Morphotopographic particularities of some muscles from the trunk region of the coypu

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Abstract
The muscles from the trunk region are covered by the cutaneous trunk muscle which has in its structure two layers, a superficial and a profound one. The skin muscle of the trunk has a unitary structure, flattened appearance, inserted on the shoulder and on the base of the tail. The muscular particularitis of the trunk region in coypu consist in their appearance and development. At the level of the trapezius muscle, there is a large interstitium that separates its cervical portion from the thoracic portion. The thoracic ventral serrated muscle, the intercostal muscles and some muscles that are not described in other domestic mammals, namely, the lower ribs muscles and the thoracic square muscle, were also dissected. Among the pectoral muscles of the deep layer, the subclavicular muscle was also identified in coypu. The abdominal, dorsal and ventral muscles were also dissected. The superficial pectoral muscle showed a flattened and triangular aspect.During dissection, it was found that the superficial inguinal ring presents the muscular cruses which are generated by muscular structures.
Key words: *dissection, coypu, muscle, trunk.*

Introduction

The coypu is a semi-aquatic mammal, which lives in natural conditions over an extended geographical area. The individuals are grouped in colonies, in a vegetation- and water-rich habitat. It adapts easily to new environmental conditions, which explains the possibility of exploiting this animal in captivity.

This rodent belongs to the *Rodentia* order, *Mammalia* class, *Myocastoridae* family, *Myocastor* genus, *Coypus* species (V. Coțofan & al., 1994; H.E.Köning & al., 2004).

In captivity, the coypu is grown for fur production, but also for meat consumption. It was deemed necessary to complete the existing literature data with this study (R. Barone, 1966; H. E. Köning et al., 2004; G. Predoi ET AL., 2001).

The trunk muscles in this species have a series of particularities which do not occur in other rodents, as well as specific muscles that are absent in other domestic mammals (G. Predoi et.al., 2011).

Materials and methods

Four bodies of adult coypu without morphopathologic changes were used. Stratigraphic and regional dissection methods were realised.

The dissection was performed by maintaining the physiological relations of the adjacent structures, the vasculonervous and lymphatic formations. In the first phase of the dissection, the skin was incised; each muscle was identified following its insertions, aspect, and relationships with the surrounding formations.

The cutaneous trunk muscle was dissected by performing a vertical incision of the brachial triceps muscle. The incisions were made parallel with the muscular fibres, and the conjunctive and fatty tissues were removed. The connecting musculature between the anterior limb and trunk was dissected in order to detach the limb.

The thoracic and cervical portions of the rhomboid muscle, which are fused, were separated. Then, this muscle was sectioned at the cervical angle of the shoulder. The trapezius muscle was sectioned from its shoulder insertions and was folded dorsally. The omotransverse muscle was cut, from its shoulder insertion. The cleidobrachial muscle was dissected and the transverse scapulohumeral joint was cut. The superficial pectoral muscle was dissected and folded ventrally. The subclavicular muscle was sectioned in its middle third.

The intercostal muscles were cut longitudinally for showing their internal and external parts. As concerns the latissimus dorsi muscle, an incision was made to separatethe fleshy portion from the aponeurosis, which was then separated from the aponeurosis of the thoracic muscles.

Theserrated dorsal muscle was cutin order toreveal its insertions and interlacing with the gluteal fascia. The muscular portion of theserrated dorsal muscle was rendered evident by removing the connective tissue along the dorso cranial curvatures of the II-XII ribs. The cranial and caudal regions of this muscle intersect on the XII rib. For the dissection of the multifidus and levatores costarum muscles, two profound incisions in the large dorso ventral muscle were made. The muscular flap was suspended on the supraspinatus muscle.

The tendons and the muscles from the fourth layer of the trunk were revealed. Laparotomy was performed for the dissection of the ventrolateral abdominal muscles flank.

Results and discussions

In coypu, the superficial pectoral muscle has a flattened, triangular appearance, having its origin on the ventral face of the sternum, and the insertion on the arm and forearm fasciae (Fig. 1).

In the profound layer of the pectoral muscles, the pectoral cleidoscapular muscle, the subclavicular muscle and the pectoral ascending musclewere identified. The pectoral cleidoscapular muscle has its origin on the III-VI sternebrae and its insertion on the clavicle.The subclavicular muscle is inserted on the first rib and the clavicle. The ascending pectoral muscle has its insertion on the small tubercle of the humerus, medial scapular fascia, and large tubercle of the humerus. Caudally, it is inserted on the xiphoid appendix, on the abdominal tunic up to the umbilical scar.

The trapezius muscle has a cervical portion and a large interstitium, which separates it from the thoracic portion (Fig. 2).

The muscular portion of the trapezius muscle is inserted on the scapular spine,and the caudal aponeurosis is inserted on the spinous T13-L3 processes. The latissimus dorsi muscle presents a large muscular portion and caudally a large aponeurosis. Its insertions are on the round tubercle of the humerus, on the spinous processes T5-T11, and the aponeurosis is inserted on the rest of the thoracal, lumbar spinous processes and on the iliac angle.

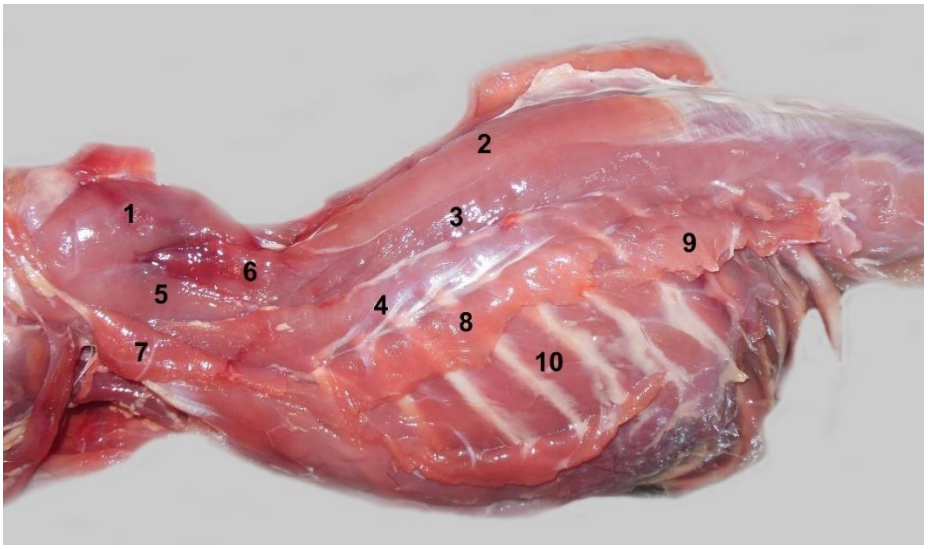

Fig. 1. Trunk muscles from the 3rd layer, after sectioning the thoracic dorsal serrated muscle in coypu (original)
1-splenius muscle; 2-thoracic spinal muscles; 3-latissimus dorsi muscle; 4-thoracic iliocostal muscle; 5-longissimus atlantismuscle; 6-biventer cervicis muscle; 7- ventral serrated cervical muscle, sectioned; 8 – ventral thoracic serrated muscle, sectioned; 9 – costal insertion of the caudal portion of the dorsal serrated thoracic muscle, sectioned.

Fig. 2. The superficial trunk muscles in coypu (original)
1-clavicle; 2-cervical trapezius muscle; 3-thoracic trapezius muscle; 4-the latissimus dorsi dorsal muscle; 5-omotransverse muscle; 6-the scapular portion of the deltoid muscle; 6'-acromial portion of the deltoid muscle; 7-lateral portion of the triceps muscle; 8-long portion of the triceps muscle; 9-infraspinatus muscle partially covered by the scapular portion of the deltoid muscle

The thoracic rhomboid muscle is inserted on the tip of the spinous processes T2-T4 and on the dorsal edge of the shoulder. It has a triangular shape with the tip oriented ventro-cranially and the basedorso-caudally.

The thoracic dorsal serrated muscle presents cranial portions with insertions on the II-XII ribs and with a large caudal aponeurosis on the T2-T13spinous processes. It is noticed that the aponeurosis covers the third layer of the trunkmuscles (Fig. 3).

The thoracic ventral serrated muscle has a triangular aspect and is inserted on the lateral costal face of the III-VIII ribs. The intercostal muscles are formed of an external portion with dorsocaudally oriented fibres, and an internal portion with fibres oriented ventrocranially. The great long dorsolumbar muscle has its insertion on the spinous processes of the thoracic and lumbar vertebrae. The iliocostal muscle is inserted on the internal face of the ribs, on the iliac crest.

The multifidus muscles are disposed obliquely between the transverseapophysis of one vertebra and the transverse apophysis of the nextvertebra. The levatores costarum muscles are inserted between the transverse apophysis of one vertebra and the anterior edge of the next rib.

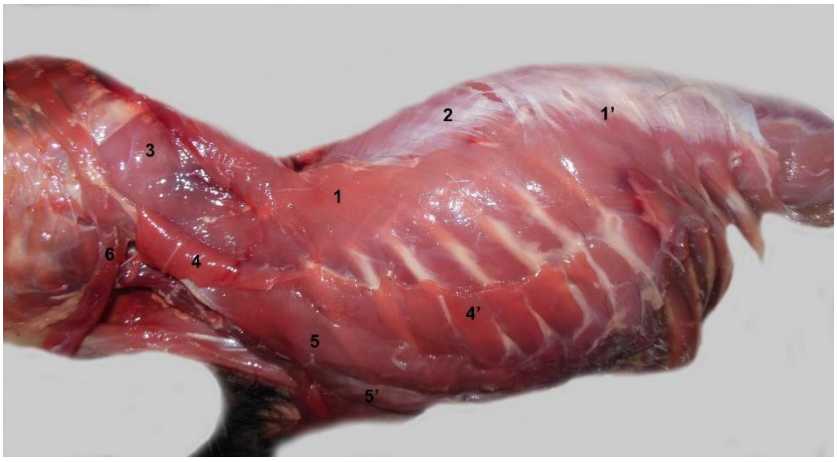

Fig. 3. Trunk muscles after removal of the anterior limb in coypu (original)
1-dorsal thoracicserrated muscle – cranial portion; 1'- dorsal thoracic muscle, caudal portion; 2 – spinal muscles from the 3rd layer covered by the dorsal thoracicserrated muscle aponeurosis; 3-splenius muscle; 4-ventral cervical serrated muscle – sectioned; 4'-thoracic ventral serrated muscle– sectioned; 5-scalen muscle, dorsal portion; 5'- scalene muscle – medial portion; 6 – omotransverse muscle.

Coypu possesses the following species-specific muscles: the descending muscles of the ribs, placedbetween the body of the thoracic vertebrae and the medial face of the ribs; thesquare thoracicmusclewith insertions between the transverse thoracic processes and proximal extremities of the ribs.

The superficial inguinal ring presents the cranial muscular crus (formed by the external oblique muscle) and the muscular caudal crus, formed by the external oblique muscle and by the straight muscle of the abdomen.

The profound inguinal ring is delimited cranially by the caudal part of the transverse muscle of the abdomen, caudolaterally by the oblique internal muscle and medially by the straight muscle of the abdomen.

Conclusions

The trunk muscles in coypu show particular interest.The latissimus dorsi muscle shows two muscular parts that emerge caudally and continue with a large aponeurosis. This aponeurosis

is inserted on the thoracic spinous processes starting with T13 and on all lumbar spinous processes, including the ilium bone edges.

The iliospinal muscle, the levato rescostarum muscles, and the iliocostal muscle are powerful extensors of the spine.

The specific muscles of the coypu (that do not appear in other species) are represented by the descending muscles of the ribs and the thoracic square muscle.

The superficial inguinal ring presents cranial,medial and caudal commissures that are generated by muscular structures.

The cutaneous trunk muscle has a unitary structure, with flattened appearance, being inserted on the shoulder and on the base of the tail.

References

1. BARONE, R.–Anatomiecomparée des mammifèresdomestiques, Tome I - Ostéologie. Imprimerie des Beaux-Arts S.A., J. Tixier&Fils, Lyon, 1966.
2. COȚOFAN, V., HRIȚCU VALENTINA., COȚOFAN OTILIA - Ventral and abdominal muscles and inguinal rings in Myocastor coypus. SeminarulInternațional, SkelletmuskulaturderHaustiere, Leipzig, 1994.
3. VALENTINA HRIȚCU,V.COȚOFAN-Anatomiaanimalelor de blană,Nutria,Dihorul,Ed. “IonIonescu de la Brad”,Iași, 2000.
4. KÖNING, H.E., LIEBICH, H.G. - Veterinary Anatomy of Domestic Mammals, Schattauer GmbH Stuttgart, New York, 2004.
5. PREDOI,G.,B.GEORGESCU,C.BELU,I.DUMITRESCU,ANCAȘEICARU,PETRONELAROȘU- Anatomia Comparată a Animalelor Domestice, Osteologie, Artrologie, Miologie, Ed. Ceres, București 2011.
6. PREDOI, G., BELU C. Anatomie clinică, Ed. ALL. București, 2001.