

The cranial mesenteric artery in the porcupine (*Hystrix cristata*)

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ABSTRACT

The aim of this study was to investigate the arteria mesenterica cranialis and its branches in the porcupine (*Hystrix cristata*). Nine adult porcupines (5 males, 4 females) were each injected with a coloured latex mixture from the aortic arch for demonstration of the arteria mesenterica cranialis. The results indicated that the arteria colica dextra was anastomosed with the arteria colica media and the ramus colicus. The arteria pancreaticoduodenalis caudalis separated from the arteria mesenterica cranialis as a third branch after the arteria colica media and the arteria colica dextra. Vascularization of the jejunum was made by the jejunal arteries, which originated from the arteria mesenterica cranialis and truncus jejunalis. The arteria ileocolica was continuous with the arteria mesenterica cranialis after giving off the jejunal arteries. Vascularization of the ileum was supplied by the ramus ilealis and the ramus ilei mesenterialis. The arteria ileocolica ended by separating into the rami colici and arteria cecalis. In summary, in the present study the branches of the arteria mesenterica cranialis were studied for the first time in porcupines. The results of this study may contribute to the data in this area of science.

Key words: arteria mesenterica cranialis, porcupine, *Hystrix cristata*

Introduction

Rodents (rodentia) are the widest order of placental mammals and comprise more than half of the mammals known at present. The porcupine belongs to the Hystricidae family, which constitutes a small group of the order rodentia (KURU, 1987; DEMİRSOY, 1992).

There was relatively more information on the arteria mesenterica cranialis of both domestic (GOMERCIC and BABIC, 1972; KNELLER et al., 1972; SMALLWOOD and SIS, 1973; GOMERCIC and BABIC, 1975; GETTY, 1975; DURSUN, 1996) and laboratory animals

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(CRAIGIE, 1948; GREEN, 1963; COOK, 1965; FAVRE, 1967; MAGALHAES, 1968; PERNECZKY, 1969; MCLAUGHLIN and CHIASSON, 1979). However, our literature investigation showed that there was no information on the arteria mesenterica cranialis of porcupines.

This investigation therefore focused on the branches of the arteria mesenterica cranialis in porcupines for the first time in order to broaden knowledge in this field.

Materials and methods

Nine adult (5 male and 4 female) porcupines (*Hystrix cristata*) were studied. Deep anaesthesia of animals was established by an initial injection of (1.5 cc i.m.) cetanes (ketamine HCL) followed by (3.0 cc i.m.) rompun (xylazine HCL). Coloured latex was injected into the arcus aortae by opening the thoracic cage after removal of the blood via the a. carotis communis. A dissection procedure was performed after 24 hours in 10 % formalin and findings were photographed. For terminology, Nomina Anatomica Veterinaria (ANONYMOUS, 1994) was used.

Results

The arteria mesenterica cranialis was the thickest of the vessels which originated from the aorta abdominalis. Approximately 6 cm after its origin, it gave off and divided into two branches the a. colica media and the a. colica dextra and then gave off the a. pancreaticoduodenalis caudalis, the aa. jejunales and the truncus jejunalis, continuing its way under the name a. ileocolica (Fig. 1).

Arteria colica media (Figs. 1, 3, 4): This vessel divided into two branches as the ramus dexter and the ramus sinister. The ramus dexter sent many thin branches to the flexura centralis coli. The vessel anastomosed with one of the branches of the a. colica dextra as reaching the flexura centralis. This vessel also gave off some thin branches to the segment between the starting point and the middle part of the ansa distalis coli. The ramus sinister was thicker than the ramus dexter and it vascularized the final segment of the ansa distalis coli and the colon transversum. This artery then sent 4-6 thin branches of the initial segment of the colon descendens and anastomosed with the a. colica sinistra, which was a branch of the a. mesenterica caudalis.

Arteria colica dextra (Figs. 1, 3, 4): The a. colica dextra, which was the second branch of the a. mesenterica cranialis, supplied the ansa proximalis coli and a part of the flexura centralis. It was observed that in one of the porcupines the a. colica dextra and the a. colica media arose from a common root.

Arteria pancreaticoduodenalis caudalis (Fig. 4): This vessel was the third branch of the a. mesenterica cranialis. The a. pancreaticoduodenalis caudalis vascularized the final part of the duodenum and the lobus pancreatis dexter of pancreas. The vessel neighbouring

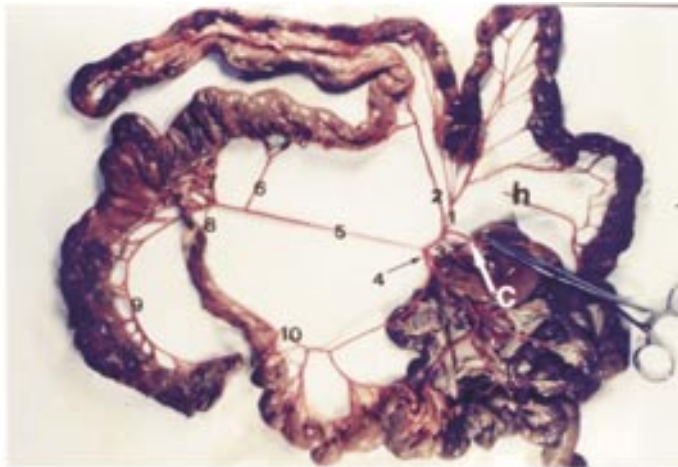


Fig. 1. Branches of the arteria mesenterica cranialis in the porcupine. C = a. mesenterica cranialis, 1 = a. colica media, 2 = a. colica dextra, 3 = aa. jejunales, 4 = truncus jejunalis, 5 = a. ileocolica, 6 = r. colicus, 7 = rr. colici, 8 = r. ilei mesenterialis, 9 = a. cecalis, 10 = r. ilealis, h = a. mesenterica caudalis.



Fig. 2. Arterial supply of the cecum and ileum in the porcupine. 3 = r. colicus, 4 = rr. colici, 5 = r. ilei mesenterialis, 6 = a. cecalis, 7 = aa. ilei, 8 = r. ilealis, 9 = last jejunal artery.



Fig. 3. Arterial supply of the colon ascendens in the porcupine. 1 = a. colica media, 2 = a. colica dextra, 3 = a. ileocolica, 4 = r. colicus, 5 = rr. colici.



Fig. 4. Arterial supply of the colon transversum, colon descendens and dorsal surface of the rectum in the porcupine. C = a. mesenterica cranialis, 1 = a. colica media, 2 = a. colica dextra, 3 = a. pancreaticoduodenalis caudalis, h = a. mesenterica caudalis, 4 = a. rectalis cranialis, 5 = a. colica sinistra.

the flexura duodeni caudalis anastomosed with the a. pancreaticoduodenalis cranialis to become a branch of the a. gastroduodenalis.

Arteriae jejunales (Figs. 1 and 2): These vessels arose from the a. mesenterica cranialis at regular intervals. The number of the jejunal arteries varied between the 10 and 15. Some of the final jejunal arteries originated from a common root, and were known as the truncus jejunalis. One branch of the last jejunal artery sent some thin branches to the final part of the jejunum, and its other branch led to the middle parts of the ileum, and was known as the ramus ilealis. The ramus ilealis gave off the aa. ilei to the ileum and anastomosed with the ramus ilei mesenterialis, in the middle parts of the ileum. The jejunal arteries supplied the jejunum and a part of the ileum.

Arteria ileocolica (Fig. 1): The a. ileocolica was a continuation of the a. mesenterica cranialis after giving off the jejunal arteries. Initially, the a. ileocolica gave off the ramus colicus to the ansa proximalis coli. The a. ileocolica then gave off the a. cecalis to the cecum and the rami colici to the ansa proximalis coli's initial segment. The ramus ilei mesenterialis, which arose from one of the rami colici, vascularized part of the ileum.

Discussion

It has been reported that the a. mesenterica cranialis first casts off the a. pancreaticoduodenalis caudalis in mouse, guinea pig, rat and in 48% of domestic cats (GREEN, 1963; COOK, 1965; FAVRE, 1967; GOMERCIC and BABIC, 1975). ÇAKIR (1991) reported that the a. pancreaticoduodenalis caudalis in cats was the second branch of the a. mesenterica cranialis, after the a. colica media. Unlike other species, the a. pancreaticoduodenalis caudalis in porcupines was observed to be the third branch of the a. mesenterica cranialis following the a. colica media and the a. colica dextra. In 2 of 9 porcupines, however, the a. pancreaticoduodenalis caudalis was similar to that observed in cats.

SHIVELY and STUMP (1975) and GOMERCIC and BABIC (1972) reported in guinea pigs and in dogs respectively that the a. pancreaticoduodenalis caudalis vascularized the part of duodenum subsequent to the duodenum descendens, and the right lobe of pancreas. The same finding was observed in porcupines.

It was emphasized that the a. colica media was given off by the a. mesenterica cranialis, as a single root in cats and guinea pigs (FAVRE, 1967; SMALLWOOD and SIS, 1973) and as a double root in rats and rabbits (CRAIGIE, 1948; HEBEL and STROMBERG, 1986). In porcupines in the present study the a. colica media originated from the a. mesenterica cranialis as a single root, as reported in cats and guinea pigs.

In rats, the a. colica dextra was reported to be a part of the vascularization of the colon ascendens and also anastomosed with one of the jejunal arteries (HEBEL and STROMBERG,

1986). ÇAKIR (1995) reported that, in guinea pigs, the a. colica dextra vascularizes the colon ascendens and anastomoses with the a. colica media and the ramus colicus. In the present study, the a. colica dextra arterial supplies a part of the colon ascendens, as has also been seen in rats and guinea pigs. Furthermore, this vessel anastomosed with the a. colica media and the ramus colicus, similar to that observed in guinea pigs.

In general, it has been known that the jejunal arteries in domestic animals arose from the a. mesenterica cranialis at regular intervals (GETTY, 1975; NICKEL et al., 1981). In rabbits (ÇAKIR, 1991) and guinea pigs (PERNECZKY, 1969), however, the jejunal arteries have been observed to arise from the a. mesenterica cranialis as well as from the truncus jejunalis. According to results of this study, the jejunal arteries had two origins, as has been observed in the rabbit and guinea pig.

NICKEL et al. (1981) reported that the a. ileocolica, one of last branches of the a. mesenterica cranialis in domestic animals, was a continuation of that artery in rodents (GREEN, 1963; COOK, 1965; MAGALHAES, 1968; ÇAKIR, 1995). The a. ileocolica joins vascularization of the colon ascendens, the ileum, and the cecum by giving off the ramus colicus, the rami colici (ruminant), the ramus ilei mesenterialis and the a. cecalis (GETTY, 1975). In porcupines, the a. ileocolica was seen as a continuation of the a. mesenterica cranialis, as has been reported for other rodents, and divided into the ramus colicus, the rami colici, the ramus ilei mesenterialis and the a. cecalis. The regions vascularized by this vessel were similar to other species.

It has been reported in domestic animals that the ileum was vascularized by the ramus ilei mesenterialis and the ileal arteries that originates from the a. mesenterica cranialis (NICKEL et al., 1981; DURSUN, 1996). SHIVELY and STUMP (1975) indicated that the a. ilealis sends off two or three branches to the ileum in guinea pigs. In golden hamsters, however, only the ramus ilei mesenterialis originates from the a. ileocolica, to provide the arterial supply to the ileum (MAGALHAES, 1968). Vascularization of the ileum in porcupines is different from that of guinea pigs, domestic animals, and golden hamsters. It was observed in porcupines that the ileum is vascularized by a ramus ilealis originating from last the jejunal artery and by ileal arteries originating from the ramus ilei mesenterialis.

In conclusion, branches of the a. mesenterica cranialis in porcupines were described for the first time in the present study. The results of the present study may contribute to a broadening of data in this field of science.

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SAŽETAK

Istražena je arteria mesenterica cranialis i njezine grane u dikobraza (*Hystrix cristata*). Svakom od devet odraslih dikobraza (pet mužjaka i četiri ženke) injicirana je obojena mješavina lateksa kroz luk aorte u svrhu prikaza kranijalne mezenterične arterije. Rezultati su pokazali da a. colica dextra anastomozira s a. colica media i ramus colicus. A. pancreaticoduodenalis caudalis izlazi kao treća grana kranijalne mezenterične arterije nakon srednje i desne količne arterije. Jejunum je okrvljen jejunalnim arterijama, koje su ogranci kranijalne mezenterične arterije odnosno jejunalnog debla. A. ileocolica nastavljala se na kranijalnu mezenteričnu arteriju nakon što su se odvojile jejunalne arterije. Ileum okrvljuju ramus ilealis i ramus ilei mesenterialis. A. ileocolica završava s rami colici i a. caecalis. U ovom radu po prvi put je istraženo grananje kranijalne mezenterične arterije u dikobraza.

Cljučne riječi: arteria mesenterica cranialis, dikobraz, *Hystrix cristata*
