**Intra-Operative Considerations**

* Anaesthesia:
* Proper preparation for an aesthetic emergencies including protocol, calculations of emergency drugs, access to emergency drugs, dosage for reversal
* Inhalation anesthesia is the method of choice for maintaining anesthesia for prolonged procedure. Intravenous techniques can be used for a short anesthetic procedure. The ex laps were performed under IV anaesthesia solely.
* Calculation of toxic doses and safe administration of additional drugs
* Knowledgeable and consistent ananesthetic monitoring and record taking every 5 minutes
* The goal of monitoring should be to maintain cardiovascular homeostasis and core body temperature.
* Parameters to be monitored in anesthetized ruminants include anesthetic depth, heart rate, respiratory rate, oxygen saturation, expired CO2 (EtCO2), temperature, blood pressure, and mucous membrane color.
* Patient monitoring is often a combination of manual and mechanical factors. Parameters such as eye position, palpebral reflex, mucous membrane color and capillary refill time are examples of manual monitoring. EKG, pulse oximetry, capnography and direct or indirect blood pressure measurement are examples of mechanical monitoring.
* Parameters for monitoring of heart rate and blood pressure are: Heart Rate – 60-120 BPM, < 55 BPM should be treated as bradycardia. > 140 BPM is tachycardia and the cause should be treated.
* Mean arterial pressure in sheep and goats should be greater than 65 mmHg and less indicates hypotension and should be addressed. An oscillametric blood pressure monitor will give accurate results placed on any leg when the correct position and size of cuff are utilized.

(<https://www.acvs.org/files/proceedings/2012/data/papers/170.pdf>)

***Normal ranges (with anesthesia)***

* *Temperature = >98°F*
* *Heart rate (beats/minute) = 80-120 (sheep, goats, calves); 70-100 (adult cattle)*
* *Respiratory rate (breaths/minute) = 30-40 (sheep, goats, calves); 20-40 (adult cattle)*
* *Blood pressure: >70 mm Hg (mean) and >100 mm Hg (systolic)*
* *Oxygen saturation = >95%*
* *EtCO2: 35-45*
* *Mucous membranes = pink, not pale, white, gray, or blue*
* General
* Possibility of regurgitation - Regurgitation during anesthesia can be a problem in ruminants due to large volumes of food in the forestomach. Anesthesia depresses the swallowing reflex, which increases the risk of aspirating stomach contents into the lungs. Active regurgitation can occur at light levels of anesthesia, especially when the larynx is stimulated by intubation.
* Possibility of bloat - Gross distention of the rumen is a problem with prolonged anesthesia. Rumen distention can impede diaphragm function, leading to abnormalities in breathing and oxygenation.
* most anesthetic drugs cause hypotension and hyperthermia, provide supplemental heat under anesthesia. Sheep become hypothermic during anaesthesia and standard methods should be used to maintain body temperature (insulating blankets, heating pads, etc.). Never place animals directly on the heat source
* Laparotomy is indicated for exploration of abdominal and pelvic cavities and other surgical procedures involving abdominal and pelvic organs; other specific indications are caesarean section, embryo transfer to produce transgenic goats, ovariectomy, rumenotomy, abomasotomy, ventral abdominal herniorrhaphy, intestinal resection, anastomosis, and cystotomry
* Preparation and control of intra-operative haemorrhage
* When incising there must be quick and accurate ligation of blood vessels using haemostats or sutures. A Mayo scissors may be used in favor of a scalpel, especially in newer surgeons (Dr Diptee recommends using Mayo for us).
* Care must be taken when incising transversus abdominis and peritoneum to avoid damage to abdominal organs
* Care of handing organs when handling and palpating internal structures, avoiding haemhorrage
* Peritonitis in ruminants is not as dangerous compared to the horse but care must be taken not to rupture intestines allowing intestinal contents to enter peritoneum
* Serosa of exposed abdominal viscera may be prone to drying and becoming damaged, and may form adhesions as a result. Constant washing of abdominal saline + lidocaine splash block (10 ml + 10 ml) or with normal saline prevents this from occurring.
* Peritonitis is a risk even without perforation of organs. Post op antibiotics essential
* Closure of skin must have apposition but not be too tightly sutured to allow space for tissue swelling.