



Gross Study on Branching Pattern of the Brachial Artery in Goat

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ABSTRACT

The axillary artery gave off the cranial circumflex artery of humerus distal to the shoulder joint and continued as brachial artery. The brachial artery continued on the medial aspect of the arm and gave off deep brachial artery from its caudal face near the middle of the arm. Brachial artery gave off collateral ulnar artery a little above the medial condyle of the humerus and then bicipital artery arose from anterior surface of brachial artery. Brachial artery gave off transverse cubital artery at the level of medial condyle of humerus and then continued as the median artery in the forearm region after origin of common interosseous artery.

HIGHLIGHTS

- Study focused on gross study of branching pattern of the brachial artery in goat.
- Axillary artery continued as brachial artery on medial aspect of arm.
- Brachial artery continued as median artery in the forearm region.

Keywords: Radiography, brachial, artery, goat.

Any abnormality or obstruction of circulation of blood vessels affects the physical, productive and reproductive efficiency of the animal. Accurate knowledge of normal topographic anatomy of blood vessels of limbs is essential for pathologists, radiologists, clinicians and surgeons for varied reasons for different clinical procedures. Knowledge of architecture of blood vessels of extremities is a prerequisite for any surgical procedure on the area involved.

MATERIALS AND METHODS

The study was conducted on thoracic limbs of 4 adult goats collected from local abattoir soon after the slaughter. The axillary artery was exposed and cannulated. The arterial system was thoroughly flushed by injecting lukewarm normal saline solution. After thorough flushing, the

dissection was carried out to look for the origin of brachial artery and its branches to study the course and branching pattern of the artery.

RESULTS AND DISCUSSION

The axillary artery continued as brachial artery (Fig. 1) after it gave off the cranial circumflex artery of humerus distal to the shoulder joint as reported in goat (Kumar and Jain, 2019), sheep, ox, horse and dog (Nickel *et al.*, 1981) and camel (Jain and Dhingra, 1993). The deep brachial artery originated from the brachial artery from its caudal

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face near the middle of the arm. The collateral ulnar artery originated from the brachial artery a little above the medial condyle of the humerus. Then brachial artery gave off bicipital artery from its anterior surface a little below the origin of the ulnar artery. The brachial artery passed beneath the insertion of biceps brachii muscle and gave off the transverse cubital artery at the level of medial condyle of humerus. Similar observation has been reported in goat (Kumar and Jain, 2019), ox and horse (Nickel *et al.*, 1981). The brachial artery in goat continued as the median artery after giving off the common interosseous artery distal to the level of medial condyle of humerus. Similar observation were reported by Konig and Liebich (2020) in ox, horse and other domestic animals.

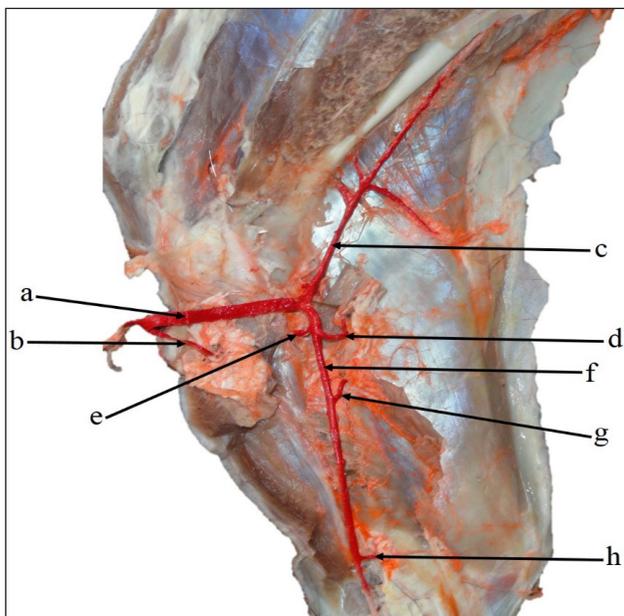


Fig. 1: Photograph showing the branching pattern of the brachial artery (medial view). (a) axillary artery; (b) external thoracic artery; (c) subscapular artery; (d) thoracodorsal artery; (e) cranial circumflex humeral artery; (f) brachial artery; (g) deep brachial artery; (h) collateral ulnar artery

The deep brachial artery

The brachial artery gave off the deep brachial artery from its initial segment (Fig. 1 & Fig. 2) as reported in goat (Kumar and Jain, 2019), ox, horse and carnivores (Nickel *et al.*, 1981), dog (Evans and Lahunta, 2013), and bovine (Budras and Habel, 2011). Deep brachial artery arose from the caudal aspect of the brachial artery at a point distal

to the teres tuberosity. Similar findings were reported in goat (Kumar and Jain, 2019) and camel (Jain and Dhingra, 1993). The deep brachial artery in goat passed backward and after a short upward course, it gave off a branch directed downward and then continued upward and then bifurcated into two unequal branches, which ramified into the medial and long head of triceps brachii muscle.

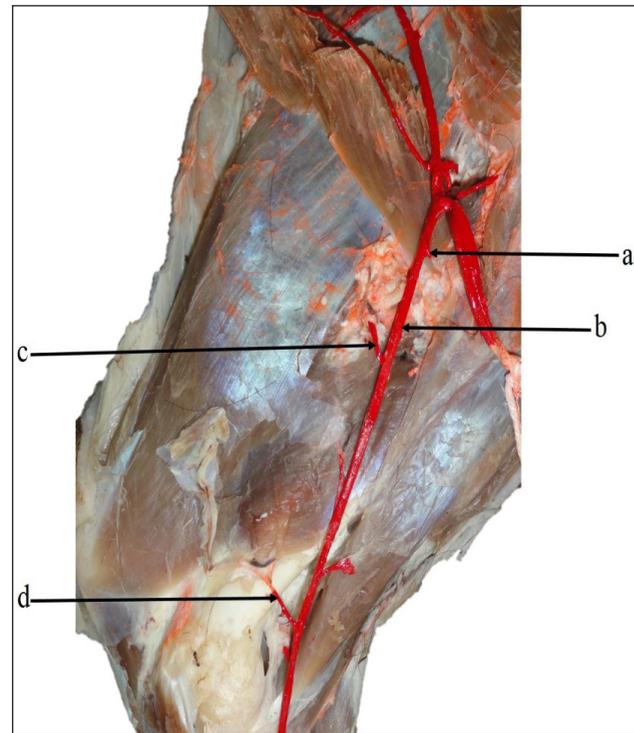


Fig. 2: Photograph showing the arteries of arm region (medial view). (a) cranial circumflex humeral artery; (b) brachial artery; (c) deep brachial artery; (d) collateral ulnar artery

The collateral ulnar artery

The brachial artery gave off the collateral ulnar artery from proximal to the medial condyle of the humerus (Fig. 1, 2, 3 & Fig. 5) which was in agreement with goat (Kumar and Jain, 2019), sheep, ox, horse and dog (Nickel *et al.*, 1981), however Jain and Dhingra (1993) reported that in camel it originated from the caudal face of the common interosseous artery. The collateral ulnar artery travelled backward and downward on the medial surface of arm, crossed the medial epicondyle and turned downward between the epicondyle and the proximal extremity of the ulna, covered by the ulnar head of the flexor carpi ulnaris

muscle. Collateral ulnar artery gave off a cutaneous branch and continued for a short length and then divided into ascending and descending branch at the caudal border of humerus. Similar observation were reported in goat by Kumar and Jain (2019).

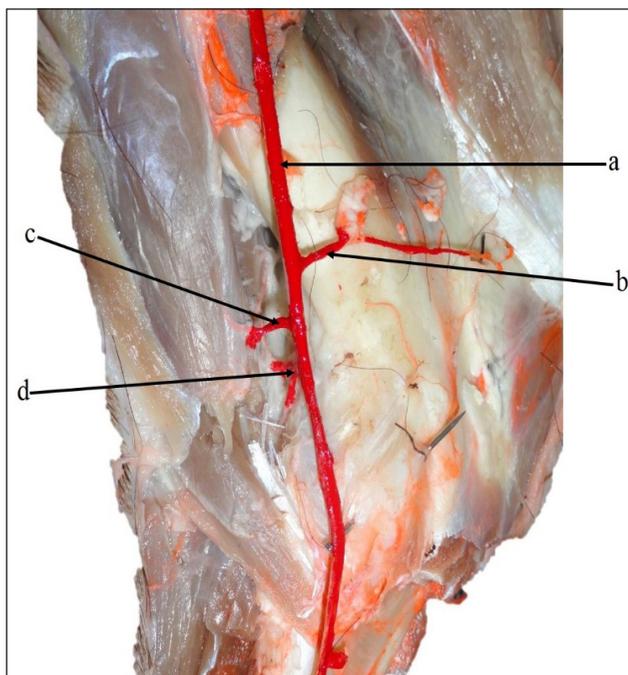


Fig. 3: Photograph showing the branching pattern of the brachial artery (medial view). **(a)** brachial artery; **(b)** collateral ulnar artery; **(c)** bicipital artery; **(d)** transverse cubital artery

The bicipital artery

The brachial artery gave off the bicipital artery from the cranial aspect, distal to the origin of collateral ulnar artery (Fig. 3) as reported earlier by Budras and Habel (2011) in bovine and Kumar and Jain (2019) in goat. However, Nickel *et al.* (1981) reported that the bicipital artery in ruminants sometimes also sprung from the transverse cubital artery whereas Jain and Dhingra (1993) reported that bicipital artery in camel arose from the cranial face of the brachial artery at level of distal one third of the humerus. The bicipital artery in goat was a short muscular vessel and divided into two branches just after origin in most of the cases and entered into the distal half of the biceps brachii muscle. Branches were also distributed to neighboring muscles especially coracobrachialis muscle and to the elbow joint.

The transverse cubital artery

The brachial artery gave off the transverse cubital artery from its cranial face at the level of the elbow joint (Fig. 3 & Fig. 4) as revealed in goat (Kumar and Jain, 2019) and sheep, ox, horse and dog (Nickel *et al.*, 1981).

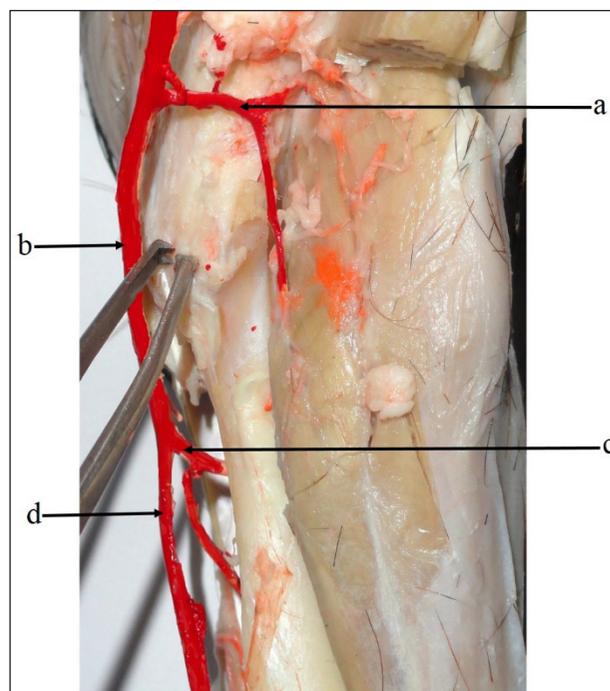


Fig. 4: Photograph showing the branching pattern of the brachial artery (medial view). **(a)** transverse cubital artery; **(b)** brachial artery; **(c)** common interosseous artery; **(d)** median artery

However, Jain and Dhingra (1993) reported that in camel, it arose from the lateral aspect of the brachial artery proximal to the trochlea of the humerus. The transverse cubital artery distributed to the craniolateral group of muscles on the forearm.

The ramus articularis

The brachial artery gave off the ramus articularis from its caudal surface in the proximal part of forearm (Fig. 5) which was in agreement with Kumar and Jain (2019) in goat. The ramus articularis divided into two branches after its origin. One branch ran its course upward and supplied to the caudomedial aspect of the elbow joint. Other branch ran downward and gave supply to flexor carpi radialis muscle.



The deep antebrachial artery

The brachial artery gave off these muscular branches from its caudal surface in the proximal part of the forearm (Fig. 5 & Fig. 7) as reported earlier in sheep, ox, horse and dog (Nickel *et al.*, 1981) and by Kumar and Jain (2019) in goat. These muscular branches in goat arose just before the origin of common interosseous artery but occasionally they originated directly from the common interosseous artery. These were distributed to medial and middle flexors of the carpus and the humeral head of the superficial and deep digital flexors.

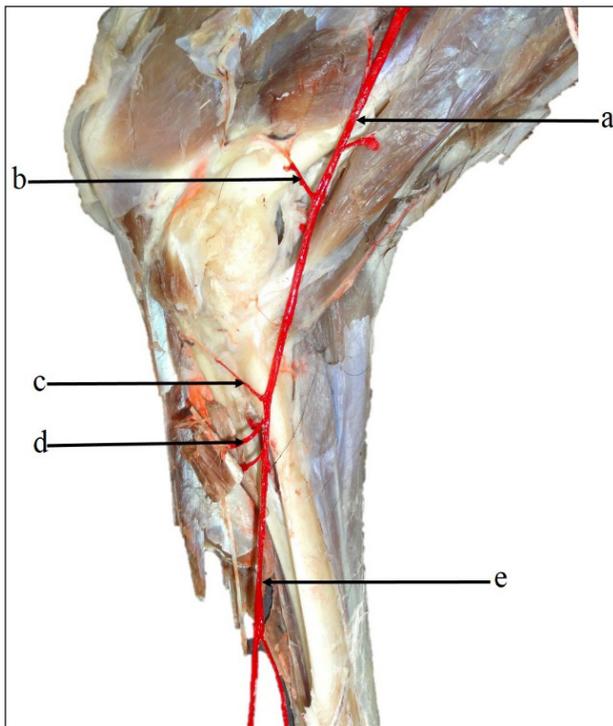


Fig. 5: Photograph showing the branching pattern of the brachial artery (medial view). (a) brachial artery; (b) collateral ulnar artery; (c) articular artery; (d) deep antebrachial artery; (e) median artery

The common interosseous artery

The common interosseous in goat was a large vessel and arose from brachial artery a little below the deep antebrachial artery (Fig. 4 & Fig. 6). It was the last vessel originated from brachial artery before it became the median artery as reported earlier in sheep, ox, horse and dog (Nickel *et al.*, 1981), dog (Evans and Lahunta, 2013)

and by Kumar and Jain (2019) in goat. It travelled into the proximal interosseous space with its satellite vein and interosseous vein between the palmar surface of radius and humeral head of the deep digital flexor. It gave off proximal and distal branches to the humeral and radial heads of deep digital flexor muscles. It gave off nutrient arteries of the radius and ulna in the interosseous space. The common interosseous artery divided into cranial and caudal interosseous artery after a short course in the interosseous space (Fig. 2) as reported in goat (Kumar and Jain, 2019) and in ox (Nickel *et al.*, 1981).

The caudal interosseous artery

Caudal interosseous artery arose from common interosseous artery (Fig. 6) and was a relatively short and slender branch of common interosseous artery as observed by Kumar and Jain (2019) in goat. It continued distally on the caudomedial aspect along with a branch of deep antebrachial artery inside the flexor muscles to which it gave off several small muscular branches and eventually ramified in the periosteum of radius and ulna.

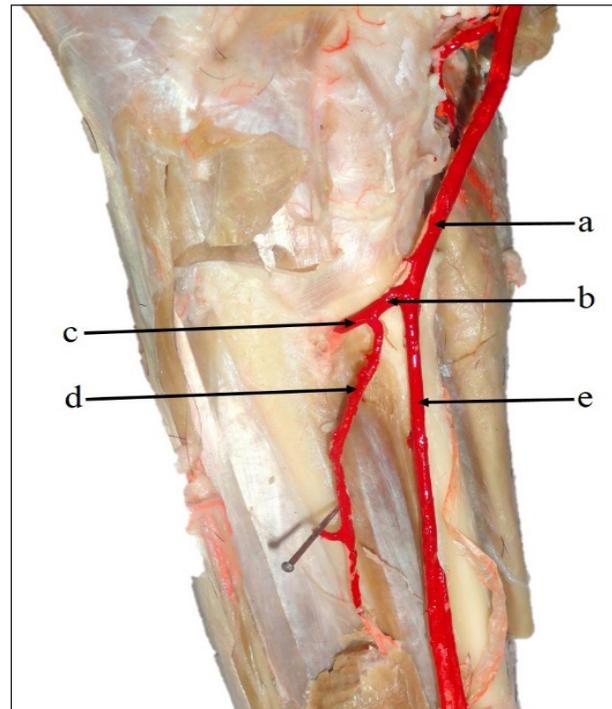


Fig. 6: Photograph showing the arteries of the forearm region (medial view). (a) brachial artery; (b) common interosseous artery; (c) cranial interosseous artery; (d) caudal interosseous artery; (e) median artery

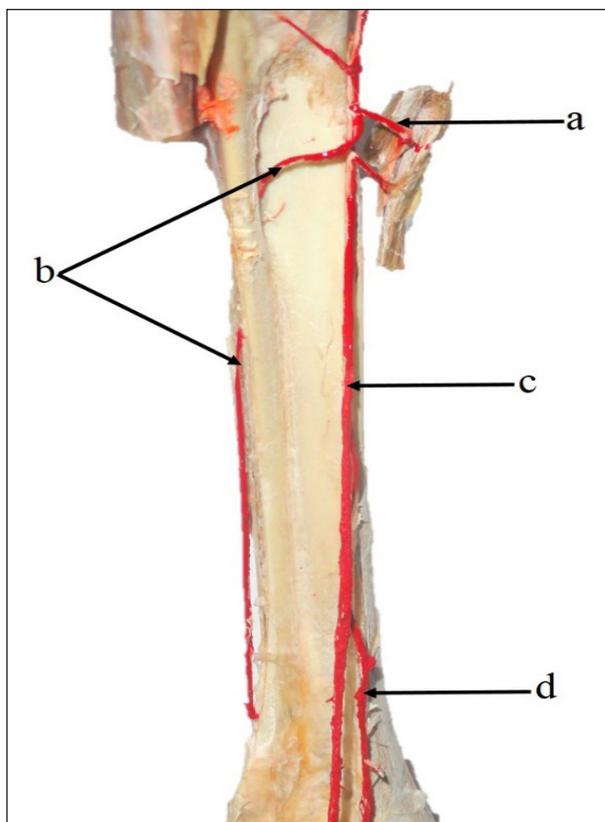


Fig. 7: Photograph showing the arteries of the forearm region (medial view). **(a)** deep antebrachial artery; **(b)** cranial interosseous artery; **(c)** median artery; **(d)** radial artery

The cranial interosseous artery

The common interosseous artery continued as cranial interosseous artery (Fig. 6 & Fig. 7) as reported by Kumar and Jain (2019) in goat. After traversing the proximal interosseous space of the fore arm, the common interosseous artery in goat descended along the craniolateral aspect inside the groove between the radius and ulna. Nutrient artery of radius and ulna was originated from cranial interosseous artery and entered the nutrient foramen at the lower level of proximal interosseous space. The recurrent interosseous artery arose from the cranial interosseous artery when it emerged through the proximal interosseous space. The recurrent interosseous

artery supplied the lateral digital extensor and common digital extensor. The recurrent interosseous artery ran craniodorsally and made anastomosis with caudal branch of transverse cubital artery. The cranial interosseous artery near the distal extremity of the forearm divided into a dorsal and palmar branch. The dorsal branch extended over the dorsolateral aspect of the carpus and contributed to the Rete carpi dorsale (Fig. 3). The palmar branch of the cranial interosseous artery passed through the distal interosseous space of the forearm and divided into a superficial and a deep branch. The deep branch supplied the caudal aspect of the carpal joint.

CONCLUSION

The brachial artery of goat was the continuation of the axillary artery after the origin of the cranial circumflex artery of humerus distal to the shoulder joint. The brachial artery in goat continued on the medial aspect of the arm and gave off deep brachial, collateral ulnar, bicipital, transverse cubital, articular, deep antebrachial and common interosseous artery and then the parent trunk continued as the median artery in the forearm region.

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