

TRAUMATIC RETICULO-PERICARDITIS (TRP) IN SHEEP: A REPORT OF 4 CASES IN A HERD

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Summary: Traumatic reticulo-pericarditis (TRP) was diagnosed in four sheep (one ram and three ewes) during postmortem examination. Gross pathology revealed the penetration of a large needle and three electrical wires through reticular wall into the pericardial sacs, regional artery and myocardium. The prominent findings in the ram were acute cardiac tamponade and hemothorax, whereas pyothorax, enlargement and thickening of the pericardium and peritonitis were the prominent findings in ewes. Disseminated abscesses in spleens, lungs, and livers were also found. During microscopic analysis, fibrosis and inflammation with neutrophilic and lymphocytic infiltrate were observed in the pericardium, epicardium and myocardium. *Arcanobacterium pyogenes* was isolated from fibrinopurulent exudates and disseminated abscesses of the affected organs.

Key words: traumatic reticuloperitonitis-pericarditis; sheep; cardiac tamponade; hemothorax; pyothorax

Introduction

The occurrence of Traumatic reticuloperitonitis-pericarditis (TRP) can be expected in ruminants (1, 2, 3, 4). TRP occurs after penetration of the reticular wall, diaphragm, pericardial sac, and myocardium by sharp metal objects (2, 3, 5, 6). While TRP has been frequently reported in the mature dairy cattle, it occasionally occurs in beef cattle and rarely in sheep and goats (4, 7, 8). Although, many veterinarians assume that the occurrence of Traumatic reticulo-pericarditis is rare in small ruminants, we describe four occurrences in a sheep herd in the present report.

Case history

Within a six-month period, four sheep from one herd including one ram (case 1) and three ewes (cases 2, 3 and 4) died and were referred to the Department of Pathology of Faculty of Veterinary Medicine, University of Tehran, Iran for necropsy. The herd

consisted of 350 Moghan ecotype sheep including 210 ewes, 105 lambs, and 35 rams. This sheep ecotype is raised for milk, meat and wool production in Iran. The farm from where the herd originate is situated in the suburb of Tehran, Iran. The herd grazed in a pasture and had access to the salt mixtures ad libitum. They had access to the water from a nearby stream. All sheep were maintained on the pasture during the day and housed at night. The sheep were routinely dewormed with albendazole and vaccinated against brucellosis, anthrax, sheep pox, and FMD based on the program instructed by Iranian Veterinary Organization. The history of the cases according to the owner declaration was as follows:

Case 1: A four-year-old ram, weighing 50 kg, with a history of four days of anorexia, reluctance to move and rise, coughing, decreased fecal production with severe abdominal distention and finally a sudden death.

Case 2: A five-year-old, non-pregnant ewe, weighing 35 kg, with a fifteen-day history of anorexia, losing weight and weakness, arch back, respiratory discomfort, reluctance to move and mild abdominal distention.

Case 3: A three-year-old, non-pregnant ewe, weighing of 25 kg, with six days history of anorexia,

losing weight and weakness, bruxism and reluctance to move.

Case 4: A four-year-old ewe, weighing 30 kg, showing symptoms of anorexia, losing weight and weakness, reluctance to move, respiratory discomfort, and frequently putting its left forelimb on the crib, during nine days after lambing.

Results

Necropsy findings

Case 1: The exploration of the ruminal and abomasal contents revealed accumulated phytobezoars. Locally extensive fibrinous adhesions between the reticulum and diaphragm were found. The ram had a large needle (9 cm) that penetrated through the reticular wall into the pericardium, regional arteries and left ventricle causing pericarditis, myocarditis, acute cardiac tamponade, and simultaneous hemothorax (Figures 1 and 2).

Case 2: The Gross pathology revealed the penetration of an electrical wire (7 cm) from the reticular wall into the pericardial sac. In the thoracic cavity, a large quantity (300 ml) of turbid, foul-smelling fluid containing clots of fibrin were observed (Figure 3). The pericardial sac was greatly thickened and fused to the pericardium by a fibrinous connective tissue. The reticulum, diaphragm and peritoneum contained numerous fibrous adhesions. Disseminated abscesses in the spleen, lungs, and liver were also seen.

Case 3: There were four electrical wires (2.5, 3, 4.5, and 6 cm) in the ruminal contents. Signs of a wire perforation into the cranioventral aspect of the reticulum were observed. The perforation site was surrounded by inflammation and hemorrhages (Figure 4). The pericardial sac was enlarged and discolored by the fibrinopurulent exudate. Local fibrinous peritonitis and disseminated abscesses in the spleen, lungs, and liver were also evident.

Case 4: Two electrical wires (3 and 5.5 cm) were found in the rumen and one (6.5 cm) was embedded in the reticular wall and penetrated into the pericardial sac. The pericardial sac was notably thickened and fused to the pericardium by a fibrinous connective tissue (Figure 5). The thoracic cavity was filled by 250 ml of the foul-smelling, dirty yellowish fluid. There were small adhesions between the serosal surface of the abomasum and parietal peritoneum. Like previous cases, disseminated abscesses in the spleen, lungs, and liver were also observed.

Histopathological examination

Similar findings were found in all four cases, except for the identification of the *sarcocystis* oocysts in case 2. They included fibrosis and inflammation with neutrophilic and lymphocytic infiltrate in the pericardium, epicardium and myocardium as well as pulmonary edema and congestion. Microscopic observations of the livers and lungs revealed variable sized abscesses surrounded by proliferating fibroblasts and connective tissue.

Bacteriological culture

Arcanobacterium pyogenes was isolated from the fibrinopurulent exudates of the thoracic cavities and disseminated abscesses of spleens, lungs, and livers.

Diagnosis

These findings strongly support the diagnosis of TRP. Accordingly, death most likely occurred due to acute cardiac tamponade in the ram and due to chronic heart failure (CHF), pleuritis and peritonitis in the ewes.

Pasture investigations

In an attempt to identify the cause of the disease, we investigated the pasture. The presence of several factories close to the pasture which are producing different types of medical and industrial instru-

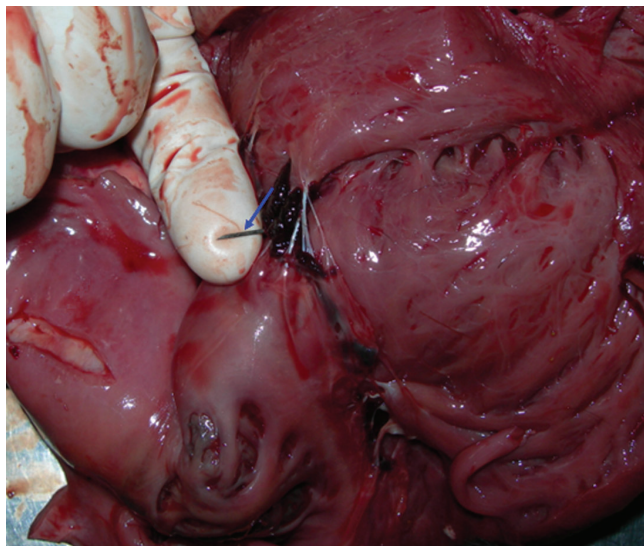


Figure 1: Sharp needle penetrating through the myocardium of the left ventricle (arrows)

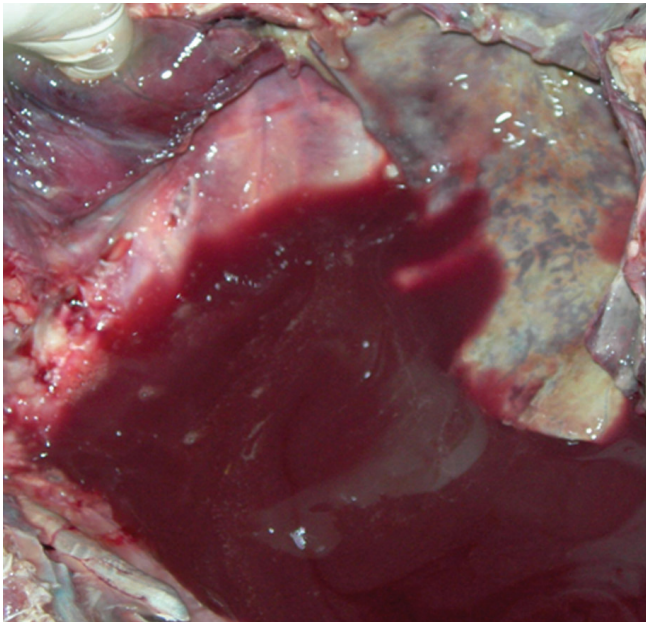


Figure 2: Thoracic cavity filled with blood (hemothorax)

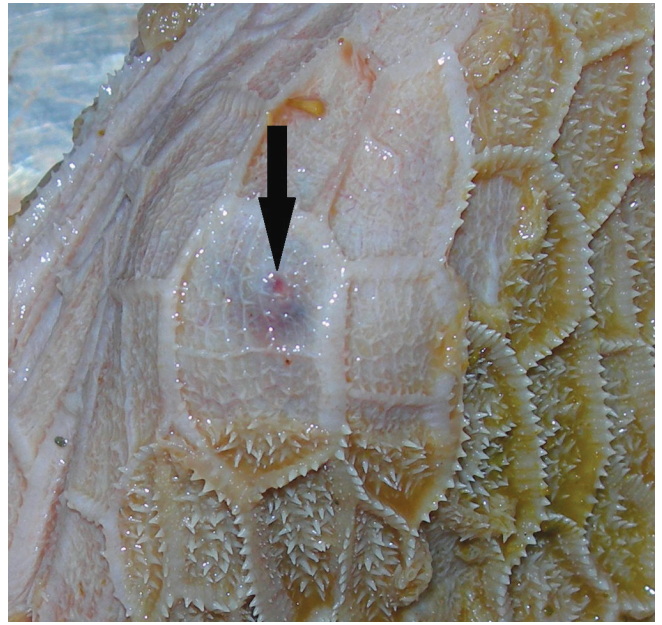


Figure 4: A wire perforation sign into the reticulum of the ewe was presented by the surrounding inflammation (arrow)

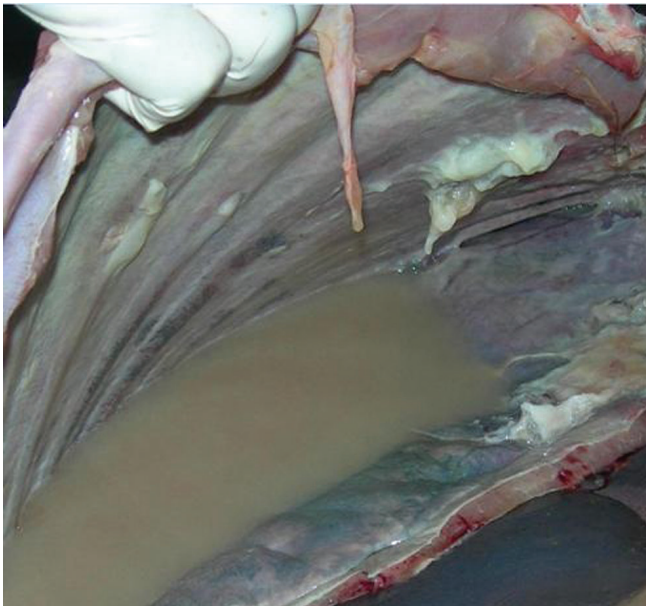


Figure 3: Pleural cavity filled with foul-smelling fluid and clots of fibrin (pyothorax) from one of the ewes

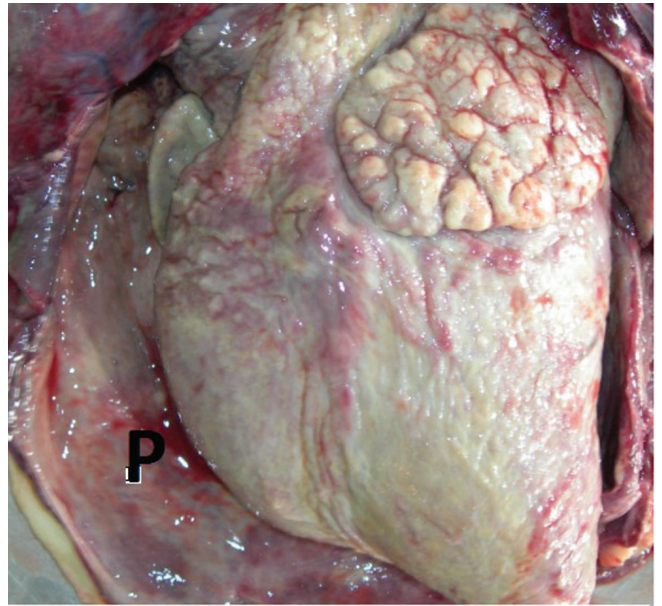


Figure 5: Fibrinopurulent pericarditis due to the traumatic reticulopericarditis; P: pericardium

ments such as syringes, needles and electrical wires, were noted. The results of our investigations showed that these factories have a considerable impact on the grazing pasture pollution by the metal objects.

Discussion

The increase in the intra-abdominal pressure due to the pregnancy and ruminal tympany may

facilitate the penetration of the foreign bodies into the reticular wall and other abdominal and thoracic organs in ruminants (1, 9, 10). Furthermore, alimentary tract obstruction and abdominal distention due to phytobezoars have also been described in ram, buffalo, cattle and giraffe (11, 12, 13, 14). In our cases, it seems that increase in the intra-abdominal pressure during pregnancy and subsequent lambing as well as alimentary tract obstruction by the

phytobezoars, might facilitated the penetration of the metallic objects through the reticular walls into the abdominal and thoracic organs. The penetration of the wall of the reticulum by a sharp foreign body may produce different types of peritonitis or may proceed beyond the peritoneum and cause damage of other organs and consequently pericarditis, cardiac tamponade, pneumonia, pleurisy and hepatic, splenic, pulmonary, or diaphragmatic abscesses (2, 3, 6). In suppurative pericarditis, the pericardial surface is notably thickened by white, often rough, shaggy appearing masses of fibrous connective tissue. Fibrous adhesions between the external and internal surfaces of the viscera and pericardium can be observed in chronic inflammatory lesions (15). Similar to these signs, an acute cardiac tamponade and hemothorax were observed in the ram in our study. These defects developed as a consequence of a large needle penetration through the reticular wall into the left ventricle and regional arteries, what caused sudden cardiac death. In the ewes, a similar phenomenon is believed to be the cause of the pericarditis, myocarditis, peritonitis, pleuritis and finally death. The macroscopic and microscopic findings such as pericarditis, myocarditis, pulmonary edema and congestion, pyothorax, peritonitis, and disseminated abscesses in the spleens, lungs and livers are in agreement with the literatures (1, 6, 7, 8).

Sarcocystosis is commonly found in slaughtered sheep in Iran and a high prevalence of sarcocystosis (33.93%) was reported by *Daryani et al* (16). The possibility of the involvement of *sarcocystosis* in heart failure is miniscule because it usually presents primarily as a neurological disorder in sheep (17, 18). In case 2, however, *sarcocystosis* could contributed to the diminished cardiac performance and deterioration of clinical sings, although the relative weakness of the infestation makes this possibility unlikely.

During microbiological analyses, *Archanobacterium Pyogenes* was isolated from the fibrinopurulent exudates and disseminated abscesses of the affected organs. In accord with our findings, Tadayon et al. in 1980 reported that *Archanobacterim* Spp. is a common finding in cultures of abscesses of sheep (19).

There is strong evidence that sheep are selective feeders and ingest significantly fewer foreign bodies in comparison to the cattle (1, 6, 20). In this respect, while the incidence of foreign body lesions in the cattle has been reported to be 7 % to 21 %, incidence rate of foreign body lesions in sheep and lambs was reported to be much lower, between 1 % and 2 % in different studies (4, 10, 21, 22). Therefore, TRP would

be rarely expected in the sheep, goats, and lambs (1, 4, and 6). In the present report, it was found that the incidence of TRP in examined herd is substantially higher in comparison to the other reports. This is most likely due to the serious pollution of the grazing pasture by the metal objects from the nearby industrial objects. The same observations have been reported in sheep in Jordan as the results of heavy environmental pollution (7, 23). As a preventive approach, it was suggested to the owners that the herd should not be grazing in the polluted area, and consequently, there were no new cases of TRP in the follow up during subsequent 4 months. Therefore, our study suggests that TRP may play an important role in animal deaths also in sheep, especially when animals are grazing on a polluted land.

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TRAUMATSKI RETIKULOPERIKARDITIS (TRP) PRI OVCI: PRIMER ŠTUDIJE OVC V ČREDI

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Povzetek: V prispevku je predstavljen primer travmatskega retikuloperikarditisa (TRP) pri štirih ovcah (enem ovnu in treh ovcah). Opisano je prodiranje velike igle in treh električnih žic skozi steno kapice v osrčnik in srčno mišičnino. Z raztelesbo smo pri ovnu ogotovili vnetje srčne mišice, srčno temponado in nabiranje krvi v prsnem košu, pri ovcah pa zadebelitev osrčnika in posrčnice ter vnetje srčne mišice. Poleg tega smo pri ovcah opazili še piotoraks ter razsejane ognjke po pljučih in jetrih. patohistološko preiskavo smo v vseh primerih ugotovili fibrozo osrčnika, posrčnice, endokarda in srčne mišice ter vnetje z infiltrati neutrofilnih granulocitov in limfocitov. V rezinah jeter in pljuč so bili ognjki različnih velikosti, obdani s fibroblasti in vezivom. Iz fibrinsko-purulentnega izcedka in razsejanih ognjokov iz patološko spremenjenih organov je bila izolirana *Arcanobacterium pyogenes*.

Ključne besede: travmatski retikuloperikarditis; ovca; hemotoraks; piotoraks