Foetal accumulation of oxymorphone after oxycodone administration to the ewe

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Background and Goal of Study: Oxycodone is a highly effective MOR agonist for managing moderate to severe visceral pain. Opioid use during pregnancy and labour is a concern because opioids pass freely through the placenta¹, and may compromise newborn's adaptation. In this experimental study with pregnant sheep we have evaluated foetal exposure to oxycodone and its major metabolites.

Materials and Methods: Ten ewes in late pregnancy received oxycodone 0.5 mg·kg⁻¹ either intravenously (i.v., n=5) or epidurally (n=5). Laparotomy and hysterotomy were performed to the ewes for placement of catheters into foetal superior vena cava and carotid artery. Two parallel maternal and foetal blood samples were taken for oxycodone and its metabolites assay.

Results and Discussion: The paired maternal and foetal blood samples were obtained at 1-2.5 h after oxycodone bolus. No accumulation of oxycodone was noticed; after i.v. administration the median (minimum-maximum) foetal-to-maternal-ratio (F/M-ratio) was 1.01 (0.77-1.95) and that after epidural administration 0.64 (0.47-1.04), respectively. However, the foetal plasma oxymorphone concentrations were significant; F/M-ratios were between 1.34 and 3.52 in the i.v.-group, and between 0.86 and 2.96 in the epidural-group. The plasma concentrations of noroxycodone and noroxymorphone were low.

Conclusion: Surprisingly, oxymorphone accumulation to the foetus was observed after a single bolus oxycodone administration to the ewe. Further studies are required to evaluate the foetal safety after maternal oxycodone administration in humans.

References: 1. Kokki M, Franco MG, Raatikainen K, Väitalo P, Sankilampi U, Heinonen S, Neuvonen PJ, Kokki H. Intravenous oxycodone for pain relief in the first stage of labour-maternal pharmacokinetics and neonatal exposure. Basic Clin Pharmacol Toxicol. 2012;111:182-8.