

## **GUIDELINES FOR ANAESTHESIA AND ANALGESIA**

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Dr Christina Dart, Anaesthetist at the University of Sydney teaching hospital at Camden's large animal campus, uses the following protocol with regards to **pig** anaesthesia. These are used in private practice/industry and the common approach for anaesthetising pigs.

With respect to research work with pigs, the anaesthetic/analgesic regimes used should be similar. In the current *Australian Code of Practice for the Care and Use of Animals for Scientific Purposes* section **3.3.30-Anesthesia and Surgery** and **3.3.33-Post operative care** it confirms this. These are also the protocols that are taught to vet students at university and the recommended balanced approach to anaesthetics in general within the industry.

Christina Dart's recommendations are:

*Anaesthesia:* I believe that you having been using the Zoletil/ketamine/xylazine combination for sedation/induction in pigs. As expected from that protocol, recoveries can be rather long. If that should be an issue for a particular project I recommend reducing the IM dose of Z/K/X to 0.02-0.03 ml/kg, which might still provide sedation adequate for approaching/handling of the animals. Anaesthesia can then be induced parenterally using any of the common induction drugs including IV Thiopental 10 mg/ml given at 2.5 mg/kg increments, IV propofol 6 mg/kg given at 1 mg/kg increments or IV alfaxan 2 mg/kg at 0.5 mg/kg increments, or inhalation anaesthetics via mask. Maintenance of anaesthesia is best and easiest accomplished by using inhalation anaesthetics administered via endotracheal tube.

*Postoperative analgesia:* Of the opioid drugs we have been using IM buprenorphine at a dose of 0.005- 0.01 mg/kg. The dose may have to be increased to 0.05-0.1 mg/kg should pain be severe such after major surgical procedures. Buprenorphine is relatively long acting (8-12 hours) however patients should be monitored frequently in order to ensure adequate analgesia. Butorphanol IM at a dose of 0.1-0.3 mg/kg q 4-6 hrs has also been recommended, but may only be suitable for moderate pain. IM Methadone at a dose of 0.2-0.3 mg/kg has also been used. The methadone dose can be increased to 0.5 mg/kg if needed. We have little experience with methadone in swine and it may be possible that the patients may become too sedated especially at higher doses. Of the NSAIDS we have been using phenylbutazone 10-20 mg/kg PO q 12 hrs, or metacam 0.2 mg/kg IV/IM q 24 hrs. When using NSAIDS in swine postoperatively or to treat chronic pain after an initial "loading dose" efforts should be made to reduce the dose to a minimum necessary to control pain.

*Intraoperative analgesia* using opioids can be achieved with CRI fentanyl 50-100mcg/kg/hr or by using transdermal fentanyl by applying the appropriate size patch(s). Fentanyl patches take 8-12 hours to reach maximum effect and in species other than swine where they can be applied in the conscious animal they are placed the day before surgery. Alternatively they can be applied during anaesthesia and analgesia provided parenterally using methadone or morphine for the first 12 hours post op after which time the fentanyl patch should have "kicked in". Last but not least, the combination of zoletil/ketamine/xylazine provides analgesia not only because of xylazine but also because ketamine and tiletamine are analgesic drugs. From the aspect of analgesia sedation/induction with that combination provides pre-emptive analgesia which can be extended by adding opioids into the mixture or after induction if considered necessary."

NB: Ketamine/xylazine/telazol combination involves reconstituting 500mg Telazol powder with 2.5ml ketamine (100mg/ml) and 2.5mls xylazine (100mg/ml). It is administered at 0.5-1ml per 23kgs IM.

Recommendations for anaesthesia/ analgesia in sheep, rabbits and rodents are on the following page.

**Sheep** - Anaesthesia is usually induced with Zoletil at 12mg/kg IM or 14.4mg/kg IV. An endotracheal tube is placed and anaesthesia is usually maintained with 2-3% isoflurane.

Alternatively sheep can be anaesthetised with Alfaxan (alfaxalone) @ 1-1.5mg/kg IV and maintained on isoflurane 2-3%.

Analgesia is usually provided using buprenorphine at 0.005mg/kg IV perioperatively and postoperatively every 6-12 hours if needed. Morphine 0.2mg/kg IV can also be used. NSAIDS such as carprofen @ 1.5mg/kg IV or meloxicam at 0.2-0.5mg/kg s/c can also be used. Local anaesthesia using bupivacaine can also be used in more painful procedures.

**Rabbits** - Diazepam/ketamine combination for sedation/light anaesthesia 1-5mg/kg diazepam and 20-40mg/kg ketamine IM and then mask with isoflurane to maintain or place Endotracheal tube and maintain on isoflurane. We pre-medicate with atropine 1mg/kg sc. Zoletil at 5-25mg/kg IM-from light to general anaesthesia depending on dose. Alternatively, premed with atropine and then induce with isoflurane to maintain-recommend this for debilitated or depressed animals.

**Rodents** - We use inhalational anaesthesia-isoflurane or combinations of xylazine/ketamine or acepromazine/ketamine.

The reason we favour isoflurane over halothane in masking down animals for anaesthesia is that OH&S wise, isoflurane is a safer drug especially if worried about chronic exposure.

In rabbits and rodents, Buprenorphine or butorphanol can be used for analgesia. We generally use these perioperatively. Ketamine has analgesic properties but we still use an opioid perioperatively.

**Buprenorphine** dose for **rabbits**: 0.05mg/kg every 6-12 hours s/c

**Buprenorphine** dose for **mice and rats**: 0.05-0.1mg/kg every 6-12 hours s/c

**Butorphanol** dose for **rabbits**: 0.1-0.5mg/kg every 4-6 hours s/c

**Butorphanol** dose for **rats**: 0.5-2mg/kg every 6 hours s/c

**Butorphanol** dose for **mice**: 1-5mg/kg every 6 hours s/c

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