**Drugs used for udder and teat surgical pre-operative anaesthetic preparation, calculations for bovine patient of approximately 500kg and their associated considerations**

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| **Drug** | **Doses/Calculations** | **Drug Class &****Route of Administration** | **Effects** | **Contraindications** | **Withdrawal times** |
| 2% Lidocaine(Local anaesthetic) | **Conc-** 20mg/ml**Toxic Dose**- 10mg/kg therefore using half the toxic dose= 5mg/kg**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)** | **Class-**1b antiarrhythmic drug**Route of Administration-** For nerve blocks therefore SC into nerve | A moderately long-acting local anaesthetic. It blocks initiation and transmission of nerve impulses at the site of application by stabilizing neuronal membrane, preventing nociception within the area. | Contraindicated in animals with a known hypersensitivity to the drug. | **Infiltration:**Meat- 4 daysMilk- 72 hours |
| Vol = 500kg x 5mg/kg 20mg/ml= 125mls (use 15mls per site) |
| 2% Xylazine(Sedative for chemical restraint) | **Conc-** 20mg/ml**Dose-** 0.025 mg/kg**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)**Vol=500kgx0.025mg/kg 20mg/ml= 0.625ml (use saline to make up to 1ml) | **Class-** Potent Alpha 2 adrenergic agonist**Route of Administration-**IM- trapezius muscle | Causes sedation, anaethesia, muscle relaxation and analgesia in many large animals. Species Variation:It is 10–20 times more potent in ruminants than other species and is therefore used as a very useful sedative and analgesic in cattle, sheep and goats. But it is still used for equine. | Contraindicated in pregnant cows as it induces uterine contractions. Detomidine may be considered as an alternative.For excited, unruly or anxious animals, xylazine may not produce reliable sedation.Side effects in animals include transient hypertension, hypotension, gastrointestinal upset and respiratory depression. | Meat: 4 daysMilk: 24 hours |
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| Tolazoline(Antagonist for Xylazine) | **Conc**- 10% = 100mg/mL**ED**- 2x xylazine dose (i.e. 0.1mg/kg)**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)**Vol=500kgx0.1mg/kg 100mg/ml= 0.5ml  | **Class-** Alpha 1 and 2 adrenergic competitive antagonist**Route of Administration-**IV | A direct peripheral vasodilator. This drug has direct actions on blood vessels; decreasing pulmonary arterial pressure and peripheral resistance while increasing venous capacity and cardiac output.  | Contraindicated in animalsexhibiting signs of stress, debilitation, cardiac disease, sympathetic blockage,hypovolemia, or shockSide effects include tachycardia, hypotension, and increased GI motility. | Meat: 8 daysMilk: 48 hours |
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| Flunixin meglumine(Analgesic) | **Conc**- 50mg/mL**Dose**- 1.1mg/kg**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)**Vol=500kg x 1.1mg/kg 50mg/ml= 11 ml  | **Class-** Nicotinic acid derivative non steroidal anti-inflammatory (NSAID)**Route of Administration-**IV- administered slowly within 30 seconds in the jugular vein. | This drug has potentanti-inflammatory and analgesic effects and is indicated for the treatment of acute and post-operative surgical pain. Flunixin is an exception among other NSAIDs since it relieves visceral pain and not integument pain as most NSAIDs do.  | Flunixin is not given slowly IV jugular as anaphylactic reactions have been associated with this drug. Treatment for longer than 3 days can result in hematochezia and hematuria. | Meat: 4 daysMilk: 72 hours |
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| Penicillin(Antibiotic) | **Conc**- 200,000 IU/mL**Dose-** 20, 000 IU/kg**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)**Vol=500kgx20,000IU/ml 200,000IU/ml= 50 ml | **Class-** Penicillin G (benzylpenicillin) – Natural penicillin**Route of Administration-**IM- Trapezius muscle | Penicillin G is used in all species for the treatment of infections caused by Gram(+), nonpenicillinase producing pathogens. | Allergic reactions to penicillin may occur in animals, especially cattle | Meat: 10 daysMilk: 48 hours |
| Streptomycin(Antibiotic) |  | Aminoglycoside antibiotic | Streptomycin is used to treat and prevent Gram(-) infections. | The aminoglycosides are relatively more toxic than other classes of antimicrobials. Hence, dosage regimens mustbe adjusted in animals with decreased renal function and they should not be used with other ototoxic or nephrotoxic drugs. | Meat: 2 days |
| Epinephrine(Used for emergency anaphylactic reactions) | **Conc**- 1mg/mL**Dose-** 0.02/kg**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)**Vol=500kgx0.02mg/ml 1mg/ml= 10 ml | **Class-** Alpha and beta adrenergic agonist**Route of Administration-**IV (emergency cases). In such a case, 0.01% (0.1 mg/mL) soln is required.If epinephrine HCl @ 1 mg/mL is the only concentration available, dilute 1mL in 9mL normal saline.Dose: 1.5 to 5.0 mL of 0.01% epinephrine HCl per 45Kg body weight (repeat after 15 minutes if necessary. | This drug’s actions on alpha adrenergic receptors reduce loss of intravascular fluid volume and possible risk of hypotension. Bronchial smooth muscle relaxation associated with action on beta adrenergic receptors helps to relieve bronchospasms, wheezing, and dyspnea that may occur during anaphylaxis. | Contraindicated in animals with narrow-angle glaucoma, hypersensitivity to drug, non-anaphylactic shock, during general anesthesia with halogenated hydrocarbons or cyclopropane, during labour and in cardiac dilatation or coronary insufficiency. Epinephrine should not be used in cases where vasopressor drugs are contraindicated. It should not be injected with local anaesthetics into small appendages of the body due to risk of necrosis.IV administration is not recommended for routine clinical cases. |  |
| Tetanus Antitoxin | Dose: 1500 unitsA 5mL vial contains 1500 units. | Systemic passive immunizing agent. |  | Risk of anaphylactic reaction | Meat: 21 days |
| Atropine(Used for emergency bradycardia associated with ocular surgical procedures) | **Conc-** 0.54mg/ml**Dose-** 0.04 mg/kg**Volume(ml) = Weight (kg) x Dose (mg/kg) Drug Concentration (mg/ml)**Vol=500kgx0.04mg/kg 0.54mg/ml= 37 ml  | Antimuscarinic agent |  |  | Antimuscarinic useMeat: 14 daysMilk: 3 daysWhen used as an antidote🡪Meat:28 daysMilk: 6 days |