid breathing to compensate for dehydration; however, five calves showed slow and laboured breathing, and in a few calves there was nasal discharge as well. Eight calves depicted signs of discomfort, like arching their backs or groaning due to cramping or bloating. Eighteen calves were presented with sternal recumbency and seven calves with lateral recumbency while the rest of the calves were in standing position.

Treatment and Management Therapy

Over a period of two years, i.e., from 2023 to 2025, the field study was carried out in the Brein area of Srinagar, Jammu and Kashmir, and all thirty-four calves suffering from calf scours were provided the following integrative treatment protocol, irrespective of the season of the year.

Metronidazole: an antimicrobial that disrupts DNA synthesis in anaerobic bacteria and protozoa, leading to cell death. It is particularly effective against *Clostridium* perfringens, *Giardia*, and *Cryptosporidium*, which are

common in calf diarrhoea. For example, Lorenz (2023) notes that metronidazole's inhibition of D-lactate-producing gut bacteria may reduce metabolic acidosis in diarrhoeic calves. Metronidazole was used at 10–25 mg/kg IV every 24 hours for 3 days.

Ringer's Lactate: Corrects dehydration and metabolic acidosis via balanced electrolytes (Na^+ , K^+ , and Ca^{2+}) and lactate, which is metabolised to bicarbonate. It contains sodium, potassium, calcium, and lactate, which is metabolised to bicarbonate, aiding in acid-base balance (Bhutan Animal Health Standard Treatment Guideline, 2021). RL contains lactate, which is metabolised to bicarbonate in the liver to correct acidosis (Trefz et al., 2019). Lorenz (2023) emphasises that RL is most effective in calves with moderate to severe dehydration. RL was used at 50–100 mL/kg IV over 1–4 hours (Smith, 2019).

Flunixin Meglumine: A non-steroidal anti-inflammatory drug (NSAID) that inhibits cyclooxygenase, reducing prostaglandin-mediated inflammation and endotoxemia (Berchtold, 2009). A randomised trial by Oetzel (2019) showed that calves treated with flunixin (2.2 mg/kg IV) had significantly improved survival rates (85% vs. 60% in controls) due to reduced systemic inflammation. The drug in this field study was used at the given dose rate; however, the route was intramuscular.

B Complex Vitamins: Thiamine (B1) corrects D-lactic acidosis by supporting pyruvate dehydrogenase activity in carbohydrate metabolism (Brent, 1976). Deficiency exacerbates lactic acidosis and neurological dysfunction. Smith and Jones (2021) recommend 10 mg/kg IM daily for calves with weakness or opisthotonos. Pyridoxine (B6) and Cobalamin (B12) enhance appetite, red blood cell synthesis, and neurological function. B6 (Pyridoxine) supports immune function and protein metabolism. Vitamin B12 (Cobalamin) is crucial for red blood cell formation and gut health. B-complex vitamins in the given field study were

used at 5 mL IM daily for 5 days (Smith & Jones, 2021).

Oral Electrolyte Solution: containing sodium chloride, potassium chloride, calcium propionate, and magnesium sulphate, fortified with vitamins A, D₃, and E. It helps in rehydration and provides essential electrolytes and vitamins lost during diarrhoea (Intas Pharmaceuticals Ltd., 2023). For mild to moderate dehydration, oral electrolyte solutions are effective. Oral electrolyte solution at 2 L per calf was provided to calves presented with calf scours twice daily (Trefz et al., 2019).



Fig. 1. calf receiving treatment

This study, conducted over two years, involved the treatment of 34 cases of calf scours using a combination of metronidazole, Ringer's lactate, oral electrolyte solution, flunixin meglumine, and B-complex vitamins. The overall recovery rate was 82.35%, with 28 calves recovering and 05 succumbing to the condition, with 01 unreported case. The results highlight the effectiveness of this multimodal treatment approach in managing calf diarrhoea under field conditions. The high success rate in this study suggests that early intervention with fluid therapy and antimicrobial treatment plays a critical role in calf survival. The combination of Ringer's lactate (IV for severe cases) and oral rehydration solution (for moderate dehydration) helped restore electrolyte balance and prevented metabolic acidosis, which is a leading cause of

mortality in diarrhoeic calves (Mangal et al., 2023).



Fig.3.Calf being treated with oral electrolyte solution

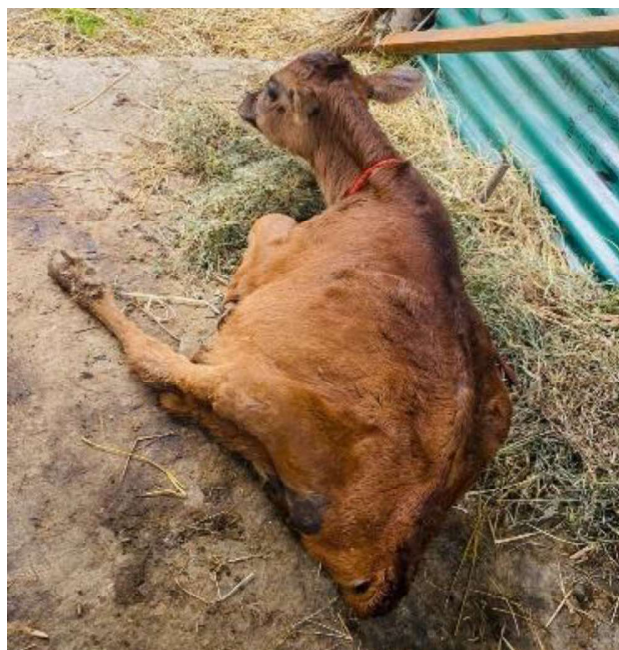


Fig.2. Calf in sternal recumbency suffering from calf scours

Discussion The use of metronidazole was beneficial against protozoal and bacterial

infections, further supporting its inclusion in the protocol. Flunixin meglumine proved useful in reducing inflammation, pain, and fever, contributing to better appetite and faster recovery. Meanwhile, B-complex vitamins helped counteract metabolic stress and aided in neurological and immune functions, which are often compromised in scouring calves. The findings highlight the effectiveness of a structured treatment protocol in field conditions while also underscoring persistent challenges in managing neonatal diarrhoea, particularly in resource-limited settings.

Conclusion

The combination therapy used in this study proved highly effective, with an 82.35% survival rate. The findings emphasise the importance of early intervention, aggressive fluid therapy, and supportive care. However, severe cases require more intensive management, and earlier recognition of symptoms by farmers could further improve survival rates. Further research is needed to optimise metronidazole dosing and validate vitamin protocols in calves.

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Delivery of *Schistosomus Reflexus* calf in a jersey cow

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C-section,
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Abstract:

A six year old jersey cow was presented with dystocia. On per vaginal examination, head and the all four legs were presented in the birth canal. A C-section was performed and a calf having *Schistosomus Reflexus* condition was removed. There were exposed abdominal organs, malformed skeleton, improperly positioned limbs which were adjacent to head with scoliosis.

Introduction

Inherited congenital anomalies are probably presented in all breeds of cattle and propagated as a result of specific trait selection. The incidence of foetal monsters is relatively high in cows, *Schistosomus Reflexus* and *Perosomus Elumbis* being commonest. *Schistosomus Reflexus* (a congenital defect) is by far the commonest gross structural defect in cattle, it is a birth defect resulting in malformation of entire body. Occasional cases are born normally without assistance and others may be extracted with moderate traction. Most affected fetuses, however, cause dystocia because the characteristic angulation of the spine greatly increases the cross-operation diameter, although the body weight may be less, the fetus is presented in one of the two ways, its exposed viscera may protrude from the vulva or the limbs and had may lie in the vagina. The dystocia can be relieved by either foetotomy or a C-section. The prognosis after a C-section is excellent, but the dam should not be rebred to the same sire (Noakes *et al.*, 2001).

The congenital defect could be caused by teratogens causing abnormalities in the developing embryo or fetus. Teratogens include drugs, hormone, chemicals high body temperature, toxic plants, viruses, chemicals etc. Vulnerability of the developing foetus varies at different stages of gestation because each organ and structure has a critical period of development during which it can be altered by harmful external influences (Azawi *et al.*, 2012).

Treatment and discussion:

A six year old jersey cow was presented on 27th December 2024 with a primary problem of difficulty in parturition which was handled by local paravet but couldn't relieve it despite many attempts. After 10 hours of dystocia owner called the assistance of Veterinary Surgeon. Upon arrival at the farmers location, the cow was recommend with signs of grinding its teeth (odontoprisis) and frequent protruding of tongue. The cow was seen frequently straining unfruitfully. While examining the animal via per rectal, it was found that the head and the all four legs are lying towards birth canal. A C-section was performed which aided in the diagnosis of *Schistosomus Reflexus* (SR). With difficulty the foetus was exteriorized because of its and the uterus had a tear because of extreme traction by the paravet. Utmost care was given to avoid further damage to the uterus. The SR was examined grossly and the features observed were exposed abdominal organs, malformed skeleton, improperly positioned limbs which were adjacent to head with scoliosis. The foetus was photographed and described grossly. This fatal congenital syndrome was characterized by presence of exposed abdominal and thoracic visera and marked spinal inversional producing a distinctive ventral convex curvature. All the four limbs were ankylosed, oriented parallel to the mandible of skull and extended beyond the head. The abdominal structures looked grossly normal in shape and texture.

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Therapeutic management of early-stage gangrenous mastitis in a crossbred cow – A clinical case report

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Fluid therapy
Vasodilation, Therapeutic
management

Abstract: Gangrenous mastitis is an acute and life-threatening condition affecting dairy animals, characterized by rapid tissue necrosis and systemic toxemia. Early diagnosis and aggressive multimodal treatment are critical for a favorable outcome. This case report presents the successful therapeutic management of early-stage gangrenous mastitis in a crossbred cow, where prompt systemic, local, and supportive therapy led to complete recovery without sloughing of the affected quarter. The report emphasizes the importance of clinical vigilance, field-level resource utilization, and the role of drugs like heparin and benzyl nicotinate in improving udder circulation and promoting healing.

Introduction:

Mastitis is one of the most economically significant diseases affecting dairy cattle, causing substantial losses due to reduced milk yield, poor milk quality, and early culling (Atakisi *et al.*, 2010). It is primarily an inflammatory condition of the udder tissue triggered by microbial infections or physical trauma. Based on severity and clinical signs, bovine mastitis is classified into clinical, sub-clinical, and chronic forms (Khan *et al.*, 2006). Clinical mastitis is typically evident through udder swelling, pain, fever, and abnormal milk with flakes and clots, and can be further subdivided into per-acute, acute, and sub-acute forms (Kibebew *et al.*, 2017; Gruet *et al.*, 2001). Sub-clinical mastitis, on the other hand, shows no visible signs but results in increased somatic cell count and reduced milk production (Abebe *et al.*, 2016). Despite being harder to detect, it often leads to greater economic loss than clinical cases (Zhao *et al.*, 2008; Romero *et al.*, 2018). Gangrenous mastitis is a rare and severe per-acute form of clinical mastitis, characterized by rapid necrosis of udder tissue, often accompanied by discoloration, coldness,

crepitation, and systemic illness (Smith and Sherman, 2009; Carlton and McGavin, 1995). The condition is mainly associated with *Staphylococcus aureus* and *Escherichia coli* infections (Jubb and Kennedy, 1963). While surgical intervention, including mastectomy or quarter amputation, is often required in advanced cases (Phiri *et al.*, 2010), early detection and timely therapeutic management can prevent further progression and improve prognosis. The present case report details the successful therapeutic management of early-stage gangrenous mastitis in a crossbred cow using a combination of systemic and supportive therapies, emphasizing the importance of early diagnosis and intervention in achieving complete clinical recovery.

History and Observations

A 5-year-old crossbred cow in its third lactation was presented with a swollen, discolored left hind quarter of the udder, anorexia, and markedly decreased milk yield for the past two days. The affected quarter was cold to touch, bluish-black in appearance, and emitted a foul odour.. Milk from the affected teat appeared blood-tinged and serous. The

cow showed systemic signs including dullness, elevated rectal temperature (104.6°F), tachycardia, and ruminal atony.

CMT was conducted and showed a three positive reaction (+++) from the affected quarter, indicating a high somatic cell count and active inflammation (Sharma *et al.*, 2011). Based on these clinical signs and rapid onset, a provisional diagnosis of early-stage gangrenous mastitis was made.

Diagnosis: The diagnosis was made clinically based on history, physical examination, and CMT. The typical signs of cold, discolored udder, sero-bloody milk, and systemic toxemia, along with the absence of complete necrosis or tissue sloughing, supported the classification as an early-stage case. Milk culture and antibiotic sensitivity testing could not be performed due to field limitations, but empirical treatment was initiated without delay.

Treatment: An aggressive, multimodal treatment protocol was initiated that included administration of Inj. Cefquinome @1mg/kg Body weight (BW) intramuscular for 4 days, Inj. Tilmicosin @20mg per kg BW subcutaneous, repeated after 72 hours. Inj. Flunixin Meglumine @1.1mg/kg BW intravenously for 3 days. Infusion Mammitel-PNC intramammary, repeated once after 24 hours (administered early before progression to necrosis). Supportive Therapy including Bol. Tissue Aid – 2 boli orally daily for 5 days. Liq. E Care Se – 30 ml orally daily (Vitamin E and Selenium). Intravenous fluid therapy for 5 days. Local Management including Ointment Thrombophob (Heparin and Benzyl Nicotinate) applied locally to the affected quarter twice daily. The owner was advised to avoid cold fomentation and to frequently milk the animal to prevent milk accumulation and pressure buildup.

Results

The cow began to show noticeable improvement after three days of treatment. Udder temperature normalized, appetite returned, and general demeanor improved. Discoloration of the affected quarter began to fade by day three. No sloughing of tissue occurred. By day 15, the animal had almost fully recovered with partial restoration of milk production from the previously affected quarter. No recurrence or complications were observed during follow-up.

Discussion: This case underlines the importance of early diagnosis and immediate therapeutic intervention in the management of gangrenous mastitis. The cow presented with signs of pyrexia, tachycardia, depression, respiratory distress, sharp fall in milk yield, and a severely swollen, discolored udder are the clinical indications of the per-acute type of mastitis as described by Vijayalakshmi *et al.*, (2004). Such signs, when seen in rapid progression, warrant aggressive and multi-pronged treatment.

The present case, along with routine field experiences, reinforces that gangrenous mastitis is highly prevalent during the periparturient period, particularly within the first month of lactation. This prevalence is likely linked to infections acquired during the dry period or at calving and reflects the critical hormonal, metabolic, and nutritional shifts taking place during the transition period (Rasool *et al.*, 1985). Hence, vigilant udder health management during this window is crucial.

Bacteriological studies have consistently demonstrated that *Staphylococcus aureus*, *Clostridium perfringens*, and *Escherichia coli* are the predominant causative agents of gangrenous mastitis in ruminants (Green and Bradly, 2004; Atyabi *et al.*, 2006). Islam *et al.*, (2008) also confirmed the dominance of *Staphylococcus* spp. (3/7 cases), followed by *E. coli* (2/7), and



Fig 1. Day 01

Clostridium spp. and *Bacillus* spp. (1 each) in gangrenous cases. *E. coli*, in particular, often gains entry through fecal contamination, multiplying rapidly within the udder. As the immune system destroys these bacteria, endotoxins are released, leading to toxemia and the classic systemic signs of per-acute mastitis, which may occasionally advance into gangrenous stages (Radostits *et al.*, 2007).

A similar case was recorded by Singh *et al.*, (2013), where an HF crossbred cow developed extensive subcutaneous edema in the perineal region, eventually leading to sloughing of the affected quarter. Fortunately, the current case was identified early enough to prevent such tissue loss.

The dual antibiotic coverage in this case with Cefoquinome and tilmicosin was effective in controlling the microbial load. Flunixin meglumine helped manage systemic inflammation and endotoxemia, while intravenous fluids corrected dehydration and helped flush out toxins. The inclusion of Vitamin E and Selenium offered antioxidant support crucial for tissue repair. Regular milking of the affected quarter was advised

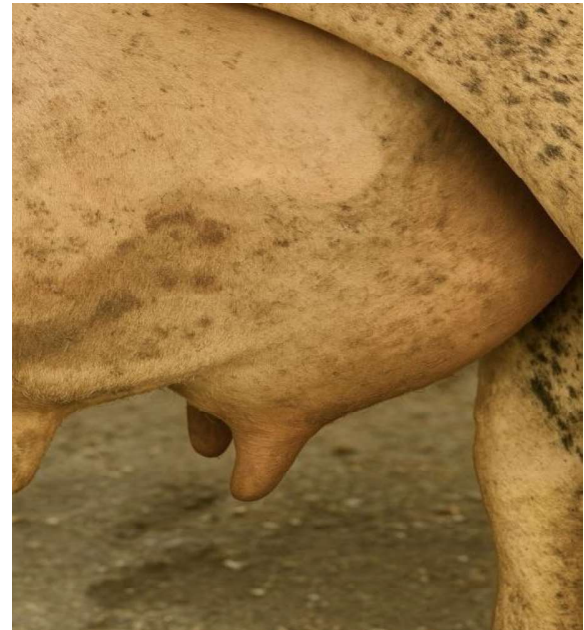


Fig 2. Day 15

to reduce pressure and toxin load. The local application of an ointment containing heparin and benzyl nicotinate aided circulation in the affected mammary tissue. Heparin acts as an anticoagulant, preventing microthrombi, while benzyl nicotinate enhances local vasodilation, thereby promoting tissue perfusion and healing.

A comparable case was reported by Singh *et al.*, (2013), where gangrenous mastitis led to sloughing of the affected quarter, emphasizing the need for immediate action. While conservative therapy may be successful in early-detected cases, decisions regarding treatment must also consider economic viability. In advanced cases or where recovery is unlikely, surgical intervention or culling may be necessary (Singh *et al.*, 2013).

Conclusion: Gangrenous mastitis, though rare, can be life-threatening if not diagnosed and treated in time. In the present case, early detection and prompt initiation of a well-planned treatment protocol led to complete recovery without the need for surgical intervention. The combination of systemic antibiotics, anti-inflammatory drugs,

intramammary therapy, aggressive fluid support, and regular udder evacuation played a crucial role in controlling the infection and restoring udder function. Local therapy aimed at improving blood circulation further supported healing. This case highlights the importance of early and aggressive management, farmer awareness, and careful monitoring during the peri-parturient period to prevent and successfully treat severe forms of mastitis in dairy cows.

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Schistosomus reflexus lamb induced dystocia in a Kashmir Merino ewe: A Case

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Key words:

Primiparous,
Kashmir Merino
Schistosomus reflexus

Abstract: A primiparous Kashmir Merino ewe in advanced pregnancy was presented with a history of dystocia, straining and recumbency. The clinical examination revealed a dead and deformed lamb which was diagnosed as a case of Schistosomus reflexus and delivered through purely non-surgical means. This case report documents the vaginal birth of a true case of Schistosomus reflexus lamb in Kashmir Merino breed of sheep.

Introduction

Schistosomus reflexus in newborn animals is defined as a congenital, hereditary (Laughton *et al.*, 2005) and fatal condition, usually diagnosed as an obstetrical anomaly (Munif *et al.*, 2023), and characterized by visceral eventerations, usually abdominal only but sometimes thoracic also, (*Schistos* meaning 'split', *soma* meaning 'body'), ventriflexion or dorsiflexion of spine (*reflexus*), skeletal deformities such as ankylosis and arthrogryposis (Roberts, 2013), lateral thoracic curvature and hypoplasia of lungs and diaphragm (Varudharajan *et al.*, 2019). All these conditions together constitute the basic criteria for a particular monstrous fetus to qualify as a case of Schistosomus reflexus (Isidro and Joaquin, 2008; Laughton *et al.*, 2005). In Kashmir, the documentation of Schistosomus reflexus cases in sheep is limited (Dar *et al.*, 2015). This case report describes the diagnosis of true Schistosomus reflexus in Kashmir Merino breed of sheep and successful management of dystocia due to this monstrous condition through purely nonsurgical means.

Case History

A 1.5-year-old primiparous Kashmir Merino ewe in late gestation was presented with a history of

complete anorexia, recumbency, prolonged labor, persistent straining, inability of the ewe to expel the fetus even after assistance, unsuccessful attempts at relieving the animal by the breeder, and progressively worsening condition of the ewe.

Clinical observations

On general clinical examination, the ewe exhibited dehydration, slightly congested ocular mucous membranes, slight tachycardia, hyperventilation and right lateral recumbency with fully extended hindlegs and an unwillingness to rise even with assistance. The perineum, vulva and vagina were extensively edematous with mucosal lacerations and ischaemic necrosis. Two rigidly locked hindlimbs, a forelimb and tail of the fetus were partially visible and protruding from the vulvar orifice. The per-vaginal manual examination with a lubricated gloved hand revealed a full-term dead fetus in posterior presentation, totally immovable and refractory to obstetric maneuvers such as version, retropulsion and mutation, and paradoxically locked in a completely dilated cervix. A detailed obstetric manipulation revealed a monstrous fetus with intestines and liver palpable outside of the fetal abdomen and

interspersed between the fetal limbs without any recognizable order.

Clinical Management

The posteriorly presenting fetus exhibited a right sided permanent bony curvature of the thorax with very little space for the hands to pass through the birth canal for postural manipulation of the fetus. After lubricating the birth canal and pushing the frontleg back into the uterine cavity, a slightly left and ventral obstetric manipulative tilt of the oversized fetal body (3.45kgs) relieved the intra-pelvic 'locked' status of the fetus and a monstrous fetus with characteristics typical of the Kashmir Merino breed was delivered without any surgical intervention. The ewe immediately rose on its legs and resumed the appetite normally. The antibiotics (Inj Amoxycillin @ 15mg/kg BW) and antiphlogistics (Inj Flunixin meglumine @ 1.1mg/kg BW) were injected intramuscularly and the ewe recovered completely within a week.

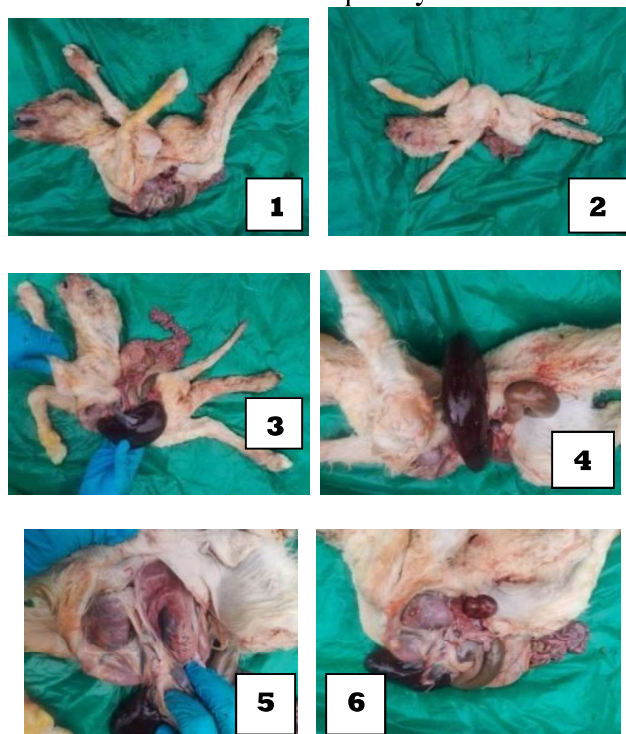


Fig (1, 2): Dystocic posture of the fetus; Fig (3, 4): Relative positions and sizes of various visceral contents; Fig (5, 6): Detailed inspection of the visceral contents for accurate diagnosis

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Discussion and Conclusion

In Kashmir, Schistosomus reflexus cases in sheep go undiagnosed and unreported, partially because of the fact that many obstetrical cases in sheep are attended to by the breeders themselves. A skilled management of a dystocic case refractory to obstetric maneuvers can help in avoiding the need for surgical interventions especially when the fetus is already dead. This case highlights the importance of a proper and timely differential diagnosis in ovine dystocia cases to prevent mortality in ewes and reporting such cases in sheep for a broader understanding of these fetal monstrosities.

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Surgical management of unilateral Feline Entropion: A case report

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Entropion

Holtz-Celsus

Persian cat

Fluorescein dye

Abstract: A 2-year-old intact male Persian cat was presented with the history of chronic unilateral ocular irritation and purulent discharge for 2 months. Epiphora, blepharospasm, photophobia, and severe unilateral entropion involving the nearly whole length of lower eyelid (primarily lateral canthus of eye) were seen on clinical examination. Corneal ulceration was observed after staining with Fluorescein dye. The surface of the involved eyelid was whitened by prolonged contact with tears, and the cat showed severe blepharospasm, keeping the eyelids tightly closed. Holtz-Celsus operation was performed, consisting of resection of skin-muscle from the involved lower eyelid. The cat recovered uneventfully.

Introduction

Entropion is a condition of eyelid margin misalignment that leads to corneal irritation by eyelashes and eyelid hair. Entropion presents a challenge that is unusual in feline medicine due to its rare appearance. If left untreated, entropion develops into signs including epiphora, blepharospasm, photophobia, conjunctivitis, and purulent discharge, with accompanying possible complications of corneal sequestration, pigmentation, and ulceration (Helper, 1989; Slatter, 1990b; Gelatt, 1991; Petersen-Jones, 1993). Several etiologies cause feline entropion, such as congenital, spastic, acquired, or cicatricial causes (Helper, 1989; Slatter, 1990; Gelatt, 1991). Surgical treatment by Holtz-Celsus procedure, is the treatment of choice for feline entropion (Nasisse, 1991; Petersen-Jones, 1993). The current report discusses the surgical correction of unilateral entropion in a Persian cat.

Case history and Clinical examination

A 2-year-old male Persian cat, weighing 4.1 kg, was brought to the District Veterinary Hospital, Doda, Jammu and Kashmir, India, with the history of recurrent unilateral ocular irritation and purulent

discharge for the past 2 months. Ophthalmic examination revealed epiphora, blepharospasm, photophobia, and severe unilateral entropion involving the entire length of the lower eyelid, along with conjunctivitis and purulent brownish discharge (Fig. 1). Fluorescein stain corneal test was performed to observe for corneal ulceration where green uptake of stain was noted at the area of corneal ulcer (Fig. 2). There was a notable excess of skin on the outer side of the affected eyelid found to be in contact with the globe, causing friction. The eyelid surface was found to be whitened due to chronic exposure to tears. The cat showed significant blepharospasm with eyelids held tightly closed.



Fig. 1: Image showing purulent brownish discharge and severe unilateral inward rolling of eyelid.



Fig. 2: Image showing Fluorescein staining and green stain uptake at the site of corneal ulcer.



Fig. 3: Image showing incisions in the lower eyelid.



Fig. 4: Image showing closed incision.

Surgical correction and discussion

The animal was premedicated with Xylazine hydrochloride @ 1 mg/kg b.wt. Ketamine @ 5 mg/kg b.wt. was used for inducing the general anaesthesia. Anaesthesia was maintained with incremental doses of Ketamine as and when necessary. The involved eyelid was clipped and aseptically prepared. The conjunctival sac was irrigated with saline to remove hair and coarse debris. The cat was placed in a lateral recumbency position. Thumb forceps were used to tent the skin in the area of entropion to gauge the size of the elliptical excision required. An incision was then created along the axis of the entropion, starting 2 mm from the lid margin, and a crescent shaped piece of skin was removed (Fig. 3). Closure of the wound was done using 3/0 nylon in simple interrupted fashion, with a central suture followed by further sutures placed 2 to 3 mm apart (Fig. 4). Postoperatively, the cat was given antibiotics and analgesics for five days. Topically Moxifloxacin eye drops and Gatifloxacin 0.3% three times a day were advised. An Elizabethan collar was advised to avoid the risk of self-trauma. Antiseptic wound dressing with povidone iodine was advised postoperatively. The skin sutures were removed 10 days post surgery. Chronic purulent discharge and

eye irritation noted in this case were caused by entropion since there was no history of trauma or evident abnormalities to explain the condition.

Conclusion

To conclude, the surgical treatment of unilateral entropion in the Persian cat was a successful outcome that emphasizes the effectiveness of surgical methods in correcting ophthalmic anatomical defects. In the present case follow-up examination showed favorable results, with ocular discomfort eliminated and prevented the risk of potential complications such as corneal ulceration, vascularisation and secondary bacterial infection.

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Successful surgical management of sole ulcer in a Crossbred Jersey cow; A case report**Aejaz Ahmad Wani^{1*}***1* **Veterinary Assistant Surgeon, Subunit D. H. Pora, Kulgam.*****Corresponding author** aejaz748@gmail.com**Article Info:****Article submitted:** 25 March 2025**Article accepted:** 05 April 2025**Article published:** 15 April 2025**Keywords:**

Prolapse

Sole

Ulcer

Abstract: Sole ulcer is not a true ulcer and is defined as a circumscribed lesion affecting the sole or sole-heal junction of the lateral claw which permits prolapse of the pododerm. The incidence is high and wide spread. The condition usually affects mature and heavy animals. The lesions are frequently bilateral and overlie the attachment of the deep digital flexor tendon.**Introduction**

Sole ulcer is not a true ulcer and is defined as a circumscribed lesion affecting the sole or sole-heal junction of the lateral claw which permits prolapse of the pododerm. The incidence is high and wide spread. The condition usually affects mature and heavy animals. The lesions are frequently bilateral and overlie the attachment of the deep digital flexor tendon.

Aetiology

Aetiology of the sole ulcer is not completely understood. A large number of factors are presumed to be associated directly or indirectly to establish the lesions (Ossent, P. and Lischer, C.H.J. 1998). Factors include hereditary predisposition (e.g. straight hind limbs), excessively overgrown hooves, decreased sole vitality as a result of circulatory stasis in the foot due to lack of exercise, stress and injury to the horny sole, over trimming and under trimming, wet conditions, nutritional disturbance (calcium and phosphorus imbalance), and impaired circulation of the foot due to thrombosis in the digital vessels (in present case same was the cause of ulcer).

Pathogenesis

Sole ulcer originates from localised damage to the pododerm at the sole-heel junction. Initially, there is localised ischemia that gets contused and thus results in an open ulcer which favours proliferation of *Fusiformis necrophorus*, *Corynebacterium*

pyogenes, Streptococci and fungi. The suppuration may also involve the navicular bursa and pedal joint (Greenough, P.R. 1987).

Case history and diagnosis

A five year old crossbred Jersey cow was presented to the author at Subunit D. H. Pora, Kulgam. According to owner the cow was left for open grazing in local apple orchard, in order to limit the access of the cow to the ripe fruits a nylon rope was tied from head to the metacarpal of left fore limb. The rope was tied taut which lead to local ischemia and development of the edema of the affected sole as shown in the fig.1(a) below. After primary examination of the affected limb and correlation of the case history it was diagnosed as a case of sole ulcer. The lesion was circumscribed with an over grown mass of diameter of approximately 7 cm with purulent discharge (fig 1 b). The animal was not able to bear weight on the affected limb due to pain arising out of the rough surface of the sole which lead to lameness.

Surgical procedure and treatment

The animal was properly restrained and a 16 gauze needle was inserted into the pasterns joint which lead to the drainage of the amber coloured accumulated fluid. The animal was put on injection Ridema (vetoquinol pharma), inj Zydacef (zydus pharma) and inj Neotol (Alembic pharma) to reduce the edema and inflammation and limit the infection of the sole for 3 days. On fourth day the animal was casted in right lateral recumbancy and the sole was

thoroughly washed with potassium-permagnate solution. 2% Lignocaine Hydrochloride was injected into the pastern joint and also sprayed over the affected sole. The over grown mass was trimmed out with a surgical blade and was wound was freshened (fig. 2 a). The wound was surgically dressed up with povidone iodine and was sealed with gauze. A polythene bag was wrapped over the sole and was tied at fetlock joint to prevent contact with soil and dung.



Fig. 1 (a). Affected limb pre operation

Fig. 1 (b). Affected sole with over grown mass

The animal was put on broad spectrum antibiotic inj Zydacef (zydus pharma), inj Neotol (Alembic pharma) and inj Zeet (Alembic pharma) for a period of five days post operation. The owner was advised

to keep the animal in a dry environment and provide soft bedding. The dressing was changed on alternate days till recovery. Animal recovered uneventfully with proper configuration and confirmation of the sole as shown in fig. 2(c).

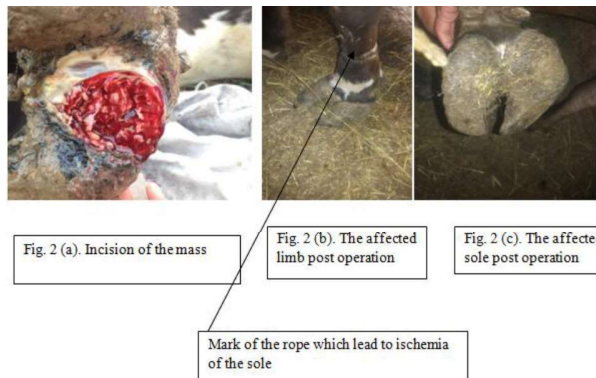


Fig. 2 (a). Incision of the mass

Fig. 2 (b). The affected limb post operation

Fig. 2 (c). The affected sole post operation

Mark of the rope which lead to ischemia of the sole

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Case report on fetal maceration in cattle

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Keywords:

Chittergul,
Prostaglandin,
Dexamethasone
Valethamate bromide

Abstract: A crossbred Jersey cattle was presented to sub unit

Chittergul with history of prolonged gestation and vaginal discharge. Rectal palpation revealed a contracted uterus with no fluid and crepitating bones, indicative of decomposing fetal bones, absence of fremitus and fetal reflex. Per-vaginal examination revealed open cervix only upto two fingers Combination of four drugs e.g. Prostaglandin, dexamethasone, valethamate bromide and estrogen was given to the animal and cervix dilated completely. A macerated fetus was delivered by forced traction and animal recovered successfully.

Introduction

Incomplete abortion after the third month of gestation is the main reason for a retained fetal bony mass in the uterus of cows and buffaloes (Sood et al. 2009). Fetal maceration may occur at any stage of gestation and has been reported to occur in all species (Purohit 2012) following fetal death, regression of corpus luteum and failure of abortion (Arthur et al. 1989). The condition is common in cattle and buffaloes (Purohit and Gaur 2011, Dutt et al. 2018) but may be rarely encountered in mares (Burns and Card. 2000) and small ruminants (Mehta et al. 2005.). It has also been observed that incidence of fetal maceration is more in cattle than in buffaloes (Personal observations). In delayed cases of maceration, the prognosis is very poor (Dutt et al. 2018). When the cervix is not open prostaglandins or estrogens can be given to regress the partially regressed CL and/or increase the uterine contractions (Purohit and Gaur 2011).

History and Clinical Examination

A 4-year-old cross bred jersey cow was presented to the Sub unit Chittergul with a history of prolonged gestation and intermittent vaginal discharge over the past two months. The owner reported signs of reproductive failure, including lack of estrous cycles and an abnormal odor from the vaginal discharge.

Upon clinical examination, the cow was having normal rectal temperature and pulse rate. However, a foul-smelling, purulent discharge was observed from the vulva. Rectal palpation revealed a contracted uterus with no fluid and crepitating bones, indicative of decomposing fetal bones, absence of fremitus and fetal reflex. Per-vaginal examination revealed open cervix only upto two fingers.

Treatment

Animal was administered with Dexamethasone (Inj. Dexona, Sarabhai Zydus Animal Health Ltd. 10ml, IM), Oestradiol Benzoate (Inj. Preg Heat, Virbac India, 2ml, IM), , Valethamate Bromide (Inj. Epidosin, TTK Pharma, 15ml IM), Cloprostenol (Inj. Pragma, Intas 2ml, IM). The animal was kept under observation for 24 hours. On the next day, per-vaginal examination revealed completely dilated cervix and macerated fetus was delivered by careful traction using Snare and manual traction. Other remaining parts of placenta, bones etc. were also removed manually. Following removal of fetus and other parts, four intrauterine boli (Cleanex®, Dosch Pharmaceuticals Pvt. Ltd.) were put in the uterus to prevent local uterine infection. Consequently, animal was administered with Normal Saline 2 litre, IV and Metronidazole 500 ml IV for 3 days.

Discussion

Fetal maceration is one of the accidents of pregnancy where fetal death can occur at any stage of the gestation but more commonly after 4th month of pregnancy. The reason for the non-delivery of a dead fetus could be a partially dilated cervix, or the abnormal presentation of a fairly dry fetus which causes it to be retained in the uterus (Drost 2007). In literature there are reports for expelling the fetus using several drugs including estrogen, prostaglandins and Valethamate bromide (Phogat 1994) and failure of this therapy may be recorded if cervix is hard and indurated or presence of structureless macerated fetus (Ball 1980). In such cases a repeated treatment can be attempted which was also true for current case that responded well with second dose of prostaglandin & dexamethasone combined with valethamate bromide, estradiol benzoate and calcium-magnesium-boro-gluconate. In non-responded cases surgical removal is considered as the last resort.

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Perineal Urethrostomy for the management of obstructive Urolithiasis in a calf

Safoora Kashafi¹ and Mudasir Ahmad Shah¹*¹Veterinary Surgeon, Department of Animal Husbandry, Jammu and Kashmir,***Corresponding author: syedmudasirshah907@gmail.com***Article Info:****Article submitted:** 25 March 2025**Article accepted:** 11 April 2025**Article published:** 15 April 2025**Key words:**Urolithiasis,
Cystostomy
Perineal**Abstract:** Obstructive urolithiasis is a common urinary tract disorder in male ruminants, often requiring surgical intervention. This report describes the case of a 3-month-old male cow calf that developed urethral rupture following tube cystostomy for obstructive urolithiasis. The calf presented with urine retention, swelling, and urine scalding around the ventral abdomen. The surgery involved perineal urethrostomy and the calf recovered successfully without any complications.**Introduction**

Obstructive urolithiasis is a urinary tract condition characterized by the formation and accumulation of insoluble mineral and salt concretions around a nidus of proteinaceous material in the urinary bladder or urethra. Formation of the nidus primarily results when mucoprotein in urine aggregate and precipitate with crystals in supersaturated urine (Belknap and Pugh, 2002). Male ruminants are more prone to be affected due to an exceptionally long urethra, whereas females have a shorter and broader urethra (Matthews, 1999). The formation of urinary calculi typically occurs due to a combination of nutritional, physiologic, and management factors and is predominantly caused by excess or imbalanced intake of minerals (McIntosh, 1978; Radostits *et al.*, 2000). Silica, oxalates and the carbonates are among the common forms of uroliths (Larson, 1996). Obstructive urolithiasis treatment has been reported to differ based on clinical status of animal and duration of the obstruction (Larson, 1996). Nevertheless, after urethral obstruction is established, surgical procedures such as perineal urethrostomy, tube cystostomy, cystorrhaphy and urethrostomy and percutaneous intraperitoneal catheterisation are indicated (Haven *et al.*, 1993;

Parrah *et al.*, 2014). The present report discusses perineal urethrostomy in a male cow calf complicated after Tube Cystostomy.

Case History and Clinical Examination

A 3 month old male cow calf was presented to us in the field with the history of tube cystostomy performed 10 days back in an institutional facility for obstructive urolithiasis. The animal was presented with the complaint that the calf is not passing urine through the Foley's catheter since 2 days. Clinical examination revealed swelling and urine scalding in the ventral abdominal region around urethra indicative of urethral rupture (Fig. 1). Abdominocentesis was performed which yielded straw coloured peritoneal fluid. Catheter was flushed with normal saline however there was no relief and it was decided to opt for palliative surgical technique viz. Perineal Urethrostomy instead of reoperation for Tube cystostomy.

Surgical Procedure

Animal was restrained in lateral recumbancy after caudal epidural anaesthesia using 2% lignocaine hydrochloride along with local infiltration of the site. The perineal region of midline between scrotum and little below to the anus was aseptically prepared by shaving, scrubbing with dettol soap and application of povidone iodine

solution (Fig. 2). A 5 cm long incision was given on midline commencing 2 inch ventral from anal opening. Subcutaneous tissue and retractor penis muscles were separated to expose urethra (Fig.3). A partial penectomy was done and urethra was split (Fig. 4). Proximal stump was ligated properly using catgut no.1 suture material. Dripset catheterization was done from urethrostomy stump to urinary bladder so as to check for the patency of remaining urethra and urine flow. The newly created penile stump was transfixed at lower commissure of incision with stay suture and the circumferential urethral edges were sutured with muscles and skin using silk in simple interrupted pattern.



Fig. 1: Image showing ventral shaved perineal region



Fig. 2: Image showing abdominal swelling and urine scalding

Postoperatively, the animal was administered with Streptopenicillin (10mg/kg body weight, I/M) for 5 days and Meloxicam (0.2mg/kg body weight, I/M) for 3 days. Urinary acidifier ammonium chloride (200mg/kg body weight orally) was also advised for 15 days. The sutures were removed after 15 days of operation and the animal was urinating through the urethrostomy opening normally (Fig. 5). Further, the skin around the ventral belly had sloughed off due to urine burn leaving a raw red oozing surface.



Fig. 3: Image showing exposed urethra



Fig. 4: Image showing partial penectomy and split urethra

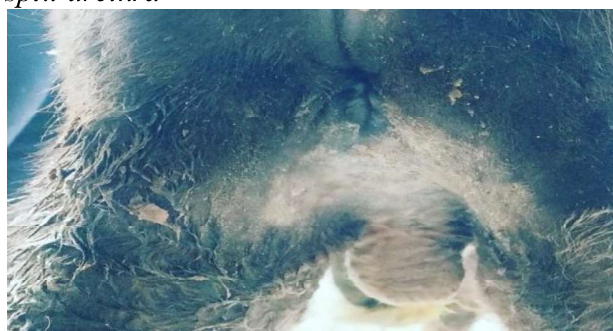


Fig. 5: Image showing healed site after 15 days of operation

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Postmortem diagnosis of Hydatid cyst in dairy cattle- a case report**Farkhanda Rahman^{1*}***1Department of Animal Husbandry Government of Jammu and Kashmir***Corresponding author: farkhandarehman1gmail.com***Article Info:****Article submitted:** 25 March 2025**Article accepted:** 11 April 2025**Article published:** 15 April 2025**Key words:**

Hydatid cyst

Echinococcosis

Dairy cattle

Abstract:

Hydatid cyst/Hydatidosis/Echinococcosis is a zoonotic helminthic disease and is worldwide in distribution. Hydatidosis has a significant economic importance in livestock industry owing to its negative effect on growth, reduction in milk production and loss of life due to multiple organ failure. The complications of disease arise due to frequent increase in diameter of the fluid filled cysts and anaphylaxis due to their rupture. Three crossbred cattle, two crossbred Holstein Friesian (CBHF) and one crossbred Jersey (CBJ) were presented at Integrated Cattle Development Centre, Preng Ganderbal with the history of transportation, parturition, anorexia, occasional cough, cachectic condition and recession. One of the CBHF cows was recumbent. Despite symptomatic treatment, the animals died on three consecutive days (five days after the onset of symptoms). Upon Post-mortem examination, hydatid cysts of varying sizes were observed in lungs and liver of all three animals.

Introduction:

One of the important parasitic zoonotic disease that affect humans and animals worldwide is Hydatidosis (Campoano. 2000). Echinococcus infection is listed in the World Organization for Animal Health (WOAH) Terrestrial Animal Health Code. Hydatid disease is caused by tiny tape worm of genus Echinococcus. There are five different species of Echinococcus that infect domestic and wild animals; however Echinococcus granulosus is the most common one (Radostits., 2010). The life cycle of a tape worm is completed in two different hosts. Carnivores are the definitive hosts where adult worms live in intestines and merely cause any damage. Intermediate host can be any mammal including cattle, buffalo, sheep, mules, goat, swine, camel and humans. Feed, fodder, water and pasture grass contaminated with the infected faeces of dogs serve as the source of infection to intermediate hosts. After ingestion, the eggs hatch in small intestines and the larva penetrate gut wall and get circulated to their sites of predilection (renal, cardiac, spleen, brain, bone marrow and particularly liver and lungs) to form fluid filled cysts known as hydatid cyst or

metacestodes (Balkaya and Simsek. (2010). As a result of strong immune response by the host, a fibrous cover is formed around the cysts that prevent

their elimination from the body. From the membrane of fluid filled cysts thousands of scolexes germinate by asexual reproduction. Cysts formed in cattle are multivesicular that is every cyst is independent of each other (Dziri. (2001). The higher risk of Hydatid cyst infection is seen in veterinarians, animal handlers, dog owners, laboratory workers and the disease is transmitted via contaminated fruits, vegetables or water. In humans' cysts are formed in lungs, liver and rarely in bones and brain (Bowmayn and Lynn. (1999). In this case report postmortem diagnosis of Hydatidosis in three crossbred cows has been presented.

CASE PRESENTATION**CASE HISTORY AND OBSERVATIONS**

Two CBHF cows and one CBJ cow in their second lactation were presented at Integrated Cattle Development Centre, Preng, Kangan Ganderbal. The animals had been inducted from outside the UT of J&K and had parturated a few days prior to the illness. All the three animals

were anorectic, milk production had abruptly decreased and one of the CBHF cows was recumbent. Onset of symptoms had been sudden. Upon clinical examination the animals were found afebrile, cachectic body, dull coat, rapid shallow breathing and increased pulse. Despite symptomatic and supportive line of treatment given to the animals, they died one after other in three consecutive days.

Postmortem of the animals was conducted on the spot of death as per protocol. The findings revealed presence of well-defined fluid filled cysts of varying sizes on liver and lungs. A few small cysts were deep seated and covered with connective tissue. The largest fluid filled cyst measured 4.5cm. The cysts were punctured by a sterile hypodermic needle which revealed clear fluid from the cysts. None of the cysts showed calcification. Other organ systems were thoroughly observed for the presence of cysts however, no cysts were observed from elsewhere in the body.

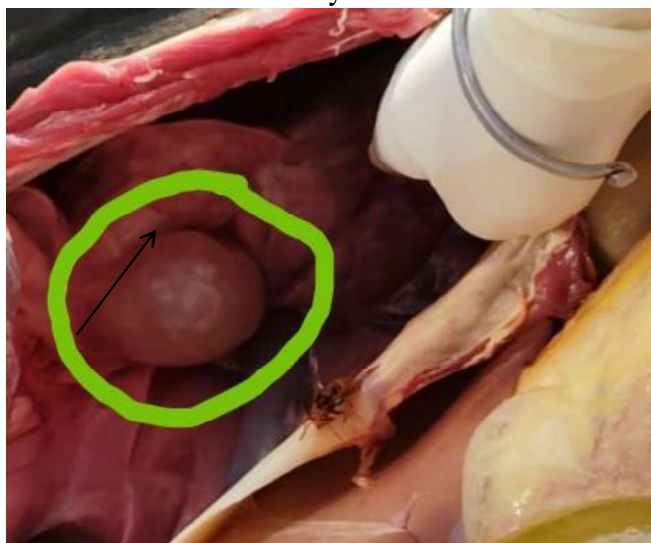


Fig 1. Hydatid cyst on Liver



Fig 2. Hydatid cyst on Lung

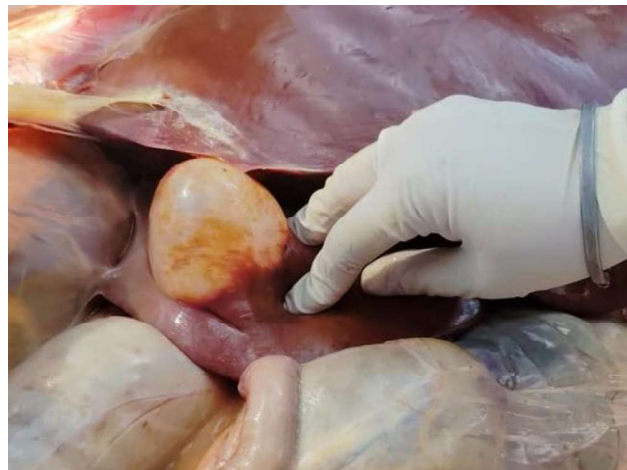


Fig 3. Hydatid cyst on Lung

Discussion

Hydatid disease is a parasitic zoonosis of public health and economic importance as it directly and indirectly affects livestock. It is caused by a minute tape worm of genus *Echinococcus* whose primary hosts are carnivores and secondary hosts can be domestic animals, wild animals and humans (Cadona and Carmena. (2013). The parasite resides in intestines of dogs and eggs are passed in faeces to contaminate feed, fodder, water etc. When ingested by the intermediate hosts especially cattle and sheep the eggs get hatched to metacestode larvae (Karaman and Gurnor. 2015). Hydatid cysts cling to the organs having busy bloodstream like lung and liver. If left untreated, hydatidosis is life threatening. Rupturing of cysts leads to severe anaphylactic shock (Marriott and Karan. 2010). Echinococcosis has a significant economic importance as it leads to decreased fertility, loss of milk production, reduced carcass weight, condemnation of animal parts and offal upon inspection. Disease prevalence is more in developing countries due to unsanitary conditions, unchecked population of stray dogs and poor management of livestock like absence of timely deworming (Craig et al., 2007).

Conclusion

Prevention is always better than cure. Deworming as per protocol should be done in animals. Stray

dogs should not have free access to farm sites. Humans in close contact with livestock and dogs should perform deworming as well. Carcass of infected animals should be properly disposed. Before inducing animals, proper health care record should be maintained. Proper abattoir inspection and sanitation should be maintained.

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Molecular detection of Contagious Ecthyma virus in Jammu and Kashmir

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Orf

PCR

Abstract: Contagious Ecthyma is a viral disease of sheep and goats affecting mostly young ones. It is a contagious disease occurring worldwide, caused by Orf virus (ORFV), a prototype member of genus *Parapoxvirus* belonging to family *Poxviridae*. The disease is characterized by non-systemic eruptive lesions. The primary lesions often develop externally on the commissures of the lips, muzzle and inside the oral cavity. This case report describes the presence of orf in three lambs from a private sheep farm located at Shalbugh Ganderbal which were presented to DIL, Nowshera Srinagar. Affected animals had proliferative wart like lesions in oral cavity especially on gingival mucosa characteristic of orf in sheep that was later confirmed by PCR assay. The animals were given antibiotics for control of secondary bacterial infection, analgesics and fly repellants and all the affected animals recovered fully in three weeks.

Introduction

Contagious Ecthyma also known as contagious pustular dermatitis, sore mouth, orf and scabby mouth is an economically important disease of sheep and goats caused by Orf virus (ORFV) belonging to genus *Parapox virus* of family *Poxviridae* (Mercer and Haig, 1999). The disease occurs worldwide and primarily affects young population less than one year age, producing papule like lesions initially which progress to vesicles, pustules and eventually form scabs on the skin of face. The lesions mostly develop externally on the commissures of the lips, muzzle and sometimes internally within the oral cavity. Other parts of the body such as the vulva, udder, under the tail and scrotal sac may also be involved in some rare cases. Affected lambs with lesions on mouth will have difficulty nursing, become weak and may die. Morbidity in susceptible lambs may reach up to 90% however the mortality was low (Li et al., 2012; Scott, 2015; Teshale and Alemayehu, 2018). Although, the disease is self limiting in nature but mortality can occur from secondary bacterial infection or failure to eat. The economic impact can be significant in some cases. Orf is a zoonotic infection and infected

humans may get ulcerative lesions or nodules particularly on their hands.

Case history and findings: On February 18, 2022, 03 lambs (Merino cross, 20- 25 days old) were presented to DIL, Nowshera, Srinagar, to ascertain the cause of morbidity and mortality in lambs belonging to sheep farmer from Shalbugh Ganderbal. Out of whole sheep flock with strength of 45 sheep, 04 lambs were affected including one dead lamb. The affected lambs showed severe oral lesions, mostly proliferative, forming varicose masses. The wart- like lesions were mainly seen on the gingival mucosa (Fig 1,4). The disease was suspected as orf and samples were collected for confirmation by Polymerase chain reaction (PCR).

Treatment: The affected animals were treated symptomatically with antibiotic (Fortified procaine penicillin), anti inflammatory drugs (Melonex) and some topical fly repellants (Lorexane cream). All the affected animals recovered uneventfully in three weeks.

Laboratory Confirmation: The oral tissue samples were collected from the lesions of affected animals suspected for Orf (Fig 2). The samples were processed at DIL SHD Nowshera. DNA was extracted using commercially

available DNA extraction kit (QIAamp DNA kit, QIAGEN, Germany). The extracted genomic DNA was used as template for PCR (Polymerase chain reaction) using Orf virus (ORFV) specific primers targeting B2L gene (Chan et al., 2007; Zhang et al., 2010; El-Tholoth et al., 2015; Selim et al., 2016; Inoshima et al., 2000). The PCR products generated were visualized under UV transilluminator which revealed the presence of 1206 bp amplicons (Fig 3), specific to Orf virus (ORFV) causing contagious ecthyma.



Fig 1. Cauliflower like proliferations in the oral mucosa



Fig 2. Collection of oral tissue samples

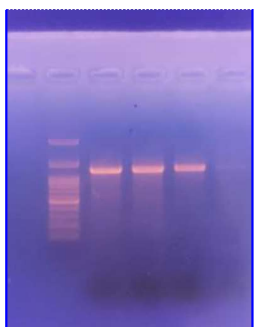


Fig 3. Lane 1-3 -1206 bp amplicon of B2L gene

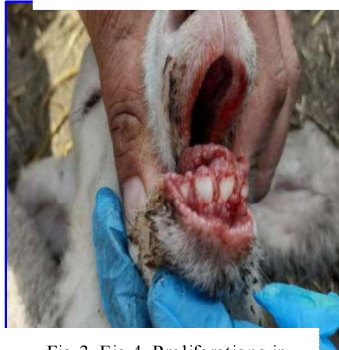


Fig 3. Fig 4. Proliferations in gingival mucosa

Discussion and conclusion: Contagious Ecthyma is a highly contagious viral disease of sheep producing cutaneous lesions. The lesions are mostly seen externally on lips and muzzle and sometimes within oral cavity also. However in some rare cases only oral lesions may be seen with no apparent cutaneous lesions. Sometimes papillomatous growths may also be seen. The disease is usually diagnosed from its

characteristic clinical picture but needs to be differentially diagnosed from bluetongue infection (which is a non-contagious, insect borne disease with respiratory symptoms and foot lesions as well), FMD if morbidity is high with clinical signs of salivation, lameness and fever, PPR, sheep pox, goat pox, papillomatosis, staphylococcal dermatitis and dermatophylosis. However, accurate diagnosis can be carried out by molecular techniques like PCR. In this study, orf in sheep was initially diagnosed based on the clinical symptoms. However, since these lesions were mostly seen within oral cavity especially on gingival mucosa with altogether no cutaneous lesions on lips or muzzle. Since this pattern of lesions is rarely seen, PCR was used for confirmatory diagnosis. Rapid and accurate differential diagnosis is therefore necessary, not only allowing adopting control measures for animals but also preventing zoonotic chances. Although generally accepted orf is endemic in Jammu and Kashmir, the exact extent of problem is unknown as it is not a notable disease. Hence there is little or no data available and recorded by veterinary authorities. Also in Jammu and Kashmir no surveillance programmes are running on ORFV. The disease is controlled by vaccination and live attenuated vaccines are available in India.

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Fetal maceration in a cow and its surgical management by laparohysterotomy

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Introduction

Fetal maceration in cows is marked by the death of the fetus, regression of the corpus luteum, and a failure to abort (Arthur *et al.*, 1989). The primary cause is often an infection, where bacteria invade the uterus after fetal death, leading to the decay and breakdown of soft tissues, while leaving the bones of the fetus behind (Long, 2003). In some rare cases, the disintegrated parts of the fetus and bones may remain in the uterus for extended periods, requiring surgical intervention for removal (Drost, 2007), as seen in this case. Fetal maceration has been documented in various animals, including cattle (Drost, 2007), sheep (Ate *et al.*, 2011), goats (Ahmed *et al.*, 2014), dogs (Serin and Parin, 2009) and mares (Burns and Card, 2000).

History and clinical examination

A six-year-old, eight-month pregnant crossbred Jersey cow was brought to the District Veterinary Hospital in Doda, Jammu and Kashmir, India presenting with a foul-smelling vaginal discharge and severe tenesmus for the past five days, with no signs of progress in labor. The local veterinarian had previously treated the cow with Cloprostenol, Dexamethasone, and Valethamate bromide to induce parturition. Upon vaginal

examination, a hard and partially dilated cervix was noted. Rectal examination revealed a thickened uterine wall, and a crepitating mass of fetal tissue. Based on these clinical findings, the case was diagnosed as fetal maceration, and due to the inadequate response to medical treatment, cesarean section was recommended to the owner.

Treatment

The cow was given intravenous fluid therapy (0.9% NS 1000 ml and 5 % DNS 2000 ml) and injection Ceftriaxone (10mg/kg body weight, IV) to stabilize her condition. An attempt was made to evacuate the uterus using prostaglandin (Inj: Pragma, 2 ml IM) and Valethamate (Inj: Epidosin 10ml IM). Efforts were also made to retrieve the fetal contents through the vagina. However, due to the size of the fetal bones and incomplete cervical dilation, the evacuation was unsuccessful. Consequently, it was decided upon to perform a laparohysterotomy via the left flank under local infiltration anesthesia. After the removal of the fetal bones and decomposed fetal hair (Fig. 1), the uterus was cleaned using normal saline and a diluted povidone iodine (5%) solution (Fig. 2). The uterus was then sutured with Cushing's sutures using chromic catgut no. 2 (Fig. 3), followed by the closure of the abdominal

incision by the standard routine method. Post-operative care included the infusion of fluids (0.9% NS 1000 ml and 5 % DNS 2000 ml, IV), anti-inflammatory medications (Meloxicam @ 0.2mg/kg body weight, IM), antihistamines (Chlorpheniramine maleate @1mg/kg body weight, IM), and parenteral antibiotics (Ceftriaxone @10mg/kg body weight, IV) for five days. The recovery was uneventful, and the skin sutures were removed 15 days after the operation (Fig. 4).



Fig. 1: Bones of macerated fetus



Fig. 2: Cleaned and washed uterus



Fig. 3: Sutured uterus



Fig. 4: Recovered cow after 15 days of operation

Discussion

Fetal maceration refers to the breakdown of a fetus that has died after the fetal bones have formed (usually after 4 months of pregnancy in cattle) and has not been expelled, even though the cervix is open (Purohit and Gaur, 2011). This condition is classified as a pregnancy pathology that arises from intra-uterine fetal death. It occurs when the fetus does not abort, leading to decomposition within the uterus while leaving the fetal bones intact. The fetal death and the failure to complete the abortion during the later stages of gestation, as noted by the client in this case, may have been caused by intrauterine

infections (Robinson et al., 2019). Diagnosis can be made based on the history, the presence of a bone fragment lodged in the cervix, rectal palpation, radiography and ultrasonography. Ultrasonography may show hyperechogenic scattered bones in either echogenic or non-echogenic fluid along with echogenic floating pus (Kumar and Purohit, 2009).

The animal should be examined per vaginum, and any bone fragments lodged in the vagina or cervix must be manually removed if the cervix is dilated. Infusing large amounts of normal saline into the uterus can help eliminate pus and bone pieces after 24 hours (Drost, 2007). If the cervix is not open, prostaglandins may be administered to regress the partially regressed corpus luteum and/or enhance uterine contractions (Purohit and Gaur, 2011). It is essential to use sufficient lubrication and to gently remove the bones. In this case, all these methods were unsuccessful, leading to the need for a laparohysterotomy. Laparohysterotomy to extract the macerated fetus is potentially risky and should be considered a last resort (Sood et al., 2009). The prognosis is generally poor. However, in this instance, the hysterotomy was successfully performed without complications. It was concluded that a macerated fetus can be removed through laparohysterotomy, and with adequate care, the clinical outcome can be favorable if there is no injury to the uterus or other tissues due to bony fragments.

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Non-surgical management of uterine torsion in Crossbred Holstein Friesian cow- a case report

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Reproductive,

Complication

Shaffer

Abstract: Torsion of uterus is a major reproductive complication in dairy cattle. Among cattle a higher incidence was observed in pluriparous cows when compared to heifers (Aubry et al. 2008) and even at higher frequency in Brown Swiss and Holstein Friesian breeds (Erteld et al. 2012). This condition occurs due to uterine instability resulting in improper extension of broad ligaments attached during advanced gestation (Lyons et al 2013). Expulsion of the fetus is impossible unless the condition is corrected, and circulatory disturbances can result in death of both the fetus and cow if a prompt diagnosis is not made (Frazer et al., 1996). If not treated in time it may lead to death of foetus, dam or both thereby leading to heavy losses for dairy farmers. Shaffer's method of de-torsion has been found to be highly successful in achieving de-torsion of uterus in fresh cases.

Case history and clinical findings

At the time of presentation, four-year-old CBHF cow in second parity was presented with signs of labour and intermittent colic for 3-4 hours from time of presentation. The animal had completed the gestation period and had past history of normal gestation and uncomplicated parturition. On general examination the animal was alert and standing with intermittent straining. Per vaginal examination of animal revealed post cervical left sided uterine torsion (anti-clock wise) of about 180 degree. Per rectal examination revealed stretching of broad ligaments and absence of oedema and adhesions. It was diagnosed as a recent case of uterine torsion having fully relaxed sacrosciatic ligaments and engorged udder.

Treatment

After analysing the stability of vitals, case was prepared for detorsion by Schaffer's rolling technique in which animal was restrained in left lateral recumbency and a wooden plank (70" long and 6" wide) was placed on the cow's flank region across the abdomen after palpating the uterus, with one end of the plank resting on the ground (Fig 1). With weight of an assistant around 60kgs on plank, cow was turned by pulling the legs tied by

ropes and rolled in anticlockwise direction. Subsequent per vaginal examination (Fig 2) revealed more than 50% correction. So in order to achieve complete detorsion, the cow was again restrained in left lateral recumbency and procedure was repeated. After two manoeuvres full correction of uterine torsion was achieved and cervix was approachable and was soft but not fully dilated. So in order to achieve cervical dilatation Inj. Valthamate Bromide (Inj Epidocin) 2 ml I.M. was administered and with every follow up P/V exam Injection was repeated after hourly interval. After four hours from detorsion the cervix was open and assisted delivery of live male foetus was achieved.

Discussion

Uterine torsion is predominantly a complication of first and second stage labor, therefore, the symptoms of torsion can be observed only in animals that are due for parturition. It has been observed that cases of torsion diagnosed early can be detorted and delivery of the foetus can be achieved but in delayed cases in which adhesions have developed detorsion cannot be achieved by this technique and caesarean section is the only recommended approach. The success of detorsion depends on degree of torsion (severity of case) and

duration of the case. This case report brings forward practice which can have promising results in successful management of uterine torsion in field conditions.

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Fig 1: Detorsion achieved by Schaffers method of detorsion

Fig 2: Accessing the detorsion achieved by per vaginal examination

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Antimicrobial Resistance in Livestock Sector: An Overview**Mudasir Amin Bader*¹**¹*Disease Investigation Officer (LDO) in Animal Husbandry Department Kashmir.***Corresponding author: mudasir1135@gmail.com***Article Info:****Article submitted:** 25 March 2025**Article accepted:** 01 April 2025**Article published:** 15 April 2025**Keywords:**Antimicrobial resistance,
Husbandry,
Bioactive peptides

Abstract: Antimicrobial resistance (AMR) has emerged as a pressing public health crisis, with the livestock sector's increasing reliance on antimicrobials exacerbating the issue. This review examines the pivotal role of antimicrobial drug use in driving resistance, shedding light on the underlying mechanisms and effective strategies to mitigate its spread. By exploring the current landscape and future directions, we can work towards a comprehensive approach to tackle this daunting challenge and safeguard global health. The use of antibiotics in food animals for therapeutic, prophylactic, metaphylactic, and growth promotion purposes is discussed, along with the risks of antibiotic residues and resistance. Strategies to prevent the insurgence and development of AMR include judicious antibiotic use, good husbandry practices, and the adoption of alternative approaches such as bioactive peptides and immunization programs. A comprehensive approach involving scientific research, legislative measures, and enforcement is necessary to mitigate the risks associated with AMR and ensure public health.

Introduction

Antimicrobial resistance (AMR) is when a microbe evolves to become more or fully resistant to antimicrobials which previously could treat it. It represents one of the most important human and animal health-threatening issues. Due to the enormous bacterial disease burden in India, it is being referred as 'the AMR capital of the World' (Chaudhry and Tomar, 2017).

The mechanisms responsible for both innate and acquired AMR have revealed that these traits are included in mobilizable genetic elements enabling the homogeneous diffusion of the AMR traits-pool between the ecosystems of diverse sectors, such as human medicine, veterinary segment, and the environmental sector (Palma et al., 2020). Thus, a coordinated multi-sectoral approach, such as One-Health, provides a detailed comprehensive picture of the AMR onset and diffusion.

Indications of antibiotic use in

Livestock: Since their breakthrough discovery, antibiotics held the promise of treating and controlling infectious diseases, leading to the massive rise of antibiotic usage in all applicative fields, including the common animal husbandry practices (Marston et al., 2016). Traditionally, veterinarians made use of antibiotics for the treatment of infectious diseases, but also in the design of prophylactic measures and as growth promoter factors (Shibergeld et al., 2008 and Economou et al., 2015).

Antibiotics are used in food animals for four purposes:

- Therapeutic:** To treat infectious diseases in the livestock and poultry.
- Prophylactic:** Prophylaxis is the administration of an antimicrobial to exposed healthy animals considered to be at risk but before expected onset of disease.
- Metaphylactic:** Metaphylaxis is a term used for certain mass-medication procedures 'med to treat sick animals while medicating

others in the group to prevent disease (WHO, 2003).

d) Growth Promotion: Antimicrobial agents in relatively low concentrations are used in food animals to promote growth and enhance feed efficiency (Kirsty et al., 2017).

Problems associated with antibiotic use:

Antibiotic residues and Antibiotic Resistance

An antibiotic residue is the presence of a chemical or its metabolites in animal tissue or food products. Consumption of antibiotic residues represents a potential threat to human health as it may trigger allergies, alter bacterial flora present in the human digestive tract and develop resistant strains of bacteria (Nagaraja et al., 1987).

Antibiotic resistance means that the bacteria survive and continue to multiply after administration of the antibiotic. Moreover, bacteria make use of their evolutionary machinery to adapt to the selective pressure exerted by antibiotic treatments, resulting in reduced efficacy of the therapeutic intervention against human and animal infections (Palma et al., 2020). Bacterial capability to face antimicrobial compounds is an ancient feature, enabling bacterial survival over time and the dynamic surrounding.

Mechanism of Antimicrobial Resistance: Mainly by a). Limiting uptake of a drug, b). Modifying a drug target, c). Inactivating a drug d). Active drug efflux. Genetic Antimicrobial Resistance can either be intrinsic (naturally occurring genes) or acquired.

Intrinsic resistance relates to the unique physiological properties of micro-organism in which their metabolic activity is substantially unaffected by the presence of an antimicrobial compound. Such resistances are generally chromosomally encoded and are typically responsible for resistance observed between genera, species and strains of bacteria. Intrinsic resistance can be

associated with differences in cell wall structures, the ability to pump antimicrobial compounds out of the bacterial cell using efflux pumps, or the production of enzymes capable of inactivating antimicrobial compounds within the bacterial cell (Russell, 2001; Gilbert and McBain, 2001).

Acquired resistance in which a previously sensitive bacterium becomes resistant, can arise as a result of a mutation in the genetic material or through the acquisition of one or more antimicrobial resistance genes as a result of horizontal gene transfer within and between bacterial species. These processes, which can occur in the environment (in vitro) or during infection (in vivo) and include the process of conjugation, transduction and transformation with the involvement of one or more defined genetic elements like bacteriophages, plasmids, conjugative transposons and integrons (Carattoli, 2001). The term 'resistome' has been coined recently to include all antimicrobial resistance encoding genes present in the environment that are potentially transferrable to pathogenic bacteria (D'Costa et al., 2006). Resistance genes that spread between bacteria reside on genetic elements such as plasmids, transposons or gene cassettes that are mobile themselves or can be mobilized.

Since various types of resistance genes can be located on the same genetic elements, horizontal spread of resistance can result in the recipient bacteria becoming resistant to several antimicrobials at the same time. Cross-resistance occurs when a single biochemical mechanism confers resistance to more than one member of a group of related antibiotics. Cross-resistance between various antibiotic classes can occur by two mechanisms i.e, overlapping targets and increased drug efflux action (Courvalin and TrieuCuot, 2001).

Co-selection is a term used when selection for one genetic trait leads to the selection for another genetic trait due to a genetic linkage between the two traits.

Preventing Insurgence and/or Development of AMR and Future Perspective: The global depiction of the antibiotic resistance is becoming alarming and the severity of this emergence is destined to worsen in the near future. Antibiotic resistance of animal origin has been proven to contribute to AMR in a significant manner and, in concert with human medicine and environment, actions need to be taken to face this overwhelming issue.

In the first instance, a judicious usage and management of the antibiotics is certainly helpful in delaying the phenomenon of antibiotics resistance. Only prescribe antibiotics that are needed. Targeting the medicine as soon as possible to the specific bacteria involved. Prescribing medicines for as long as needed and in recommended doses. Stop random use of antibiotics in animal/poultry industry.

Follow good husbandry practices and implement bio-security measures on farms, in abattoirs, during distribution and marketing of food, in food preparation and finally, by the consumer. Adhere to animal welfare standards including safe drinking water supply, good nutrition, clean air flow, proper waste management and avoid overcrowding.

Efforts for discovery of novel classes of antimicrobials and alternatives. Use of bioactive peptides, Nisin A, a naturally produced bacteriocin by lactic bacteria have shown promising results, since harmless for the mammalian species and rather efficient in the control of pathogenic specimens. (Tilocca, et al. 2020). Predatory bacteria might also represent a promising alternative to antimicrobials.

Besides the cautious use of antibiotics, the adoption of adequate prophylactic interventions such as immunization programs is warmly required.

Scientific research, appropriate legislative measures and enforcement are required to guarantee fair "behavior" and ensure public health. Competent surveillance of disease and antibiotic resistance as well as repeated refinement of risk analysis is required.

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Post-mortem examination of sheep and goats under field conditions: An overview

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necropsy, lesions, abnormalities,
sheep**Abstract:**

A post-mortem examination is a systematic and thorough inspection of an animal carcass to identify lesions or abnormalities leading to diagnosis of disease. This examination plays a vital role in supporting diagnostic procedures, particularly in investigating disease outbreaks. A standardized necropsy approach is employed to ensure consistency and thoroughness. The examination involves examination of all organs for changes in color, size, condition, congestion, hemorrhage, infection, and inflammation. Accurate and detailed record-keeping is essential for post-mortem examinations. The examination should be conducted in a safe and healthy environment, with proper disposal of carcasses. A thorough post-mortem examination, including sample collection and laboratory analysis, is essential to identify the cause of death and the presence of any lesions. The necropsy should be performed in a standardized and systematic way, rather than chasing lesions. By performing post-mortem examinations, veterinarians can gather firsthand information about disease progression and impact.

Introduction

A post-mortem examination is a systematic and thorough inspection of an animal carcass to identify lesions or abnormalities, playing a vital role in supporting diagnostic procedures, particularly in investigating disease outbreaks (Harwood, 2016; Nation, 2019; Pointon et al., 2018). By performing post-mortem examinations, veterinarians can gather firsthand information about disease progression and impact (Lear et al., 2024). Standardizing the post-mortem examination process is crucial, as inconsistencies in results can lead to inaccurate diagnoses. A systematic approach ensures relevant and accurate information is collected, enabling precise diagnoses and informing targeted treatment and management strategies (Nation, 2019). Various sheep diseases, including Polioencephalomalacia (CCN), Bluetongue, Caseous Lymphadenitis (CL),

Johne's Disease, Lamb Dysentery, Pasteurellosis, Enzootic Abortion (EAE), Toxoplasmosis, and Coccidiosis, can be diagnosed through post-mortem examination, highlighting the importance of thorough and systematic post-mortem examinations in animal health and disease diagnosis.

Basic Equipment Required for Post-mortem Examination

Using old, dull surgical instruments for post-mortem examinations is a misguided approach, as high-quality, sharp instruments are essential for efficient and effective examination, preventing tissue damage, artifacts, and inaccurate results (Cheville, 2009). When conducting a post-mortem examination, the selection of equipment depends on animal size, examiner preference, and examination location. Essential equipment includes cutting instruments, sample collection tools, and

protective gear, such as gloves and masks, to prevent contamination and ensure a safe working environment, minimizing the risk of exposure to infectious agents and preventing disease transmission (Harwood, 2016). The necessary equipment includes cutting instruments like scissors, hacksaws, and knives for dissecting tissues and accessing internal organs. Sample collection tools, such as disposable syringes, needles and glass slides, and sterile vials for fluid collection, are also necessary for collecting and preserving tissue samples (Anonymous. 2020).

Optimal Time and site for Post-mortem Examination and its disposal

A prompt post-mortem examination is crucial, as the breakdown of tissues and organs, known as autolysis, begins rapidly after death. This process can be accelerated by factors such as high temperatures, delays between death and examination, and the presence of certain pathogens like Clostridia. Additionally, the body condition of the animal, including excess fat or thick fur, can contribute to faster decomposition. As a result, certain tissues like the gut and pancreas, which contain high levels of enzymes, can deteriorate quickly, making it challenging to identify the underlying cause of death, particularly in cases of suspected bacterial infections (Griffiths. 2005). The selection of site for PM examination is crucial for maintaining a safe and healthy environment. The site should prevent water contamination, safeguard humans and animals from infectious diseases, minimize health hazards, and provide facilities for proper and sanitary disposal of carcasses. Two widely accepted methods for carcass disposal after post-mortem examination include incineration/burning, which reduces the carcass to ash, and burial.

Principle of Necropsy

To ensure consistency and thoroughness, a standardized necropsy approach is employed, involving a systematic examination, minimal disturbance of internal organs, reconstructable organ examination, and optimal specimen collection for ancillary tests, allowing for a comprehensive and repeatable evaluation. The

necropsy should be performed in a standardized and systematic way, rather chasing lesions, as it distracts from conducting a thorough examination (Nation, 2025). A thorough post-mortem examination, including sample collection and laboratory analysis, is essential to identify the cause of death and the presence of any lesions. Recording post-mortem examination data: Document all observed abnormalities or indications of disease to ensure a comprehensive understanding of the animal's condition. Accurate and detailed record-keeping is essential for post-mortem examinations, involving the collection and documentation of information before, during, and after the examination. This includes pre-examination records such as case identification details (brand/tag number; Fig. 1, date and time of death, and examination), owner's information (name, address, phone number), specimen details (species, breed, age, sex), clinical history (clinical signs, diagnosis, treatment), flock information (flock strength, demographics, disease spread), disease timeline (first cases, losses, treatment), examiner's details (name, qualification), descriptions of observed lesions and abnormalities, and photographic documentation of lesions, ensuring comprehensive and reliable post-mortem examination results.



Fig. 1. Identification of animal of carcass

External observation and Examination

Conduct a thorough external examination and document all observations, including the overall condition of the carcass,

such as any signs of distension, bloating (Fig. 2), or emaciation. Inspect all external orifices, including the mucous membranes, and note any signs of congestion, jaundice (Fig. 3), discharge, bleeding, or prolapse. Additionally, observe for any abnormal postures, such as torticollis or stargazing (Fig. 4), and record any changes in color or pallor of the mucous membranes (Fig. 5, 6 and 7), which could indicate anemia resulting from parasitism, haemorrhages, iron deficiency (Rather et al., 2025). Furthermore, examine the skin for parasitic infestation, pox lesions, pus and wounds, muzzle for erosions and skin, lips and commissures for lesions of BT, FMD, Orf etc is also important to arrive at conclusion.



Fig 2. Bloating carcass



Fig 3. Yellow sclera (Jaundice)



Fig 4. Stargazing



Fig 5. Pale conjunctiva

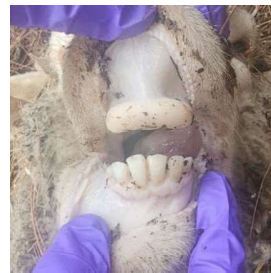


Fig 6. Pale buccalmucosa



Fig 7. Pale conjunctiva

Congenital abnormalities like *Atresia ani* and *perosomus elumbis* (Fig. 8) are frequently observed.

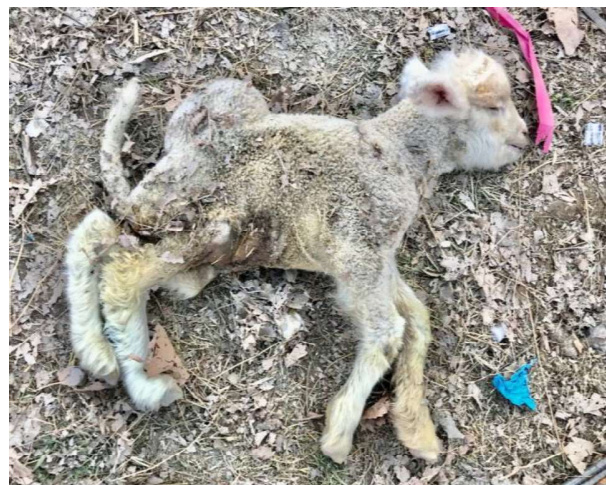


Fig 8. Perosomus elumbis

Malignant edema (Fig 9 and 11) gangrenous mastitis (Fig 10) and FMD (Fig 12) of varying severity are conditions wherein lesions can be seen externally.

Buccal cavity: To conduct a thorough post-mortem examination of the digestive system in

sheep and goats, begin by carefully inspecting the mouth cavity and tongue. Next, cut the



Fig 9 and 10. External gangrene and gangrenous mastitis



Fig 11. Malignant edema Fig 12. FMD

submandibular muscles and underlying structures, split the mandibles at the symphysis using a hacksaw, and free the tongue. Examine the palate, pharyngeal mucosa, and tonsillar tissues. In sheep and goats, post-mortem examinations have revealed various lesions in the buccal cavity, including ulcerative, necrotic lesions, erosions, and hemorrhages on the mucosa, dental pad, gums, tongue (Fig. 13 and 14), and hard palate. Similar oral lesions have been reported in several diseases, including Peste des Petits Ruminants (PPR) (Parida et al., 2015), bluetongue (Backx et al., 2007; Darpel et al., 2007; Elbers et al., 2007; Williamson et al., 2008; Bashir and Rather, 2024), foot-and-mouth disease (FMD) (Kitching et al., 2002), idiopathic oral ulceration, insect/snake bites, photosensitization, and contagious pustular dermatitis (orf) (Watson, 2004).



Fig 13 and 14. Ulcers on tongue in FMD

The characteristics of these lesions vary by disease. For example, PPR is often accompanied by emaciation, conjunctivitis, stomatitis, intestinal congestion, and hemorrhagic streaks in other organs (Parida et al., 2015). In FMD, oral lesions include blister-like sores that can erode and form ulcers, often with concurrent foot lesions (Kitching et al., 2002). Bluetongue is characterized by oral lesions, including erosions and ulcers on the dental pad and lips, and occasionally a cyanotic tongue (Backx et al., 2007). Orf (Fig. 15) typically presents with small papules, vesicles, pustules, and cauliflower-like growths around the mouth, gums, lips, and commissures (Watson, 2004).



Fig. 15 Cauliflower like growth in Orf

Internal examination: After the external examination is complete, the animal should be opened. Animal positioning is the preference of the post mortem conducting authority. The

authors prefer the animal to be in left lateral recumbency. Right fore- and hind-limbs are lifted and incisions are made to reflect these limbs. The skin along the midline is incised and subcutaneous tissues are observed for any pathological change like congestion, color, edema of subcutaneous tissues (Fig. 16). Pre-scapular and pre-crural lymph nodes are examined for any changes. Muscles of the abdomen are incised in inverted L shape with horizontal line being along the transverse processes of the lumbar vertebrae and ventral line being along the border of last rib. This prevents the leakage of the peritoneal contents, if any. Incision along ventral border may be made to expose the abdominal organs. Once the abdominal wall is removed, position of abdominal organs may be noticed especially of the intestines to observe any intussusceptions or torsion cases. After that the thoracic cavity is opened starting at costochondral junctions and along attachment of ribs with thoracic vertebrae (Fig. 17). Incision should be extended along the neck till base of mandible base. The trachea and esophagus must be incised in the neck region. Respiratory tract viz lungs, trachea along with the heart must be pulled from the thoracic cavity and examined separately.



Fig. 16: Fully opened carcass

Gastro-intestinal tract: Gastro-intestinal tract may be removed from the abdominal cavity and spread to visualize the whole tract (Fig. 18).



Fig. 17: Edematous, haemorrhagic subcutaneous tissues in ventral neck and brisket region (Pasteurellosis)

Esophagus must be examined for presence of any lesions especially when the animal is suspected to have died from bloat. In case of bloat, bloat line is seen at the junction of cervical and thoracic part of the esophagus. Sheep and goats can exhibit various post-mortem lesions in the esophagus, including ulcerative or erosive lesions, caseous changes, and megaesophagus. These lesions can be associated with diseases such as Peste des Petits Ruminants (PPR), Foot-and-Mouth Disease, Orf, and Pasteurellosis. Additionally, conditions like oesophagitis, megaesophagus (Nascimento et al., 2016) secondary to extraluminal stenosis, and coenurosis (Ioannidou et al., 2005) can also cause esophageal lesions. These lesions can manifest as pale and friable mucosa, dilated esophagus, or segmental necrosis, and can be accompanied by other oral and gastrointestinal lesions.

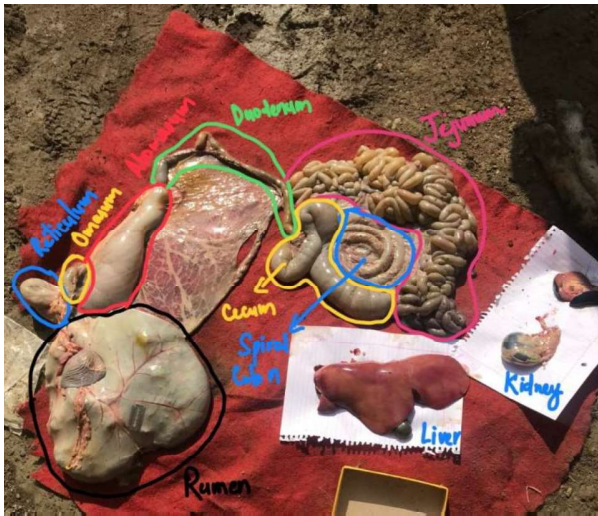


Fig. 18: Abdominal organs removed and spread to observe all parts in detail

Rumen: Sheep and goats can develop various rumen lesions, including rumenitis, erosion, ulcers, and nodular formations, often due to foreign bodies, dietary imbalances leading to acidosis, or infections (Hailat, et al., 1998). Acidosis, typically caused by high-grain diets or rapid dietary changes, can lead to rumenitis (Fig 19), erosion, ulceration, loss of papillae, fungal infections and phytobezoars formation in rumen (Fig 20). Additionally, paramphistomes (Fig 21) are also observed in rumen. Sheep pox lesions may be observed in internal organs including rumen wall (Fig 22).



Fig 19 and 20: Rumenitis and phytobezoars formation in rumen

One of the conditions that seems specific to Kashmir is feeding of salt boluses to livestock instead of regular supplementation. This leads



Fig. 21, 22: Paramphistomes and sheep pox lesions in rumen

to salt toxicity and abomasal congestion (Fig 22).



Fig. 23: Severe abomasitis with ecchymosis in due to salt bolus feeding

Post-mortem lesions in the abomasum can include thickening of mucosal folds, petechial hemorrhages, nodule development,

ulceration, and hemorrhage. These lesions can be caused by various factors, including



Fig. 24: Brown colored digested blood in abomasum due to Haemonchosis

parasitic infections (e.g., *Haemonchus contortus* Fig. 24, *Trichostrongylus axei*), bacterial infections (e.g., *Clostridium perfringens*, *C. septicum* Fig. 25, *Salmonella*), and other diseases (e.g., heartwater, PPR,



Fig. 25 Edemaous, congested abomasum in Braxy

theileriosis). Dietary issues, such as overload of the rumen and abomasum with concentrate or nutrient deficiencies, can also contribute to abomasal lesions. The intestines are pulled to examine all the parts of small as well as large intestine. Mesenteric lymph nodes are examined for size and any pathology if present. Intestine especially ceacum, ileum and jejunum is examined for any lesions or parasites (Fig 26, 27). Rumen is opened in the end to prevent spillage and contamination. All the contents are removed and examined for presence of any foreign body, parasites, ulcers etc. Metacystode stages of *Taenia* spp are a common finding on PM examination.

The post-mortem lesions observed by the authors in the intestines of sheep and goats include metacystode stages of *Taenia* species, hemorrhages, congestion, hyperemia, and lesions characteristic of Johne's Disease (JD).



Fig. 26: Congestion of intestines

Liver:

Externally, the rounded edges of the liver may reveal inflammation of the liver, which can be indicative of hepatitis or other liver diseases. The postmortem lesions observed in the liver are varied and indicative of underlying



Fig. 27: Corrugations in intestine

pathological conditions. Changes in color, congestion, and hemorrhage are common findings mainly due to Fasciolosis (Fig 28, 29). Parasitic cysts are also commonly observed on PM examination (Fig. 30). Cirrhosis (Fig. 31) is characterized by a nodular surface, fibrous bands surrounding the nodules, and a firm texture, with the liver size being either shrunk or enlarged. Abscesses are marked by pus-filled cavities on the liver surface or within the parenchyma (Fig. 32), with surrounding tissue potentially inflamed or necrotic. In some cases, parasites such as *Fasciola* spp. (Sofi et al., 2020) and *Dicrocoelium dendriticum* (Fig) may be found in the liver parenchyma and gallbladder. Postmortem liver lesions exhibit

various characteristics and possible causes. Congestion and hemorrhage appear as dark red or purple discoloration with a soft and swollen texture, often resulting from trauma, infection, liver disease, or Fasciolosis. Cirrhosis is marked by a nodular surface, fibrous bands, firm texture, and a shrunk or enlarged liver, typically due to chronic liver disease, alcoholism, or hepatitis. Fatty liver is characterized by a pale yellow or creamy color and soft, fragile texture, often linked to fatty acid metabolism disorders, obesity, or diabetes. Abscesses present as pus-filled cavities with inflamed or necrotic surrounding tissue, usually caused by bacterial or parasitic infections. Hydatid cysts are well-defined, fluid-filled cysts with thick walls, resulting from Echinococcosis parasitic infection. Fasciolosis shows characteristic migratory tracts with liver parenchyma and gallbladder involvement due to *Fasciola* spp. parasitic infection. Inflammation can cause rounded edges of the liver, often associated with hepatitis or other liver diseases.



Fig. 28: Haemorrhagic liver due to acute fasciolosis



Fig. 29: Fasciola affected liver



Fig. 30: Liver with metacestodes of E. granulosus.



Fig. 31: Cirrhotic liver



Fig. 32: Multiple abscess in liver

Peritoneum: Post-mortem lesions in the peritoneal cavity of sheep and goats can include signs of infection, inflammation, and fluid accumulation, such as peritonitis, abscesses, and ascites, which can be caused by various diseases like PPR, salmonellosis, and traumatic injury (Figs. 33, 34, 35)



Fig. 33: *Taenia metacestode* on mesentery



Fig. 34: *Taenia metacestode* with single scolex



Fig. 35: Severe peritonitis in sheep

Thoracic cavity: use rib cutters to cut along the ventral and dorsal aspects of the rib cage, revealing the thoracic contents (Fig. 36).



Fig. 36: Ribs reflected to reveal thoracic contents

Cardiovascular system: During a post-mortem examination of sheep suspected of having Clostridial enterotoxemia, careful attention should be paid to the pericardial sac, as an increase in pericardial fluid is a consistent feature of the disease. The epi-, myo-, and endocardium should be thoroughly inspected for any pathological changes (Fig. 37, 38, 40), and the valves examined for signs of vegetative endocarditis. The outer surfaces of the pericardial sac should be evaluated for thickness, transparency, color, consistency, and the amount of pericardial fluid and fibrin present (Fig. 39, 41, 42). Additionally, the auricles and ventricles should be opened to assess the patency of the valves and check for hemorrhages, degenerations, or fibrosis on the endocardium.



Fig. 37: Pustules in myocardium (sequelae to Navel ill)



Fig. 38: Haemorrhages on endocardium



Fig. 39: Suppurative pericarditis



Fig. 40: White necrotic patches in liver (Tigroid heart) in FMD

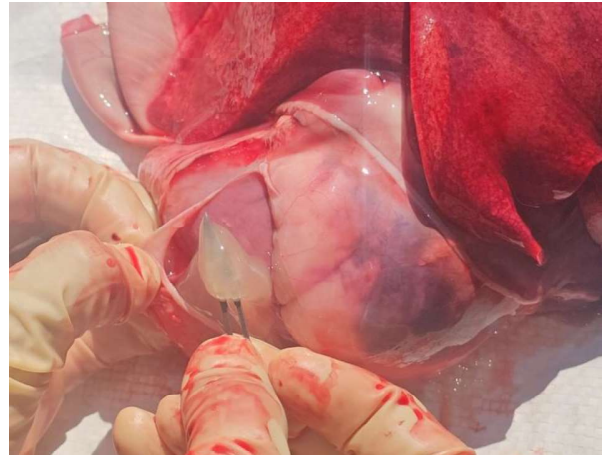


Fig. 41: Excessive protein rich pericardial fluid that clotted on exposure suggestive of Enterotoxemia



Fig. 42: Pustules on epicardium (sequelae to navel ill)

Respiratory system:

Trachea: Open and examine for hemorrhages, congestion (Fig), fluid, froth (Fig), foreign bodies, worms (Fig. 43), and broken cartilage rings.



Fig. 43: Congested trachea with pinpoint haemorrhages

Lung: A range of lung pathologies in sheep and goats, including lungworms (Fig), various types of pneumonia (broncho-, interstitial-, fibrinopurulent (Fig. 44), and verminous pneumonia), and cysts of *Echinococcus granulosus* (Fig. 48) can be observed on PM examination. Other findings included lesions from aberrant larval migration, sheep pox lesions (Fig. 45) hepatization (Fig. 46), and potentially other conditions such as pulmonary abscesses, and ovine pulmonary adenocarcinoma (Fig 47), highlighting the diversity of lung abnormalities that can affect small ruminants. Lungworms are commonly found in animals not dewormed properly (Fig. 49).



Fig. 44: Fibrinopurulent pneumonia in sheep



Fig. 45: Sheep pox lesions (gun shot lesions) in lung

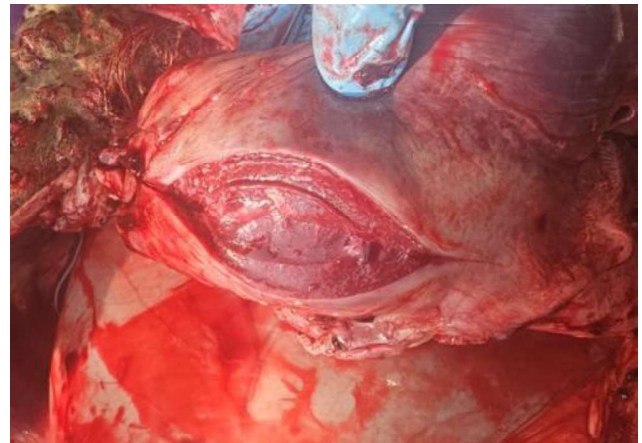


Fig. 46: Hepatization of lung



Fig. 47: Enlarged lung (A,B) and cardiac lymph node (C) in Ovine Pulmonary adenocarcinoma

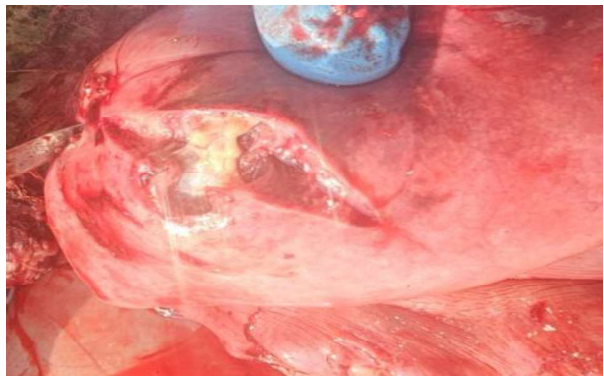


Fig. 48: Echinococcus cyst in lung with pus formation



Fig 49: Threadlike Lunworms in lungs

Urinogenatal system: To examine the kidneys, they should be removed from their attachments, cut in half longitudinally, and inspected for hemorrhages, necrosis, infarcts, mineralization and pus (Fig. 50). During post-mortem examination, the kidneys and urinary bladder showed various changes, including color changes (Fig 51, 52), congestion, abscesses (Fig. 50), infarcts, and uroliths (Fig. 53). The genital system was also inspected for signs of inflammation, pregnancy, metritis, and handling-related injuries.



Fig. 50: Pustules in kidney (sequelae to navel ill)

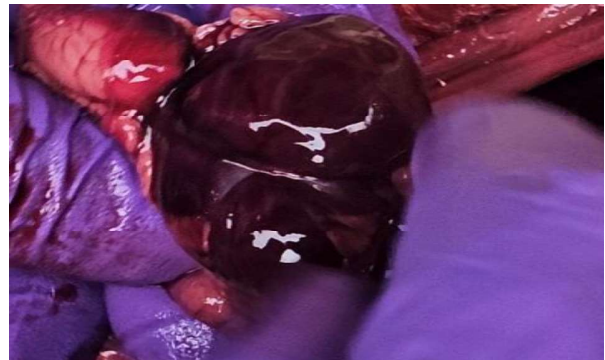


Fig. 51: Severely haemorrhagic kidney in still born lamb due to Brucellosis



Fig. 52: Gun-metal kidneys due to Cu poisoning

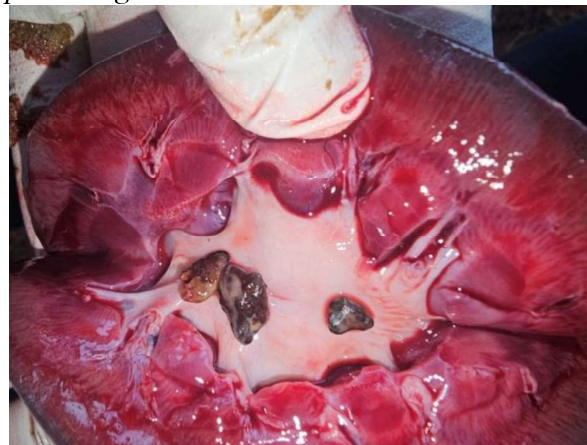


Fig. 53: Uroliths in kidney

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