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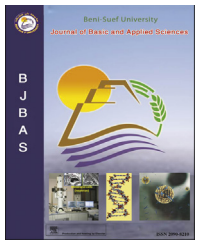

Full Length Article

Anatomical and radiographical studies on the venous drainage of the udder in goat with special reference to the cranial superficial epigastric vein

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ABSTRACT

The present study was achieved to clarify the venous drainage of the udder in twelve healthy Egyptian Baladi goats. Gum-milk latex injection (nine specimens) and radiographic imaging technique (three specimens) were used to demonstrate the course and tributaries of the main veins draining the udder. The obtained results revealed that the udder of goat was drained through three venous circles, one at its base, while the other two were present in the form of one circle at the base of each teat. The basal venous circle was formed by the external pudendal and cranial superficial epigastric veins, as well as the dorsal labial and mammary branch of the ventral perineal vein. While the papillary venous circle was formed mainly by the cranial and caudal lateral sinus branches of the cranial mammary vein of the external pudendal vein. Also, the origin, course, distribution and termination of the cranial superficial epigastric vein were described. The venous architecture reported in this study could serve as a guide for the further surgical interference within the udder of goat.

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1. Introduction

The udder is a very important physiological and structural component of all dairy animals, so, preservation of its normal function is regarded for production of high-quality milk and vital offspring. Due to the high activity of the mammary gland throughout the lactation period, it is susceptible to several pathological conditions; gangrenous mastitis is one of the main diseases affecting the udder especially in goat (Abu-Samra et al., 1988; Kerr and Wallace, 1978).

The gross anatomical features of the udder were described during surgical interference (Fubini and Ducharme, 2004; Hofmeyer, 1990). Consequently, establishment of specific anatomical studies was required for characterization of the venous architecture of the udder. The current study tried to give a full anatomical description of the venous drainage of the udder in goat which could help as a guide for the surgical interference.

2. Materials and methods

2.1. Animal specimens

The present study included twelve healthy Egyptian Baladi female goats (age 2–5 years, weight 18–27 kg) which were purchased alive from the animals' markets in Beni-Suef Governorate.

2.2. Dissection of the specimens

Nine fresh cadavers were injected with the embalming solution through the common carotid artery (2% Formalin 40%, 2% concentrated liquid phenol, 20% Ethyl alcohol 95%, 6% Glycerin and 70% water), then the specimens were kept in formalin 10% for 7 days. The caudal vena cava was injected with gum-milk latex, colored blue (Rotring ink®). The blood vessels were secured and the whole cadavers were preserved in formalin 10% for 3 days. The specimens were eviscerated and carefully dissected in both sides for demonstration of the origin, course and tributaries of the main veins draining the udder (Hildebrand, 1968).

2.3. Preparation of the radiographic images

Three fresh udder specimens were radiographed using urographine as a contrast medium. The parameters used were 50 K. volt and 70 mAs. The system of films and screen used was C.R. AGFA.

The nomenclatures in this study were adopted according to Nomina Anatomica Veterinaria (2012) and the available literatures.

3. Results

The udder of goat was drained by three venous circles, one at its base, while the other two were present in the form of one circle at the base of each teat.

3.1. Circulus venosus basalis

This venous circle was formed by the external pudendal and cranial superficial epigastric veins, as well as the dorsal labial and mammary branch of the ventral perineal vein of the internal pudendal vein.

3.2. V. Pudenda externa (V. Mammaria)

The external pudendal vein was detached from the pudendoepigastric trunk and then it passed through the inguinal canal to reach the caudal third of the base of the udder as mammary vein (Figs. 1/1&2 and 5/1) just cranial to the mammary lymph node in accompaniment with its satellite artery. The mammary vein was divided into cranial and middle mammary veins. During its course, it gave: ventral labial, caudal basal and caudal mammary veins, as well as branches to the mammary lymph node.

3.2.1. Ramus labialis ventralis

The ventral labial vein was one of the collateral branches of the mammary vein having a variable origin in the same specimen as it detached either from the medial aspect of the mammary vein before its bifurcation (Fig. 1/9) or from the medial aspect of the middle mammary vein (Fig. 1/8). However, this branch was not observed in one specimen (Fig. 2). The ventral labial vein passed caudomedially along the medial

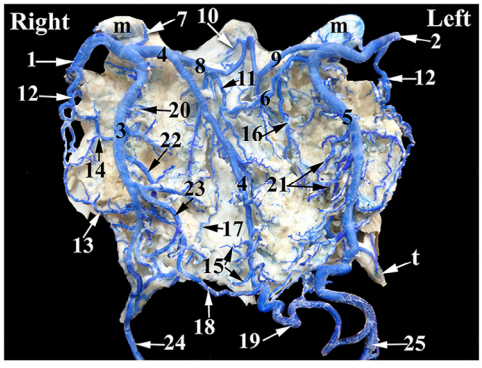

Fig. 1 – A photograph of dissected dorsal aspect of the udder of goat showing the distribution of the mammary vein; m – Mammary lymph node, t – Teat, 1 – R. mammary vein, 2 – L. mammary vein, 3 – R. cranial mammary vein, 4 – R. middle mammary vein, 5 – L. cranial mammary vein, 6 – L. middle mammary vein, 7 – Branch to the mammary lymph node, 8 – R. ventral labial vein, 9 – L. ventral labial vein, 10 – Dorsal labial and mammary branch of the ventral perineal vein, 11 – Anastomosing branch of the ventral labial vein, 12 – Caudal basal vein, 13 – Termination of 12, 14 – Anastomosing branch of the cranial mammary vein, 15 – parenchymal branches of 4, 16 – Medial sinus vein of 6, 17 – Papillary vein of 4, 18 – Anastomosing branch of 4, 19 – Cranial medial basal vein, 20 – Parenchymal branches of 3, 21 – Dorsal branches of 5, 22 – Caudal lateral sinus branch of 3, 23 – Cranial lateral sinus branch of 3, 24 – R. cranial superficial epigastric vein, 25 – L. cranial superficial epigastric vein.

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