

Incidence and Pathologic Studies on Liver Telangiectasis in Beef Cattle

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Abstract: In this study, 3470 livers of beef cattle slaughtered by the Ankara Meat and Fish Company were inspected. In these animals, 82 livers had telangiectasis, and the incidence of lesions was 2.3%. They were characterized grossly by single or multiple red-brown foci, generally 1 to 5 mm in diameter, and occasionally larger. They were located on the parietal surface of the lobus dexter or rarely scattered throughout the organ. Microscopically, dilated sinusoids filled with erythrocytes were observed in initial lesions; the distortion, atrophy and necrosis of hepatocytic cordons were seen in advanced cases. There was no correlation between liver abscesses and telangiectasis.

Key Words: Beef cattle, liver, telangiectasis

Besi Sığırı Karaciğerlerinde Telangiektazinin İnsidensi ve Patolojisi

Özet: Bu çalışmada Ankara Et ve Balık Kurumu'nda kesilen 3470 besi sığırının karaciğerleri incelendi ve bunların 82'sinde (% 2,3) telangiektazi saptandı. Makroskopik olarak, bu lezyonlar tek ya da çok sayıda, kırmızı kahverenkli, genellikle 1-5 mm büyüklükte, nadiren daha büyük odaklar halinde görüldü. Bu lezyonlar çoğunlukla karaciğerin sağ lobunun pariyetal yüzünde, bazen de tüm karaciğerde lokalize olmuştu. Mikroskopik olarak başlangıç lezyonlarda az sayıda değişik derecede genişlemiş ve içleri eritrositlerle dolu sinüzoidlere rastlanırken, ilerlemiş olgularda lezyon içindeki hepatositik kordonlarda distorsiyon, atrofi ve nekrozun şekillendiği saptandı. Çalışmada karaciğerin telangiektazik lezyonları ile apseleri arasında bir korelasyon saptanamadı.

Anahtar Sözcükler: Besi sığırı, karaciğer, telangiektazi

Introduction

Telangiectasis is a frequently encountered lesion that leads to economic losses due to the condemnation of the affected parts of the liver in cattle (1-4). These lesions do not lead to any clinical symptoms, they are only come across on post-slaughter examination or during the necropsy process performed on the animals that have died from other causes (1,5,6). They appear grossly as small, red to bluish blood-filled spaces (2,3,5). The following hypotheses have been proposed to explain the pathogenesis of these lesions: focal necrotizing hepatitis (2,3,7,8); metabolic disturbance (1,9); high levels of vitamin A (10); ischemic injury of the hepatocytes from the hepatic portal vein occlusions (11); dilatation of the space of Disse by glycogen extruded from hepatocytes with endothelial rupture and subsequent erosion of the

hepatocytes (5,7,8); and reduced density of the reticulin framework with a reduction of the trabecular resistance to the intrasinusoidal pressure (5,12). However, it has recently been suggested that a primary alteration of the sinusoidal barrier as increased deposition of basement membrane components in the perisinusoidal region, and fibrosis are responsible for the development of telangiectasis (8). Furthermore, many investigators have associated telangiectatic lesions and hepatic abscesses (5,13-15).

This is the first study on this subject in Turkey. This report deals with the incidence, and gross and microscopic pathology of telangiectasis of beef cattle slaughtered by the Ankara Meat and Fish Company. We also investigated the relation between telangiectatic lesions and abscesses.

Materials and Methods

Liver specimens were obtained from 3470 beef cattle, aged 1-3 years, of different breeds, slaughtered at the Ankara Meat and Fish Company. One or 2 specimens from each liver were fixed in 10% buffered formalin, dehydrated through graded alcohols and embedded in paraffin wax. Sections were stained with hematoxylin-eosin (HE) and some of them were also stained with Brown and Brenn, Toluidin blue, and van Gieson stains (16). Grossly evaluated lesions other than telangiectatic lesions did not undergo histopathological examinations.

Bacteriologic examinations were performed on a number of telangiectatic lesions in the University of Ankara, Faculty of Veterinary Medicine, Department of Microbiology.

Results

Grossly, telangiectatic lesions were observed in 82 out of 3470 livers (2.3%). They were visible as localized reddish brown depressed spots. Most of them ranged from 1 to 5 mm in diameter, while a few reached up to one centimeter. In 80 of these cases, each liver had from 1 to 10 lesions which were generally located at any site on the parietal surface of the lobus dexter; in the remaining 2 cases, multiple lesions were diffusely distributed in the hepatic lobules without any zonal prevalence (Figures 1,2).

In 74 cases, no gross lesions apart from the telangiectatic lesions were observed in these livers. However, in 6 cases, liver abscesses of varying sizes were

seen away from the telangiectatic lesions, while distomatosis was noted only in 2 cases.

Microscopically, telangiectasis was recognized in 2 different types of disorders, namely pretelangiectasis and telangiectasis. Pretelangiectatic lesions were located around the telangiectatic areas and could only be seen microscopically. They were characterized by the slight enlargement of a few sinusoidal lumens filled with erythrocytes (Figure 3). In these lesions no significant disorders were seen on the hepatocytic plates.

In the other type, fully developed telangiectatic lesions, which could also be seen grossly, were examined. They were composed of marked dilated sinusoids as irregular cavernous vascular spaces (Figure 4). In these areas, the numbers and the sizes of the sinusoids were increased in relation to the development stages (Figures 4-6). Dilated sinusoids were filled with erythrocytes, and rarely mononuclear cells, neutrophil leucocytes, desquamated hepatocytes, some endothelial cells, and plasma. In some areas, hepatocytic cord disorganization was very prominent, and some residual hepatocytic cord with atrophic hepatocytes crossed the telangiectatic cavities. Sinusoids communicating with each other were not completely lined with endothelium. In these lesions, newly formed connective tissue proliferation was demonstrated with van Gieson staining, but mast cells were not encountered with Toluidine blue. Brown and Brenn staining did not reveal any microorganism, and *Spherophorus necrophorus* was not isolated bacteriologically.



Figure 1. Diffuse hepatic telangiectasis.



Figure 2. Diffuse hepatic telangiectasis, cut section.

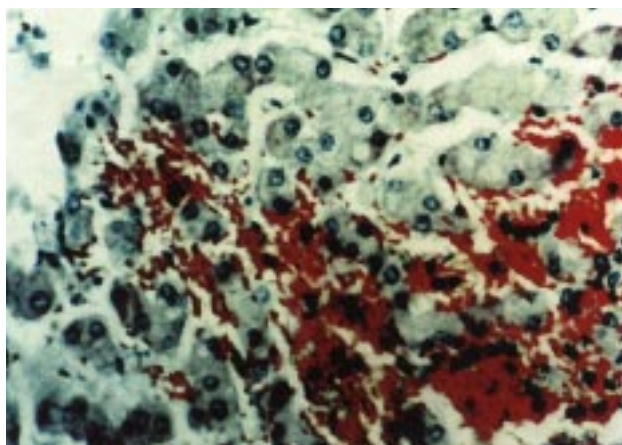


Figure 3. Pretelangiectatic lesion, HE X400.

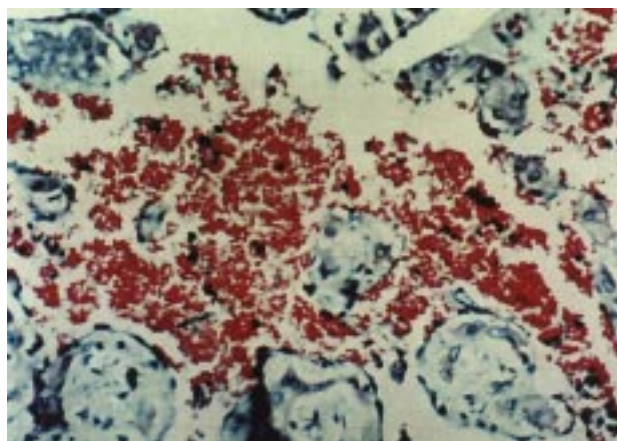


Figure 4. Cavernous vascular spaces in telangiectasis, HE X320.

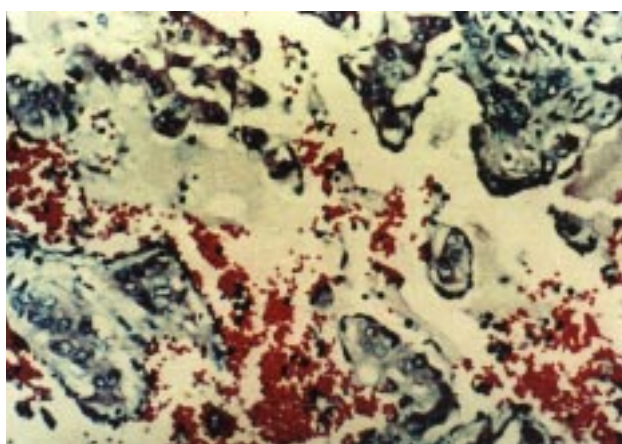


Figure 5. Telangiectatic cavities filled with erythrocytes, plasma, and crossed by residual hepatocytic plates, HE X320.

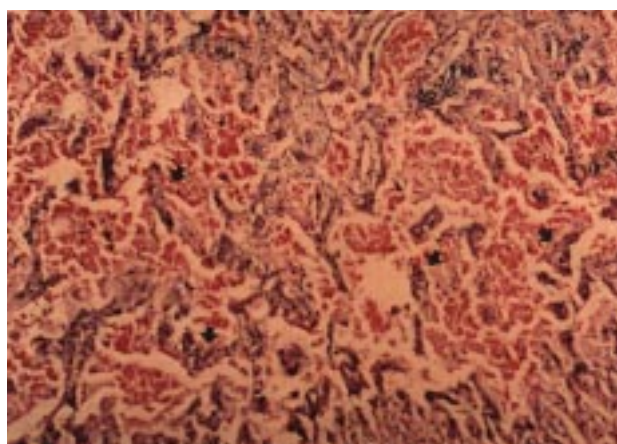


Figure 6. Fully developed telangiectatic lesion, separated hepatic cell cordons (arrows), HE X200.

The central vein of the lobules in the telangiectatic lesions was dilated and empty, and some eosinophil leucocytes were observed in some of the portobiliary spaces adjacent to telangiectatic foci.

Discussion

Hepatic telangiectasis has been reported in many countries, such as the USA, France, Germany, Italy, and Argentina (13,17,18). In the present study, the incidence of telangiectasis was 2.3%, and this was close to those reported (1.3-2.1%) by other workers (3,18,19), except 61.8% in one of the survey studies (1).

It is recorded that telangiectatic lesions tend to develop either in the top parietal portion of the liver and

at the periphery of the liver lobules or in any area of the organ (3,5,14,15,18). In this study, these lesions were generally located at any site on the parietal surface of the lobus dexter. Gross and microscopic lesions of telangiectasis were similar in all respects to those previously described (2,5,7,11,14). In this study, the reports which state that these lesions end up in focal hepatitis or may be repaired with either mesenchymal tissue or proliferation of hepatocytes (2,5) were not confirmed. Mast cell infiltrations as stated by Andersen (5) were also not seen in these areas. However, the fibrous tissue proliferation seen in some lesions was not as significant as that recorded (3). The varying degree of eosinophil leucocytes seen in the some portobiliary spaces indicates parasitic infestations.

It was stated that intralobular telangiectasis is accompanied by portal venopathy (11). Some portal veins of medium and small size were thrombotic and occluded, or lumens may be emptied due to contractions of the blood vessels in these regions. In this study, the central veins located in the lesions or around them were dilated and empty, but there was no thrombosis in any of the vessels.

In studies, the incidence of telangiectatic lesions and hepatic abscesses was increased in beef cattle (6,14), and it was observed that telangiectatic lesions developed prior to the liver abscesses and it was postulated that these

lesions predispose hepatic tissue to abscesses (5,13-15). Other investigators found that telangiectatic lesions tended to develop in the top parietal portions of the liver, which were preferential sides for the colonization of *Spherophorus necrophorus* (13). In this study, although most of the telangiectatic lesions were located on the parietal surface of the liver, neither the microorganism nor abscesses (except 6 cases) were detected. Thus, no correlation was found between telangiectasis and hepatic abscesses.

This study is the first report on liver telangiectasis in beef cattle in Turkey.

References

1. Andersen, A.C.: The Pathogenesis of Telangiectasis in the Bovine Liver IV. Discussion and Summary. *Am. J. Vet. Res.* 1955; April: 240-245.
2. Getty, R.: The Histopathology of a Focal Hepatitis and of Its Termination ("Sawdust" and "Telang" Liver) in Cattle. *Am. J. Vet. Res.* 1946; 7: 437- 449.
3. Julian, L.M.: Studies on the Subgross Anatomy of the Bovine Liver II. The Pathology of Telangiectasis as Demonstrated by the Vinylite-Corrosion Technique. *Am. J. Vet. Res.* 1950; April: 162-172.
4. Julian, L.M., Doewe, L.B.: Studies on the Subgross Anatomy of the Bovine Liver. I. The Distribution of the Blood Vessels and Bile Ducts as Revealed by the Vinylite-Corrosion Technique. *Am. J. Vet. Res.* 1947; 10: 331-335.
5. Andersen, A.C.: The Pathogenesis of Telangiectasis in the Bovine Liver II. Histopathological and Microbiological Studies II. *Am. J. Vet. Res.* 1955; April: 217-236.
6. Jones, T., Hunt, R.D.: Hepatic Abscesses and Related Conditions. *Veterinary Pathology*. Lea and Febiger, Philadelphia. 1983; 1423-1426.
7. Andersen, A.C., Hart, G.H.: Histochemical Methods in the Study of Telangiectasis. *Am. J. Vet. Res.* 1952; July: 359-365.
8. Marcato, P.S., Bettini, G., Della Salda, L., Galeotti, M.: Pretelangiectasis and Telangiectasis of the Bovine Liver: A Morphological, Immunohistochemical and Ultrastructural Study. *J. Comp. Path.* 1998; 119: 95-110.
9. Andersen, A.C.: The Pathogenesis of Telangiectasis in the Bovine Liver III. Experimental Telangiectasis. *Am. J. Vet. Res.* 1955; April: 237-239.
10. Pinto, J.P.A.N., Penteadó, M.V.C.: Vitamina A em Figados Bovinos Portadores de Teleangiectasia Capilar. *Vet. e Zoot. Sao Paulo*. 1993; 5:83-95.
11. Jensen, R., Johnson, L.W., Lauerman, L.H., Tucker, J.O., Swift, B.L., Alexander, A.F., Hancock, H.A., Flack, D.E., Braddy, P.M., Horton, D.P.: Ischemia: A Cause of Hepatic Telangiectasis in Cattle. *Am. J. Vet. Res.* 1982; 43: 1436-1439.
12. Domitrovic, H., Morales, C.R., Perevra, L.A.: Telangiectasis of the Liver in Cattle in Particular Reference to Reticulin Fibers. *Rev. Mil. Vet.* 1978; 25: 101-102.
13. Jensen, R., Frey, P.R., Cross, F., Connell, W.E.: Telangiectasis, "Sawdust" and "Abscesses" in the Livers of Beef Cattle. *J. A. V. M.A.* 1947; 110: 256- 261.
14. Robinson, T.J., Jasper, D.E., Guilbert, H.R.: The Isolation of *Spherophorus Necrophorus* from the Rumen Together with Some Feedlot Data on Abscess and Telangiectasis. *J. Anim. Sci.* 1951; 10: 736.
15. Scanlan, C.M., Berg, J.N.: Experimental Hepatic *Necrobacillosis* Infection in Cattle. *Cornell Vet.* 1983; 73: 117-124.
16. Luna, L.G.: *Manual of Histologic Staining Methods of the Armed Forces Institute of Pathology*. McGraw-Hill Book Company, New York. 1968.
17. Kreuzer, W., Rosopula, A., Petry, P., Schunemann, D.: Chromium Content of Various Edible Tissues (Muscle and Organ) of Slaughter Cows. *Fleischwirtschaft*. 1985; 65: 1255-1261.
18. Morales, C.R., Sampietro, J.C., Pereyra, L.A., Domitrovic, H.A., Paez-Barrio, J.R.: Telangiectasia in the Liver of Cattle. 1978; *Index Vet.*, 046 - 00000.
19. US Department of Agriculture, ARS: Meat Inspection Branch, Summary of Activities 1935-1980. In: Jensen, R., Johnson, L.W., Lauerman, L.H., Tucker, J.O., Swift, B.L., Alexander, A.F., Hancock, H.A., Flack, D.E., Braddy, P.M., Horton, D.P.: Ischemia: A Cause of Hepatic Telangiectasis in Cattle. *Am. J. Vet. Res.* 1982; 43: 1436-1439.