

Refinement: Implantation of Central Venous Catheter in Minipigs

The experiment:

In March 2012 our department conducted a toxin experiment on minipigs. We bought 4 minipigs from Ellegaard Göttingen Minipigs. The minipigs were acclimatised for 4 weeks during which time the minipigs were housed in a group. The day before the experiment started, the pen was divided into 4 individual pens and we implanted central venous catheters in all 4 minipigs. The day of the experiment all 4 minipigs were fed the toxin in the feed, 3 different toxins plus 1 control. Blood samples were collected every other hour and all faeces were also collected. After 24 hours the minipigs were sacrificed and necropsied.



Refinement:

Our department works for animal welfare and refinement and we were able to do so in this experiment. We conducted a pilot study for this experiment, with one minipig, in 2011, and with our experiences from the pilot study and tips from several sources we were able to refine the implantation of the central venous catheter for the main experiment.

First, I would like to thank Ellegaard Göttingen Minipigs for all their help and service. They helped us a lot with this experiment. We used Ellegaard's protocol for implantation of the central venous catheter. And they helped us refine the bandaging that we used to fixate the catheters.

They recommended the Optiplaste Duct tape which is more flexible and softer than the normal duct tape we had used during the pilot study, which resulted in oedemas in the minipig jaw area. When using the Optiplaste Duct tape we had no oedemas.



We also had help from our anaesthesia department to refine the anaesthetic used for the implantation of the central venous catheter. During the implantation of the central venous catheter during the pilot study, we used the Zoletil mix, but after some concern from the anaesthesia department about the minipigs' venous pressure, especially seeing that the procedure of implantation of the central venous catheter requires good venous pressure, we decided to use a combination of medetomidine, butorphanol and propofol. This combination can also be reversed with atipamezol after the procedure is done. Using this anaesthesia we had no problems with the venous pressure and since we reversed the anaesthesia after the procedure was done, we reduced the recovery time considerably.

During the pilot study the minipig turned blue during the procedure, as it was laying on its back under anaesthesia for a long period of time. For the main experiment, we gave the minipigs oxygen via a mask from an oxygen concentrator. When using the oxygen concentrator, none of the minipigs turned blue.

In the pilot study we used the Braun Certofix Mono S 415 (6fr/15 cm) central venous catheter, but it was too long for the small size of minipig (10 kg) we were using and we had problems with the catheter sliding out and bending. After consulting with a colleague who uses the same procedure, we decided to use the Cook Medical C-PUM-301J (3fr/8 cm) catheter. This catheter is so short that you can insert it totally and imbed the end before suturing. A 10-cm Luer Lock BD Connecta extension with a three-way stop lock was then attached; the port rested in the bandage and could be exposed for sampling. The catheter was flushed with NaCl with Heparin between blood sampling. When using the Cook Medical catheter we had no problems with sliding or bending of the catheter. All the blood samplings were successful.

I hope these tips will be informative for others who use this procedure and that this will result in refinement of your procedures and better welfare for the minipigs.

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