

SOME APPLIED ANATOMICAL ASPECTS USEFUL FOR A FIELD VETERINARIAN

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A comprehensive knowledge on anatomy of various organs and structures is useful for a Veterinarian for the exact diagnosis of diseases and in surgical and gynaecological interventions. It helps in understanding and interpreting various postmortem changes, in veterolegal cases and in meat inspection.

SUPERFICIAL ARTERIES AND VEINS

A. SUPERFICIAL ARTERIES:

- are examined for recording pulse. Common palpable arteries are,

1. CATTLE:

- a) Ventral coccygeal artery (along the midline of ventral surface of tail approximately 5-10 cm from tail head)
- b) Facial artery (along the anterior border of masseter muscle)
- c) Median artery (on the medial aspect of forelimb at the level of elbow joint)
- d) Digital arteries (on lateral aspect of forelimb just caudal to metacarpus)

2. CALF, SHEEP, GOAT AND DOG:-

Femoral artery (on medial aspect of thigh between sartorius and gracilis muscles)

B. SUPERFICIAL VEINS: -

are used for intravenous injections, collection of blood and blood transfusion. Palpable veins are,

1. CATTLE:

- a) External jugular vein (in jugular furrow) for I/V
- b) Ear vein

- c) Milk vein / anterior mammary vein/subcutaneous abdominal vein

2. DOG:

- a) Cephalic vein (on anterior aspect of forelimb)
- b) Lateral saphenous vein (in front of Tendo-Achilles for I/V in hindlimb)

3. PIG:

Ear vein

4. ELEPHANT:

Ear vein for I/V

EXTERNAL JUGULAR VEIN:

may show pulse in lower 3rd of jugular furrow on both sides in normal animals due to the closure of left atrio-ventricular (mitral) valve. Compression of the vein in normal animal causes disappearance of this pulse. Pulsation up to angle of jaw is abnormal and compression of vein will not result in loss of pulse. When animal lowers head, pulsation may be seen throughout and disappears when the animal lifts head. False jugular pulse may be seen due to pulsation of carotid artery seen beneath it. In dehydrated animals or animals in shock, it may appear flat and empty and compression at lower part of the vein fail to produce any degree of filling. In normal animals blocking of the vein by pressing it near base of neck causes its distension.

MILK VEIN/ SUBCUTANEOUS ABDOMINAL VEIN:

runs forward from udder on either side of the midline and each vein passes through a palpable orifice called "milk well" anterior and lateral to

umbilicus and joins internal thoracic vein. Internal thoracic vein joins brachio- cephalic vein which reaches heart through cranial venacava. It will be very large in dairy breeds and it has a flexuous course. Normal vein will be readily compressible and can be occluded using digital pressure. It will be abnormally enlarged and will be firm like a rope and pulse will be evident when there is heart defects like CHF, pericarditis, endocarditis etc.

Lymph nodes:

Examination of lymph nodes is important in diagnosis of some diseases like TB, Theileriasis and in meat inspection. Usually they will be firmer than adjacent structures. Many lymph nodes are readily palpable in healthy animal and others can be palpated only when they are enlarged. Each paired node should be compared for size and consistency. Enlargement of lymph nodes occur either due to infections of lymphatic system as in diseases like Bovine TB or due to infection or inflammation of the area drained by the lymph nodes. Enlarged node may be warm, inflamed and sensitive to touch. If a lymph node is enlarged, the area drained by the node should be examined for evidence of any pathological problem. Important lymph nodes are,

1. Submandibular lymph nodes:

Palpable on the medial aspects of angle of jaw where horizontal and vertical rami of mandible meet.

2. Parotid lymph nodes:

lie subcutaneously just below temporo- mandibular joint, partly covered by parotid salivary gland. Not palpable unless enlarged due to local infection or tumour formation.

3. Retro- pharyngeal lymph nodes:

Lie in the midline dorsal to pharynx. In normal animal rarely palpable. If enlarged, can be palpated by placing two fingers of one hand on either side of larynx and by advancing fingers of two hands towards each other just dorsal to larynx. Enlargement causes dysphagia, dyspnoea etc.

4. Pre- Scapular Lymph Nodes:

Lie subcutaneously just anterior to supraspinatus, a few inches above shoulder joint. For palpating this, extend fingers and press them forward from shoulder

joint onto the neck. It's size varies and may be small and rounded or elongated dorsoventrally.

5. Pre-femoral lymph nodes:

Located anterior to tensor fascia latae and a hands breadth above the stifle joint or patella. Size variable and may be elongated and flattened. Palpated similar to Pre-Scapular lymph node.

6. Inguinal lymph nodes:

Palpable as small group of fairly mobile and firm structures adjacent to inguinal canal. In male, it is located just anterior to scrotum and in female just anterior and lateral to udder.

7. Supramammary lymph nodes:

Located at the caudal aspect of base of udder. They will be enlarged in mastitis. If the weight of udder is supported with one hand it will be easy to palpate the nodes. They can be palpated in the fold of skin between the attachment of udder and pelvic limb medially.

8. Caudal mediastinal lymph nodes:

are groups of large lymph nodes located at caudal mediastinum below aorta and above oesophagus. If enlarged it will compress the oesophagus and cause bloat. They may also cause damage to vagal trunks passing beneath them and may interfere with normal gastric motility.

Skin

Condition of skin reflects the general health of the animal. Skin has epidermis, dermis and subcutis. Epidermis contain epithelial cells and pigment. Dermis is a connective tissue layer containing blood vessels, nerves, hair follicles, sebaceous and sweat glands. Subcutis contains fibrous and fatty tissues which provide insulation for body and support for other skin layers. In normal animal skin has considerable elasticity and helps in body movements. In dehydration and inflammation / injury to skin, elasticity is reduced. It is covered by hairs except at mucocutaneous junctions or on muzzle and teats. Cells produced in stratum germinativum reach the surface in about 3 weeks. Average skin thickness in adult cattle is 6 mm and decrease from dorsal to ventral aspect of body.

Pathological thickenings occur in conditions like sarcoptic mange, callus formation etc.,

Head and Neck

Head, face and neck should be symmetrical. Muscular tone on either side should be equal. Normally neck is highly mobile and the animal should be able to turn the head back towards the flanks on either side of the body.

Mandible

Lower border may be irregular in animals changing their teeth. Mandibular symphysis and rami should be examined for fracture if the animal is unable to prehend or close its mouth.

Eyes

Abnormal eye position can occur due to damage of nerves controlling ocular movements. Infection /tumour within orbit causes prominence of one eye. Eyes may be sunken in dehydrated and severely emaciated animals. Sclera, the outer fibrous tunic should be examined for discolouration as seen in jaundice. Cornea is the transparent and anterior part of the fibrous tunic and plays an important role in the convergence of light rays so that images are formed on the retina. Conjunctiva lines eyelids and is reflected onto eyeballs and should be salmon pink in colour and slightly moist. Foreign bodies may be trapped in conjunctiva and cause irritation and corneal damage and increased tear production. Size of pupil should be evaluated. Abnormal dialation may be due to lesions in 3rd cranial (oculomotor) nerve, retina/optic nerve.

Lips and Tongue

Tongue is usually highly mobile and muscular. Inability to co-ordinate lip movements and accumulation of boluses in cheek may be due to damage of 7th cranial (facial) nerve and may be unilateral usually. Damage to 12th cranial (hypoglossal) nerve due to alkaloid toxicity, botulism or listeriosis causes inability to move tongue. Damage to 9th (glossopharyngeal) and 10th (vagus) nerve causes inability to swallow.

Pharynx

lies dorsal to larynx and can be compressed if retro-pharyngeal lymph node is not enlarged and infected. Inflammation of Pharynx or enlargement of retro-

pharyngeal lymph node causes difficulty in swallowing.

Trachea

Can be palpated on the ventral part of neck. In normal animals tracheal palpation evokes a single cough, but upper respiratory tract infection/pneumonia gentle palpation causes paroxysmal coughing.

Oesophagus

Is seen on ventro lateral side of neck on left side. It has cervical and thoracic part. The cervical part can be palpated. In fine coated animals boluses of food/cud passing through oesophagus can be seen. While passing stomach tube the tip of stomach tube causes a visible bulge in cervical part of oesophagus

Heart and Lungs

For understanding the functional state of heart and lungs the most common method used by a Veterinarian is auscultation and percussion. Common sites for auscultation and percussion are same but size, shape and borders vary in species.

a). Auscultation and percussion area of lungs

It is in a triangular area. Its dorsal border extends along a line from caudal angle of scapula to tuber coxae. Cranial border extends from caudal angle of scapula to olecranon and caudal border intersects these two lines and extends from sternal end of 6th rib to dorsal border of last but one intercostal space through the middle of 9th rib.

b). Auscultation and percussion of heart

Heart is located in anterior part of thorax between 3rd and 6th ribs. Anterior extremity of base of heart where greater blood vessels originates is in level with 3rd rib. Posterior extremity is in level with 5th rib on left and 6th rib on right side. Apex is directed down in level with 6th rib. Percussion in this area gives cardiac dullness. Increase in area of cardiac dullness indicate enlargement of heart or pericardial effusion and decrease may be observed in emphysema or pneumonia.

Abdomen

The abdominal cavity has to support the larger organs for fermentative digestion and hence it occupies a greater percentage of the trunk. The lateral part of abdominal wall not protected by the rib cage, pelvis or thigh is called flank and the triangular depression on the upper part of flank is the paralumbar fossa and this is an important surgical area.

Bony Pelvis

It is formed by sacrum and first 2-3 caudal vertebrae dorsally, pubis and ischium ventrally, wings of ilium and sacrosciatic ligament laterally. Pelvic inlet/terminal line is the imaginary line separating abdominal and pelvic cavities. It is bounded dorsally by base of sacrum, laterally by ilio-pectineal lines and ventrally by anterior border of the pubis. The pelvic outlet is bounded by 3rd caudal vertebra dorsally, ischial arch ventrally and caudal part of sacrosciatic ligament and semi membranous muscle laterally. Sacrosciatic ligament almost fills the space between sacrum and pelvic bones and forms major part of lateral wall of pelvic cavity. The pelvic floor is concave and rises to the ischial arch. The ischiatic spine seen laterally is high and unyielding to expansion. Hence there is no possibility of lateral expansion of pelvic canal even under hormonal influence. Just before calving due to hormonal influence sacrosciatic ligament and the sacro-iliac ligament relax and as a result sacrum and first few caudal vertebrae move dorsally and the tail head appears raised.

The obturator nerve passes along the medial aspect of ilium and is vulnerable to injury during dystocia, resulting in obturator paralysis.

The 6th lumbar nerve contributes to the formation of lumbo-sacral plexus which mainly supplies hindlimb and genital organs. This nerve also passes caudally over the pelvic inlet and it is also vulnerable to damage during dystocia.

Middle Uterine Artery:

Is a branch of internal iliac artery which is the direct branch of abdominal aorta. In non-pregnant animals it runs caudally in the broad ligament over wing of ilium into pelvic cavity and joins the concave ventral surface of uterus. It is highly mobile and tortuous in the broad ligament. As pregnancy advances, it will be pulled forwards by enlarging uterus and by second half of pregnancy it can be palpated 5-10 cm anterior to wing of ilium. At five months a turbulent flow or fremitus is palpable on the pregnant side of uterus. Towards the end of pregnancy it is palpable on both sides.

Internal iliac artery:

Is relatively immobile and is found just anterior to the wing of ilium.

Pudendal artery:

Is palpable on the wall of pelvic canal 10 cm anterior to anus. □

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