

Splenic Artery and its Intrasplenic Tree in Zavot Breed Cattle

Ismet Takci

Department of Anatomy, Faculty of Veterinary Medicine, University of Kafkas, Kars, Turkey

Abstract: Forty-eight corrosion casts of Zavot breed cattle splenic artery and their intrasplenic trees were studied. One extrahilar branch that supplied the dorsal extremity of the spleens was seen in all the animals. While, the extrahilar branch bifurcated before entering to the dorsal extremity in 33 (68.75%) spleens bifurcation was not observed in 15 (31.25%) spleens. The spleens showed no arterial segmentation in any of the animals.

Key words: Spleen, artery, cattle, intrasplenic tree, segmentation

INTRODUCTION

Blood is supplied to spleen by the splenic artery, which is a branch of the coeliac artery (Dyce *et al.*, 2002; Dursun, 1995; Nickel *et al.*, 1981). Splenic artery and its intrasplenic tree have been reported in bovines of Nelore breed (Carvalho *et al.*, 2001), goat (Gupta *et al.*, 1978), sheep (Ocal and Takci, 1991), swine (Sampaio and Sampaio, 2006; Silva and Martins, 2000) armadillo (Schimming and Abreu, 2001), white lipped pecari (Reginato and Melo, 2004) and mice (Miguel and Miguel, 2006).

The aim of this study is to observe the splenic artery and its intrasplenic tree in Zavot breed cattle, hitherto unreported.

MATERIALS AND METHODS

Forty-eight spleens of the adult Zavot breed cattle (A native breed in Turkey) obtained from slaughterhouse were used in this study. The vessels were washed with 9% saline solution. The corrosion casts of the splenic arterial tree were prepared by injecting acrylic solution composed of 20% powder monomethyl methacrylate and 80% polymethyl methacrylate. The casts that were left in tap water were kept at room temperature for 24 h. Then, they were corrosion casted in 40% NaOH solution at 50°C for 24 h and washed under tap water.

RESULTS AND DISCUSSION

In all cases, there was only one extrahilar branch that supplied the dorsal extremity of spleen and there was no other branches that supplied the dorsal extremity (Fig. 1 and 2). In 33 (68.75%) spleens, the extrahilar branch

bifurcated before entering the spleen and entered as 2 separate branches to the dorsal extremity of spleen (Fig. 1). In 15 (31.25%) spleens, the extrahilar branch did not show a bifurcation and entered to the spleen as a single branch (Fig. 2). Extrahilar branches entered to the spleen through the cranial side of the dorsal extremity (Fig. 1 and 2).

After giving the extrahilar branch, splenic artery entered to the spleen 3-8 cm close to the cranial side of the spleen (Fig. 1 and 2). After entering to the spleen, splenic artery, which tapered down to the ventral extremity of the spleen, branched into 2 branches within the ventral extremity of the spleen. As the splenic artery goes through within the spleen it gave cranial and caudal branches going through the cranial and caudal directions. Branches going through cranial and caudal directions were mostly originated from cranial and caudal sides of the artery, sometimes they were originated from the dorsal and ventral sides were observed. The caudal branches were thicker and longer than the cranial branches. Secondary and tertiary branches of the splenic artery were closely intervening except the branches supplying the dorsal extremity and not showing anastomosis in any of the branches (Fig. 3).

A clear arterial segmentation was not seen in any of the spleens.

In this study, an extrahilar branch was observed in all the cases, similar to the observation in Nelore breed cattle reported by Carvalho *et al.* (2001). Schimming and Abreu (2001) described 2-4 extrahilar branches in armadillo. On the other hand, the extrahilar branch formation was not described in cattle by Sisson and Grossman (1964), Dursun (1995) and Dyce *et al.* (2002). In the current investigation, one extrahilar branch, which was bifurcated in 33 (68.75%) cases and not bifurcated in 15 (31.25%)



Fig. 1: View of the splenic artery and its bifurcated extrahilar branch



Fig. 2: View of the splenic artery and its single extrahilar branch



Fig. 3: View of the splenic artery and its intrasplenic tree

cases, was observed to enter the spleen. Carvalho *et al.* (2001) reported that splenic artery gives 2 separate branches in 10% of animals and a single branch in 90% cases. Nickel *et al.* (1981) described 4-5 branching of

splenic artery in the hilus however no such formation was observed in this investigation. As it was reported by Carvalho *et al.* (2001) splenic artery was observed to enter to the spleen on the dorsoventral axis after giving branches towards the cranial and caudal directions. Similar to the observations in sheep, pig and armadillo (Ocal and Takci, 1991; Silva and Martins, 2000; Shimming and Abreu, 2001), no observable anastomoses between the vessels originating from the splenic artery were determined.

CONCLUSION

Although there were no arterial segmentation in any of the spleens, dorsal extremity might be thought as a separate segment since after giving the extrahilar branch, there were no branching for 3-8 cm and no intervening with the secondary and tertiary branches of the adjacent secondary and tertiary branches.

REFERENCES

- Carvalho, R., M.A. Miglino and W.M. Souza, 2001. Lienales artery and vein of bovines of Nelore breed. *Brazilian J. Vet. Res. Anim. Sci.*, 38: 9-12. <http://www.scielo.br/pdf/bjvras/v38n1/9667.pdf>
- Dyce, K.M., W.O. Sack and C.J.G. Wensing, 2002. *Textbook of Veterinary Anatomy*. 3rd Edn. Saunders. Philadelphia, London, New York, St. Louis, Sydney, Toronto, pp: 258. ISBN: 0721689663.
- Dursun, N., 1995. *Veterinary Anatomy II*. Published by Medisan, Ankara, pp: 244. ISBN: 975-7774-09-X.
- Gupta, S.C., C.D. Gupta and S.B. Gupta, 1978. Arterial segmentation in the goat (*Capra hircus*) spleen. A study by corrosion cast. *Acta Anatomica (Basel)*, 102: 102-104. PMID: 354306.
- Miguel, J. and T.T.A. Miguel, 2006. Splenic segmentation. Experimental study in mice. *Revista Científica Do Hce.*, 1: 77-80. <http://www.hce.eb.mil.br/revista/revhce2006.pdf>
- Nickel, R., A. Schummer and E. Seiferle, 1981. *The Anatomy of the Domestic Animals*, Verlag Paul Parey, Springer-Verlag, Berlin, Hamburg, New York, Heidelberg, 3: 161. ISBN: 3-489-55618-6.
- Ocal, M. and I. Takci, 1991. Arterial segmentation in the spleen of the sheep. *Anatomia Histologia Embryologia*, 20: 152-153. PMID: 1897734.
- Reginato, A.L. and A.P.F. Melo, 2004. Anatomosurgical segmentation in the spleen of the white lipped pecari. *Brazilian J. Vet. Res. Anim. Sci.*, 41: 281-285. <http://www.scielo.br/pdf/bjvras/v41n4/25271.pdf>

- Sampaio, M.A.P. and B.P.M. Sampaio, 2006. Anatomical study and proportional analysis of the pig spleen arterial segments. *Cell Tissues Organs.*, 182: 32-34. PMID: 16651827.
- Schimming, B.C. and M.A.F. Abreu, 2001. Systemization of the arteries in the splenic hilus of the armadillo (*Dasypus novemcinctus* L.) *Revista Chilena de Anatomia*, 19: 149-154. http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0716-98682001000200005&lng=en&nrm=iso&tlng=en.
- Silva, J.R.C. and M.R.F.B. Martins, 2000. Comparative study of arterial vascularization in swine spleen (*Sus scrofa domesticus*). *Revista Chilena de Anatomia*, 18: 223-226. http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0716-9868200000200001&lng=en&nrm=iso&tlng=en.
- Sisson, S. and J.D. Grossman, 1964. *The Anatomy of the Domestic Animals*. 4th. Edn. W.B. Saunders Company, Philadelphia, London, pp: 727. ISBN: 0721641024.