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Research Article

Pathology and Management of Acute Immature Fasciola Infestation in Sheep and Goats in Western Maharashtra

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Abstract

Total 204 cases of acute fasciola i.e., immature fasciola were presented for diagnostic post-mortem at Omega Laboratories, Lonand, Maharashtra. Out of 204 case 122 cases were of sheep and 82 were of goats. Higher incidence of fasciola infestations were noticed in month of May. Sudden death in these sheep and goats were noticed due to severe internal bleeding. This internal bleeding was observed due to rupture of liver and rupture of lungs. All the 204 animals showed involvement of lungs which is considered as rare in other countries. Specific treatment with Ivermectin + Clorsulone (Neomec SXTM) and supportive treatment with HemokrutR and TransferrinTM were found to be beneficial for the complete recovery from the disease. Avoiding grazing around the stagnated water, where the population of snails is higher is the crucial step to prevent re-infestation and infestation of fasciola in sheep and goats.

Keywords: Immature Fasciola; Sheep and Goats; Maharashtra; Month of May; Neomec Sx™; Hemokrut® Transferrin™

Introduction

Heavy mortality due to acute fasciola is noticed in free grazing small ruminants. This mortality leads to heavy economic losses of the shepherds. In the summer season, there is a scarcity of feeding and grazing areas, shepherds are having very few resources to feed their animals. A small quantity of green grass is available around the bank of rivers, but many times in the late winter season and summer season population of snails was found more prominent around these rivers, stagnated water ponds, and lakes [15]. To get water and feed at one place shepherds preferred these places for grazing their animals, at the same time they may be unaware about the role of the intermediate host i.e., snails [14] in transmitting the fasciola infestation to their animals. A proper specific treatment with suitable anthelmintic and required supportive treatment will be much more helpful to stop the mortality due to acute fasciola in sheep and goats.

Materials and Methods

During the last one-year total 204 cases of immature fasciola in sheep and goats were presented for post-mortem examination at Omega Laboratories, Lonand Maharashtra. These cases were from 6 districts viz. Satara, Pune, Solapur, Sangli, Ahmednagar, and Kolhapur. Out of 204 cases, 122 cases were from sheep and 82 cases were from goats. All these flocks were of free-range types i.e. they were fed anywhere and drink the water anywhere in their free range grazing areas. The flock sizes of sheep ranged between 80 to 300 per flock whereas size of goat flock was between 40 to 100 goats per flock. After presenting the carcass to Laboratory, detailed post-mortem examinations were carried out and tissues were collected for histopathology examination in 10% neutral buffered formalin. After fixation of tissues in 10% Neutral buffered formalin, tissues were processed for microscopic examination by paraffin embedding technique [1] and 5-micron thick sections were stained with H and E stain [2]. Stained slides were observed under a microscope and relevant microphotographs were snapped by using an Olympus microscope and Magnus microphotography attachment. No statistical model was applied in the present study for data evaluation.

Life cycle

Life cycle of Fasciola hepatica included shedding of eggs through faecal material, followed by the development of encapsulated miracidium. This encapsulated miracidium are engulfed by intermediate host snails mainly of Lymnaea spp. After the development of miracidium, miracidium larvae are developed followed by sporocyst larvae, then radia larvae formed and metacercaria larvae sheded by snails on the leaf of grasses. Sheep and goats eat this grass infected with cercaria and once these cercaria enters the host digestive tract they get converted into metaceracaria. From metacercaria L1 stage, L2 stage, and L3 stages of immature fasciola hepatica flukes are developed and these immature stages penetrated through liver parenchyma and some of them will reach to lungs as an accidental parasite through a major vein.

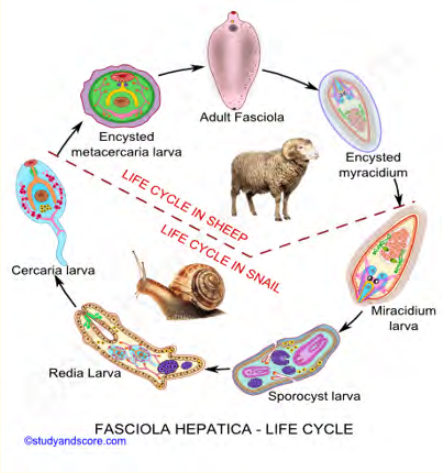


Figure 1: Curtsy - studyandscore.com.

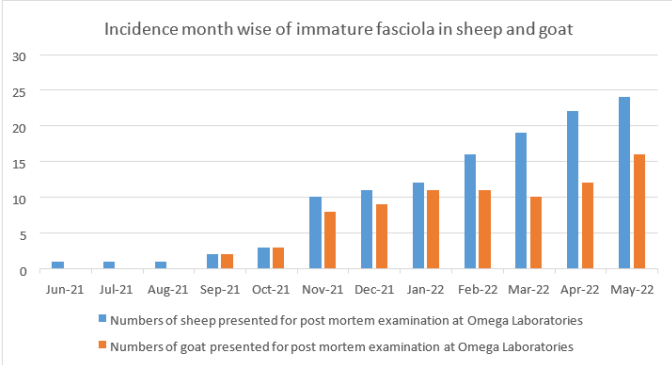
Results and Discussion

Total numbers of cases affected by immature fasciola were 204, amongst that sheep were 122 and goats were 82. The highest incidences of fasciola were in the month of May 2022 the details are given in table no 1 and its graphical representation is given in graph no 1. Similar observations of higher incidence of acute fasciola hepatica in summer seasons in sheep and goat were mentioned by some workers [3].

- **Epidemiology of grazing conditions**" In the late winter season free flowing rivers, fountains, small lakes, water channels, etc. become stagnated and get dried. Only a small quantity of stagnated water remains there. Sheep, goats, and free-range grazing animals don't have other water source for drinking. Small green grass remained there around these stagnated water resources. The snail population is too high around these areas, which acts as an intermediate host for the fasciola infections in sheep and goats. Similar observations were recorded by various scientists [4,5] and [6]

Month and year	Number of sheep presented for post-mortem examination at Omega Laboratories	Number of goats presented for post-mortem examination at Omega Laboratories	Total
June 2021	01	0	01
July 2021	01	0	01
August 2021	01	0	01
September 2021	02	02	04
October 2021	03	03	06
November 2021	10	08	18
December 2021	11	09	20
January 2022	12	11	23
February 2022	16	11	27
March 2022	19	10	29
April 2022	22	12	34
May 2022	24	16	40
Total	122	82	204

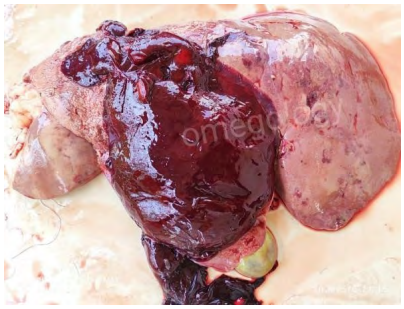
Table 1: Numbers of cases.



Graph 1: Month wise Incidences of Immature fasciola in sheep and goat.

- **Clinical signs:** All the animals that were dead showed sudden death within 2-3 hours of showing illness. The clinical signs includes sudden stopping of grazing, shivering, colic, kicking at the belly, bellowing, respiratory distress, some animals showed bleeding through the nose and through saliva and followed by collapsing lateral recumbence and death.
- **Postmortem examination**: post-mortem examination revealed pale mucous membranes and pale subcutaneous tissues, hemothorax due to rupture of the lung, similar observations were noticed by some workers [7], hemoperitoneum due to rupture of the liver, both the cavities were filled with blood clots and free fluid containing blood. Various sizes of hematomas in liver parenchyma were noticed. Many foci of perforations, fibrosis, and necrosis were evident, and similar observations were noticed by some of the scientists [8-10] and [16]. In all the cases large numbers of live larvae of fasciola were recovered especially at the tip of lesions from lung and liver tissues. Mild to moderate yellow discoloration of livers were noticed in some of the cases. The gross findings are mentioned in table 2.
- **Histopathology**: Histopathology of the liver revealed, multifocal necrosis, fibrous connective tissue proliferations, diffuse leucocytic infiltration, hematomas, hemorrhages, replacement of liver parenchyma by mature and newly formed fibrous connective tissues. Lung tissues showed fibrous capsules, hematomas, emphysema, and compressions of alveoli adjacent to fibrous nodules and larvae in the middle of nodules. Diffuse infiltration of connective tissues, hemorrhages and leucocytes, macrophages around the larvae, and damaged tissues. [11,12] and [16].
- **Treatment:** All the flocks presented for diagnosis were prescribed with Ivermectin + clorsulone subcutaneous route 1.5 ml as a single dose (Inj. Neomec SX™, Intas Pharmaceuticals), Hemokrut® 20 ml twice a day for 10 days – liver tonics with silymarin (Health tonic by Omegologist Pvt. Ltd), Transferrin™ 10 gram twice a day for 10 days (A potent hematinics by Omegologist Pvt. Ltd) along with Vit.K and Tranexamic acid to stop the bleeding; similar types of treatment was suggested by many workers [13] All the shepherds were suggested to change the grazing and feeding places and avoid grazing around the stagnated water ponds. After 10 days of specific and supportive treatment mortality in flocks were stopped.

Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae



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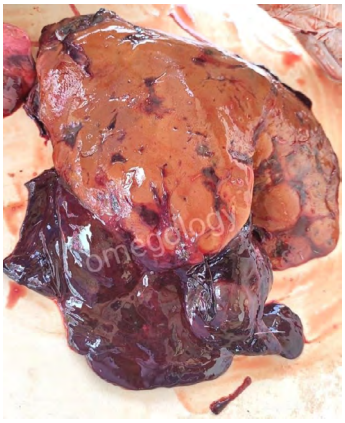
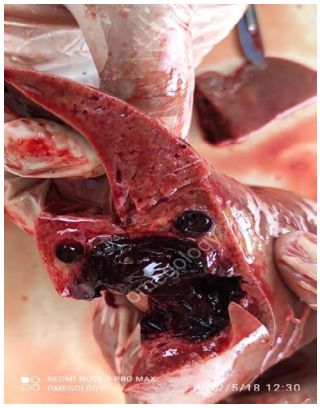
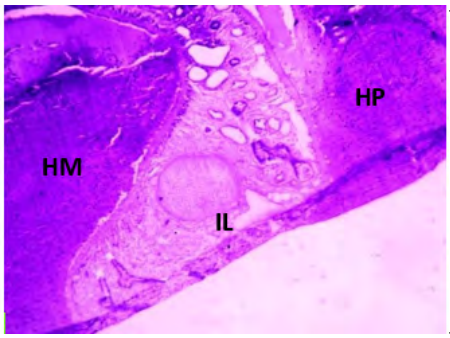
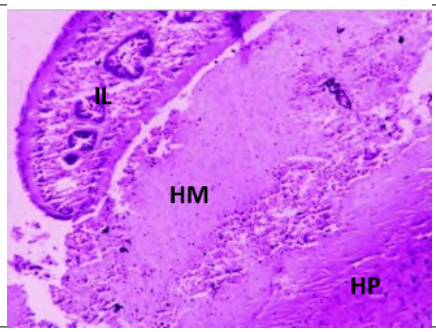
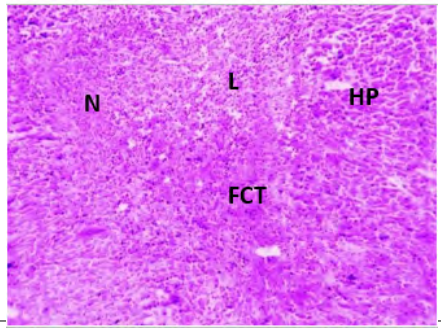
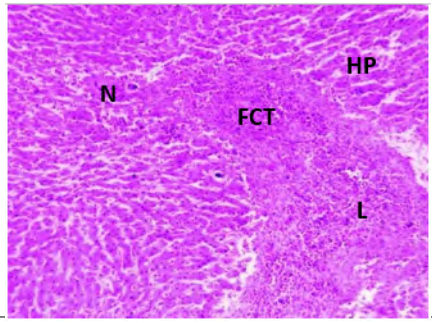
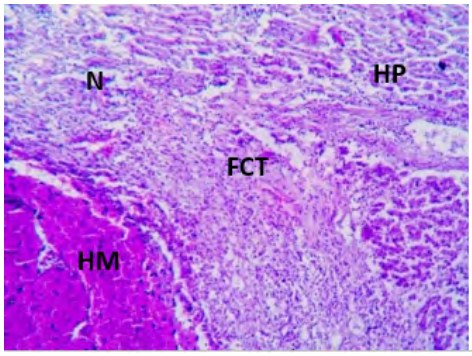
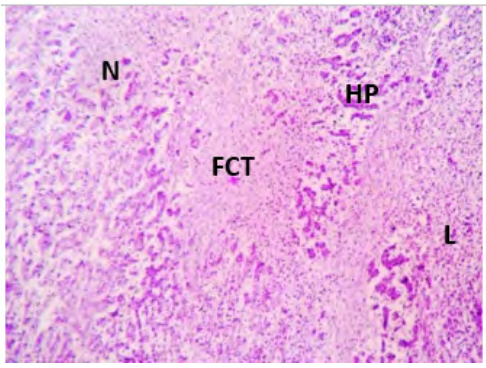




Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae	Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae
	
Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae (IL)	Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae (IL)
	
Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae (IL)	Photograph showing traumatic hepatitis, hematomas and ruptured liver due to migratory immature fasciola larvae (IL)
	
Photograph showing nodules formations and hematomas in lung tissues	Photograph showing nodules formations, hematomas in lung tissues and immature larvae in nodules (IL)

Table 2: Gross pathology of immature Fasciola hepatica in liver and lung.

	
Photograph of liver showing Immature Larvae (IL), Hemorrhages and hematomas (HM) and damaged hepatocytes (HP), H& E stain 40 X	Photograph of liver showing Immature Larvae (IL), Hemorrhages and hematomas (HM) and damaged hepatocytes (HP), H& E stain 100 X
	
Photograph of liver showing necrosis (N), fibrous connective tissue proliferations (FCT) and damaged hepatocytes (HP) and leucocytic infiltration (L) H& E stain 100 X	Photograph of liver showing necrosis (N), fibrous connective tissue proliferations (FCT) and damaged hepatocytes (HP) and leucocytic infiltration (L) H& E stain 100 X
	
Photograph of liver showing necrosis (N), fibrous connective tissue proliferations (FCT), Hematoma and hemorrhages (HM) and damaged hepatocytes (HP) and leucocytic infiltration (L) H&E stain 100 X	Photograph of liver showing necrosis (N), severe fibrous connective tissue proliferations (FCT) and damaged hepatocytes (HP) and leucocytic infiltration (L) H&E stain 100 X

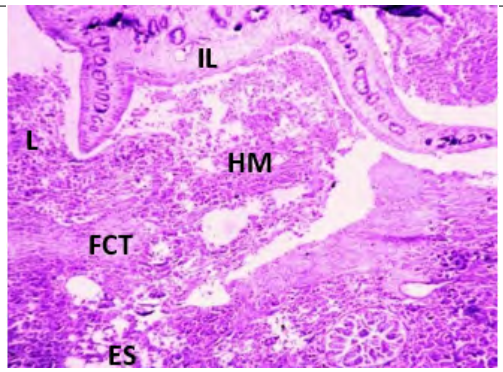
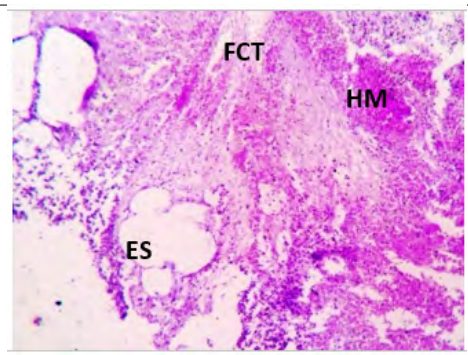
	
Photograph of lung showing immature larva (IL), Hemorrhages (HM), Fibrous connective tissue proliferations (FCT), Leucocytic infiltration (L) and emphysema of alveoli (ES) H and E stain 40X	Photograph of lung showing Hemorrhages (HM), Fibrous connective tissue proliferations (FCT) and emphysema of alveoli (ES) H and E stain 40X

Table 3: Histopathology of organs.

Conclusions

late winter season and summer season are very crucial for the shepherds with respect to Fasciola hepatica infestations for sheep and goats. Proper care is to be taken during this period of the year. Accidental entry of fasciola hepatica larvae in lung tissues is very common in the state of Maharashtra though it may be rare in other countries. Death due to acute fasciola was noticed in sheep and goats due to extensive damage to liver and lungs tissues which leads to sudden internal bleeding and hypovolemic and traumatic shock. Specific and supportive treatment will be beneficial to the animals for proper and desirable recovery from the disease.

Interest of Conflict

No.

Funding

No.

Acknowledgment

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