CHAPTER III
MATERIALS AND METHODS

The present study entitled “Ultrasonographic studies for diagnosis of clinical abdominal pathological conditions in dogs” was carried out on twenty five client-owned dogs of either sex and different age group at the Department of Veterinary Surgery and Radiology, College of Veterinary Science and Animal Husbandry, Junagadh Agriculture University, Junagadh during year 2017 to 2018.

3.1 EXPERIMENTAL DESIGN

In a prospective randomised blinded design 100 dogs will be screened. Out of which 25 dogs will be selected which exhibits clinical signs of abdominal pathologies. Ultrasonographic examination of abdomen was performed in dogs. These dogs underwent operation as a surgical regimen indicated for the treatment of various surgical affections of internal abdominal region.

3.2 ULTRASONOGRAPHIC EXAMINATION

3.2.1 Equipment and procedure

Department of Veterinary Surgery and Radiology, College of Veterinary science and Animal Husbandry, Junagadh Agriculture University, Junagadh is well equipped with an ultrasound machine e-Saote with multi frequency probes. Curvilinear variable frequency scan head (2.5-5 MHz) and linear scan head (8-10 MHz) to undertake ultrasonographic examination in dogs of the present study.

After history taking animal were placed on dorsal or lateral recumbency and gently restrained by assistant holding the forelimb and hindlimb after being muzzled. Abdominal hair was clipped by wetting the skin with water, soap, 70 % iso-propyl alcohol or by scrub solution. Shaving the ventral abdominal starting from xiphoid cartilage up-to the inguinal region of animal. On the lateral aspects, shaving included the area caudal to the 8th intercostal space, extending caudally up to the coxo femoral joint. Abdominal region was examined by e-saote ultrasound machine equipped with a curvilinear variable frequency scan head (3-5 MHz) and by linear scan head with the frequency of (8-10 MHz) by placing ample amount of acoustic coupling gel.
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(aquascan) on transducer then the probe was placed on the skin of the abdomen and moved across for examination of desired region.

3.2.2 Abdominal divisions

The ventral abdomen and pelvis were divided by two transverse lines into three distinct regions namely cranial abdominal region (hypochondriac region), middle abdominal region (umbilical region) and caudal abdominal region (suprapubic region). Further, divided by two longitudinal lines into nine regions to facilitate examination of different abdominal and pelvic organs according to (Done et al., 2009) as illustrated.

3.2.3 Topographic anatomy of ventral abdomen and pelvic regions

These innovative divisions were used to localize the different situations of abdominal and pelvic organs by numerical numbers in figure, then abdominal wall was covered with coupling gel and the animals were placed in dorsal or left lateral recumbency for examination.

3.2.4 Different approaches to ultrasonography of abdominal and pelvic organs

3.2.4.1 Liver

The hepatic parenchyma, gall bladder, biliary system, and vascular structures were evaluated during the course of ultrasound study. The scan head was applied immediately caudal to the xiphoid cartilage at the right and left hypochondriac and xiphoid regions for examination of different liver lobes as formerly demonstrated in and directed cranially to minimize interference from stomach gases according to (Kealy et al., 2010).

3.2.4.2 Urinary system and prostate

3.2.4.2.1 Kidney

The kidneys were examined from a ventral approach with the animal in dorsal recumbency. The scan head was applied at the left and right hypochondriac and flank regions over the last two intercostal spaces on the right and just caudal to the last rib on the left for visualization of right and left kidneys. Standard transverse and sagittal planes of the kidney were performed according to (Barr and Gaschen, 2011).

3.2.4.2.2 Urinary bladder
The urinary bladder was examined at pubic region. The bladder wall thickness was measured at transverse and sagittal planes as described by (Dennis et al. 2010).

3.2.4.2.3 Prostate

The animals were examined in lateral, ventrodorsal recumbency or in the standing position in large dogs. Transcutaneous sagittal and transverse scans were performed at left or right caudal abdominal region. Hair was clipped lateral to the prepuce and acoustic coupling gel was applied. The transducer was placed parallel to the prepuce, perpendicular to the skin as described by (Cartee and Rowles, 1983).

3.2.4.3 Spleen

The spleen was examined through ventral approach at left hypochondriac region just caudal to the xiphoid cartilage from this window the remainder of the spleen was examined by scanning dorsally along the costal arch, until the head of spleen was located. The left intercostal approach was used to visualize the head of the spleen at 11th or 12th intercostal space according to (Kamonrat, 2013).

3.2.4.4 Gastrointestinal tract

3.2.4.4.1 Stomach

Animals were positioned in the ventrodorsal position with the transducer placed caudal to the costal arch in a sagittal plane. The gastric area was examined from right to left, angling the beam craniodorsally at the left hypochondric and xiphoid regions. The wall thickness was measured as described by (Larson and Biller, 2009).

3.2.4.4.2 Intestine

The intestine was scanned in middle abdominal region. The descending duodenum was identified in the right cranial abdomen as it extends caudally from the stomach. The wall thickness was measured using according to (Larson and Biller, 2009).

3.2.4.5 Genital system

3.2.4.5.1 Uterus
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The uterus was scanned at caudal abdomen, cranial to pubic bone just dorsal to urinary bladder. Uterine horns: left and right mid-abdominal window with sagittal beam.

3.3 PARAMETERS MONITORED

3.3.1 Clinico-physiological parameters:

The animals were subjected for thorough clinical examination, after collecting detailed anamnesis. The vital signs like rectal temperature (°F), pulse rate (number of beats per minute), respiratory rate (number of breaths per minute), mucous membrane colour and capillary refill time were recorded. All the animals were subjected for physical examination methods like palpation and percussion of the abdomen in order find out the nature of distension or abdominal masses if any.

3.3.2 Haematological parameters:

Two millilitre blood was collected from the cephalic vein from each animal and transferred in K₃EDTA vials for estimation of different haematological parameters viz haemoglobin (Hb) (g /dl), packed cell volume (PCV) (%), total Erythrocyte count (TEC) (x 10⁶ /µL), total leukocyte counts (TLC) (x 10³ /µL), differential leukocyte counts (DLC) (%) by haematology auto analyser (Model no. Abacus Junior Vet 5, Diatron, Hungary).

3.3.3 Biochemical parameters:

Four millilitre blood was taken and serum was collected by centrifugation at 3000 revolution per minute for 10 minutes and stored in Eppendorf tubes and was stored at -20°C. Biochemical study of blood serum sample was performed for quantitative estimation of tests including A) Alanine Aminotransferase (ALT) (IU/L), B) Aspartate Aminotransferase (AST) (IU/L), C) Alkaline phosphatase (ALP) (IU/L), D) Blood urea nitrogen (BUN) (mg/dl), E) Serum creatinine (mg/dl), F) Total protein (TP) (g/dL), G) Pancreatic lipase (IU/L), H) Albumin (g /dl) and I) Total bilirubin (TB) (mg/dL) was done in dogs using standard assay kits (Greiner Germany) with the help of automatic biochemical analyzer (Model no. Dia-chem 240 plus, Diatek, India).
3.4 STATISTICAL ANALYSIS

The data collected was analysed according to standard statistical procedure as described by Snedecor and Cochran (1994). The results were expressed as mean ± standard error of mean (SE).