

Percutaneous Endoscopic Gastrostomy (PEG) catheter placement for intragastric dosing studies in the Göttingen minipig

Peter Bollen¹, Henrik Saxtorph¹, Helle Lorentsen² & Adrian Zeltner²

¹) Biomedical Laboratory, University of Southern Denmark, Odense, Denmark

²) Ellegaard Göttingen Minipigs, Dalmoose, Denmark

Oral dosing is widely used to test compounds on Göttingen minipigs. The procedure of oral dosing by gavage is stressful for the animals and may require up to 3-4 technicians to perform. Some of these studies are chronic dosing studies with multiple daily dosing. In humans, PEG (Percutaneous Endoscopic Gastrostomy) catheters are commonly used to feed patients who are not able to ingest food, and where the placement of a nasal intragastric catheter is not possible. We suggested that oral dosing studies in minipigs would be easier to perform, and would cause less distress for the animals, when using PEG catheters, due to the absence of the need for restraint. For this reason, we investigated if PEG catheters could be placed and maintained in Göttingen minipigs, and we examined the degree of tissue reaction three weeks after placement.

Methods

Two male Göttingen minipigs with a body weight of 6 kg were brought into general anaesthesia by administration of 0.04 mg/kg medetomidine, 0.2 mg/kg midazolam and 0.05 mg/kg atropine IM, followed by IV administration of 3-5 mg/kg propofol IV. Anaesthesia was maintained by 3.5% sevoflurane. Via a gastric endoscope, the ventricle was insufflated with CO₂, and the mucosa of the ventricle was inspected for optimal placement of the PEG catheter. The catheter (Nutricia Flowcare) was placed through the mouth, by retracting a transabdominal snare. The security rings were attached, and the minipig was recovered from anaesthesia. The animals were housed post-operatively for three weeks, after which they were euthanized for pathological examination.



Figure 1: Placement of the endoscope through the mouth and oesophagus into the ventricle.



Figure 2: The site of PEG catheter placement is clearly visible by translumination.



Figure 3: An endoscopic view of the inserted cannula (white) and pulling snare (blue).

Results

PEG placement was performed without complications, and the animals recovered uneventful from anaesthesia. Appetite was fine, and a normal weight gain was observed. In one animal, no visible signs of inflammation (erythema, exudation) were observed. In one animal a slight formation of clear exudate was observed in combination of light reddening of the skin. Pathological inspection revealed a sheet of connective tissue around the catheter, with slight inflammation in both animals. In the animal with exterior exudation, a small (1x1 cm) adhesion to the spleen was observed. In both animals the ventricle, intestines and liver were mobile.

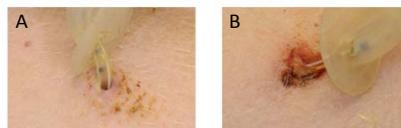


Figure 4: Skin reaction to catheter placement in two Göttingen minipigs. Minipig A had no erythema and exudation. Minipig B had slight erythema and exudation.



Figure 5: The catheter encapsulated in connective tissue in the abdominal cavity, with vascularisation and slight inflammation.



Figure 6: Schematic placement of a Flowcare PEG catheter.

Discussion

The study demonstrated that PEG catheter placement in the Göttingen minipig is possible without major complications. Apart from mild tissue reactions to the foreign body, no major inflammation was observed. The animals tolerated the PEG catheter well, and had a normal body weight gain. Correct placement of the PEG catheter is essential. The adhesion to the spleen was possibly due to damage of the splenic capsule. Therefore, extra attention should be paid to the correct placement of the catheter, and the catheter should be placed as far as possible from palpable and visible organs, like spleen and liver. This study investigated only acute tissue reaction to PEG catheter placement, and a follow-up study over a longer period should be performed for investigating chronic tissue reactions, and the effect of growth on PEG catheter placement.



Figure 7: The loose end of the catheter is kept in place by a net stocking. This animal started eating within 15 minutes after recovery from anaesthesia.

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