Journal of Animal and Veterinary Advances 7 (6): 673-675, 2008
ISSN: 1680-5593

The Topographical Anatomy, Blood and Nerve Supply of the Carotid Body in the Cattle (1-3 Years Old)

G. Najafi, A. Ahmadi and M. Razi
Department of Basic Sciences, School of Veterinary Medicine,
University of Uremia, Uremia, Iran

Abstract: The aim of this study is to review of carotid body location and nerve and blood supply. In this study Heads of eight cattle of different sexes were collected from Uremia abattoir. By simple dissection method, definite position and nerve supply of the carotid body. Before dissection, colored gelatin was injected into right and left common carotid artery. According to this technique all the branches of common carotid artery and the branch which supplies into carotid body were investigated. This investigation revealed that, the carotid body of cattle is situated around the occipital artery and it is made up of compact portion only. Its blood supply is by glomic artery which is a branch of occipital artery. Its nerve supply is by herring nerve which is a branch of glossopharyngeal nerve. The carotid body in cattle was found close to the origin of occipital artery similar in sheep, buffalo.

Key words: Anatomy, carotid body, cattle

INTRODUCTION

The carotid body was first described by Won Haller in 1743 and is a round, reddish-brown to tan structure found in the adventitia of the common carotid artery (Francis and Quinn, 1995). Carotid body responds to the fall in partial oxygen pressure, the increase in partial Pco2 pressure and the full in arterial blood PH, Contributing to the genesis of the-hyperventilation observed under these conditions. Other factors such as temperature, osmolarity and arterial pressure, at least in animals, can stimulate the carotid body (Eyzaquirre and Zapata, 1984). Two types of the carotid body present, compact part as in the human (Francis and Quinn, 1995) cat (Al-Lami and Murray, 1967; Ross, 1957), hedgehog (Adams, 1957) and Scattered part in dog (Sadik *et al*., 1993) and camel (Etemadi, 1975) but few animals have both 2 types, for example sheep and goat (Sadik *et al*., 1993).

The situation of carotid body was described in buffalo (Najafi *et al*., 2006). Sheep and goat (Sadik *et al*., 1993), origin of the occipital artery from the common carotid artery, Horse (Getty, 1975) bifurcation of common carotid artery. birds located between the distal ganglion of the vagus nerve and recurrent laryngeal nerve at the beginning of the common carotid artery (Kameda, 2002) rabbits (Unur, 2002) between internal and external arteries after the bifurcation point the common carotid artery, camel (Etemadi, 1975) point of separation of the internal carotid artery from the carotid trunk.

Its blood supply is by glomic artery and nerve supply is by Herring nerve which is a branch of glossopharyngeal nerve (Sadik *et al*., 1993).

The histological appearance of the carotid body is identical to other Para ganglia and includes two types of cell: Type I (chief) cell: with copious cytoplasm and large round or oval nuclei (Hardel, 1977)Type II (sustentacular cells): are elongated cells that closely resemble Schwann (Eyzaguirre, 1993).

MATERIALS AND METHODS

Heads of 8 cattle 1-3 years of both sexes (male and female) were collected from Uremia abattoir. Before dissection, colored gelatin was injected into right and left common carotid artery. Following dissection of the jugular vein the carotid sheath was freed from the vagus nerve and underlying fascia.

The common carotid artery was transected 7 cm below its bifurcation and the external and internal carotid arteries and occipital artery at least 5 cm above the bifurcation.

Both carotid bifurcation were then removed and pinned to cork sheets to dissect out the carotid body.

Corresponding Author: G. Najafi, Department of Basic Sciences, School of Veterinary Medicine, University of Uremia, Uremia, Iran

This was achieved by carefully stripping off the adventitial fat and connective tissue with fine dissecting scissions, starting with the common carotid artery and working distally. Then carotid body was weighted and length, wide, thickness of each carotid body was measured by colix under the stereomicroscopy (7X). By dissection method, nerve supply of carotid body was specified.

Statistical analyses: Variance analyses of mast cell numbers were calculated by using SPSS program (version: 15) and student t-test method.

RESULTS AND DISCUSSION

In all cattle's the carotid body was situated at the origin of the muscular branch of the occipital artery. The carotid body was ovoid or rounded in shape and yellowish-brown in color and was surrounded with a loose connective tissue capsule (Fig. 1 and 2).

This study revealed that, internal carotid artery was disappeared in cattle. The carotid body of cattle was supplied with blood by small radicals off the glomic artery. This artery arose from the occipital artery near the bifurcation of common carotid artery. Its nerve supply was by herring's nerve which is branch of glossopharyn--geal nerve (Fig. 3).

The mean weight, length, wide and thickness of carotid body in male and female cattle were shown in Table 1.

Table 1 shows there were not significant ($p<0.01$) difference between all parameters in male and female cattle.

Our study shows that, carotid body in cattle was found close to the origin of the occipital artery. Carotid body was ovoid shape and yellowish-brown in color. This agrees with the finding of Sadik *et al*. (1993) in sheep and goat and Najafi *et al*. (2006) in the buffalo.

These findings differ from results of studies in the other animals that having internal carotid artery i.e.; rabbits (Unur, 2002), camel (Etemadi, 1975), birds (Kameda, 2002) and horse (Getty, 1975). This investigation revealed that, internal carotid artery disappeared in cattle similar to buffalo (Najafi *et al*., 2006), sheep and goat (Sadik *et al*., 1993), therefore, carotid body present at the origin of occipital artery. Blood supply to the carotid body is by glomic artery which is a branch of occipital artery in cattle. This findings agree with buffalo (Najafi *et al*., 2006), sheep and goat (Sadik *et al*., 1993).

The glomic artery in dog was originated from the external carotid or ascending pharyngeal artery

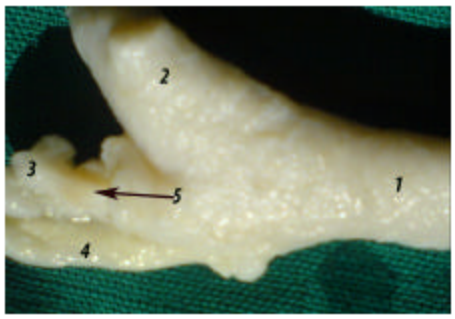

Fig. 1: 1-Common carotid artery 2-External carotid artery 3-Occipital artery 4-Internal carotid artery 5-Carotid body

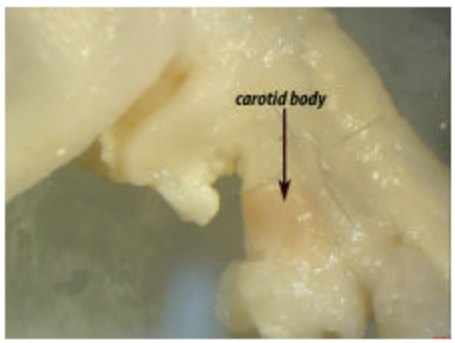

Fig. 2: Carotid body around the occipital artery

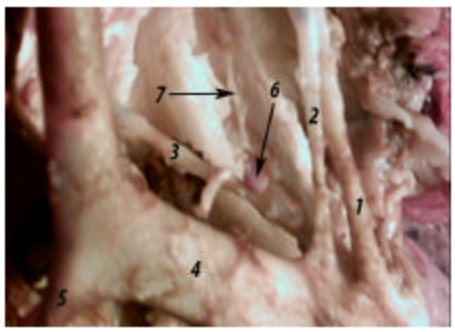

Fig. 3: 1-Muscular branch of common carotid artery 2-Internal carotid artery 3-Occipital artery 4-External carotid artery 5-Lingo facial artery 6-Carotid body 7-Herring nerve

Table 1: Mean (M±SE) of weight, length, wide and thickness of carotid body in cattle 1-3 year

Female (Left)	Female (Right)	Male (Left)	Male (Right)	Parameters
0.011±0.001	0.013±0.001	0.012±0.001	0.011±0.001	Weight (gr)
1.27±0.037	1.38±0.040	1.41±0.041	1.24±0.036	Length (mm)
0.71±0.020	0.66±0.019	0.75±0.022	0.62±0.018	Wide (mm)
1.09±0.032	1.12±0.033	1.11±0.032	1.04±0.030	Thickness (mm)

Values did not show significant difference between male and female group ($p<0.01$)

(Chungcharoen *et al*., 1952) and from occipital and ascending pharyngeal ascending pharyngeal arteries in cat (Davis and Story, 1943), rabbit (Chungcharoen *et al*., 1952) and hedgehog (Adams, 1957).

Nerve supply of the carotid body is by herring nerve which is a branch of glossopharyggeal nerve. These findings conformed to that of other mammalian species (Sadik *et al*., 1993; Najafi *et al*., 2006).

CONCLUSION

This study reveled that the carotid body locate s a roundly to muscular branch of the occipital artery, that vasculated by glomic artery and herring's nerve supplied nerving of it. In the comparative view there were no differences in weight, length, wide and thickness parameters between female and male cattle in 1-3 ages rage.

ACKNOWLEDGMENT

The authors wish to thank Prof. rajabali sadrkhanluo for helpful discussions. The authors thanks Dr Farhad Soltanalinegad for preparing animals and anatomical dissection in this study. We also thank the staff of Anatomy, especially Mr. Dehgani of the collage of Veterinary medicine of Urmia University for helping us to perform this study.

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