

THE UNIVERSITY OF QUEENSLAND
STANDARD OPERATING PROCEDURES
LABORATORY ANIMAL RESEARCH

SOP No: AHP 63

SUBJECT: Rederivation by Caesarian Section in Rodents

POLICY: This procedure may only be performed by a competent surgeon using full aseptic technique.

PRECAUTIONS: It is important to ensure that cross-contamination does not occur.

1. Dip the mother in disinfectant, such as dilute iodine, immediately after euthanasia
2. Use a second set of sterile instruments for opening the uterus from those used to open the skin.
3. If survival of the dam is not necessary, it is best to euthanaze her by cervical dislocation without any anaesthesia in order to avoid cardiovascular and respiratory depression of the pups

EQUIPMENT: Full surgical apparel including cap gown and gloves
Anaesthetic/Euthanasia soln of choice
Weak iodine solution B.P.
0.9% sodium chloride
70% ethanol
Cork board
Bench cloth x2
Swabs and cotton buds
Heat pad
250ml glass beakers x2

INSTRUMENTS (sterilized):-

120mm sharp/sharp scissors x3
120mm curved artery forceps
120mm straight toothed forceps x3
Ophthalmic fine tip cautery pen

PROCEDURE:

1. Place the euthanased or anaesthetised pregnant animal in dorsal recumbency on a sterile surface and make a long ventral midline incision from the xiphoid process to the pubis (care should be taken when opening the abdominal wall to not accidentally enter one of the uterine horns, as these are often lying immediately dorsal to the abdominal musculature).
2. Exteriorize one horn of the uterus and place on gauze soaked with warm saline.
3. Carefully open the horn along its entire length using scissors (on the side opposite the placental discs).
4. Working with one pup at a time, use forceps to ligate the umbilical blood vessels between the placental disc and the mother's uterus.
5. Pull the foetus away with its amniotic sac and placenta still attached.
6. Hand the pups to an assistant who then removes the amniotic sacs and provide postpartum care to the pups.
7. After all pups are removed from one horn, the forceps can be removed. If the blood vessels are large (e.g., in rats in advanced pregnancy) they should be ligated prior to removal of forceps; otherwise, gentle pressure with gauze or a cotton-tipped applicator will provide sufficient haemostasis.

8. Quickly proceed to the other horn and repeat the procedure for removing the pups.

9. For non-survival procedures, an alternative method is to make a cut across the caudal vagina and dissect out the entire uterus from the mesentery. The entire uterus is then placed in a dish with disinfectant and then removed onto a sterile absorbent surface for removal of the foetuses (An audiovisual step-by-step instructional guideline of this procedure in mice is available online [1]).

10. The pups should be gently dried and stimulated until they are breathing well and gain a healthy pink colour indicating good tissue oxygenation. Gently squeezing the tail or a paw, or providing oral stimulation using a cotton tipped applicator should evoke a response from a healthy full-term pup. The pups should be transferred to the foster mother as soon as possible.

RECOMMENDATIONS:

This procedure should be performed as close as possible to the expected time of parturition to increase the likelihood of producing viable pups. For mice, this should be performed on Day 19 or Day 20 (with day of vaginal plug observation being Day 0), depending on the strain.

The foster mothers should be of a stock or strain that typically has strong maternal instincts. Most outbred stocks do well. With inbred strains, BALB/c mice are typically good mothers

Foster mothers should have newborn litters preferably no more than 2 - 3 days old at the time of rederivation. Using a foster mother with pups of different coat colour from those pups being rederived will allow the two sets of pups to be easily distinguished once they are mixed together

Removal of the natural litter from the foster mother shortly before the procedure, and gently rubbing the two litters together along with some of the nesting material from the home cage should provide sufficient olfactory masking of the new pups to avoid rejection. Depending on the total number of pups in the two litters, some of the natural pups may need to be removed. A total of 8 to 12 pups will stimulate good milk production without overburdening the mother.

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REVISED:

REFERENCES

1. URL <http://www.ivis.org>
2. Foley PL Common Surgical Procedures in Rodents. In: *Laboratory Animal Medicine and Management*, Reuter J.D. and Suckow M.A. (Eds.). International Veterinary Common Surgical Procedures in Information Service, Ithaca NY
3. URL <http://oslovet.vetth.no/teaching/mouse/techniques/rederive/default.html>