Doxorubicin-Induced Gut Toxicity in Piglets fed Bovine Milk and Colostrum - DTU Orbit (14/12/2018)

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OBJECTIVE: Chemotherapy-induced intestinal toxicity is a common adverse effect of cancer treatment. We hypothesized that a milk diet containing bovine colostrum (BC) would reduce intestinal toxicity in doxorubicin-treated piglets. METHODS: Study 1 investigated intestinal parameters nine days after a single dose of doxorubicin (1×75mg/m) in piglets fed bovine milk enriched with whey protein (BM). In Study 2, responses to doxorubicin treatment were investigated in piglets receiving either seven BC feedings per day (Only-BC, n=13), four BC feedings (High-BC, n=13), two BC feedings (Low-BC, n=14) or no BC (only BM, n=13). RESULTS: Doxorubicin treatment induced clinical signs of intestinal toxicity with diarrhea and weight loss, relative to controls (P<0.05). White blood cells, hexose absorptive function, plasma citrulline, weights of intestine, colon, and spleen were reduced, while gut permeability and plasma C-reactive protein (CRP) levels were increased (all P<0.05). Limited or no effects were observed for digestive enzymes, pro-inflammatory cytokines or tight-junction proteins in the intestine. Increasing BC supplementation to doxorubicin-treated piglets (Study 2) had no consistent effects on plasma CRP and citrulline levels, intestinal morphology, digestive enzymes, permeability, or proinflammatory cytokines. However, Only-BC pigs had lower diarrhea severity towards the end of the experiment (P<0.05 versus BM) and across the BC groups, intestinal toxicity was reduced (P<0.01). CONCLUSIONS: Doxorubicin-treated piglets are relevant for studying chemotherapy-induced gut toxicity. Colostrum supplementation had limited effects on doxorubicin-induced toxicity in milk-fed piglets suggesting that colostrum and a bovine milk diet enriched with whey protein provided similar chemotherapy protection of the developing intestine.

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