Doxorubicin-Induced Gut Toxicity in Piglets fed Bovine Milk and Colostrum - DTU Orbit
(17/01/2019)

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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.

General information
State: Published
Organisations: National Veterinary Institute, Section for Immunology and Vaccinology, University of Copenhagen, Odense University Hospital, Copenhagen University Hospital
Contributors: Shen, R. L., Rathe, M., Jiang, P., Pontoppidan, P. E. L., Heegaard, P. M. H., Müller, K., Sangild, P. T.
Pages: 698-707
Publication date: 2016
Peer-reviewed: Yes

Publication information
Journal: Journal of Pediatric Gastroenterology and Nutrition
Volume: 63
Issue number: 6
ISSN (Print): 0277-2116
Ratings:
BFI (2019): BFI-level 1
Web of Science (2019): Indexed yes
BFI (2018): BFI-level 1
Web of Science (2018): Indexed yes
BFI (2017): BFI-level 1
Scopus rating (2017): CiteScore 2.37 SJR 1.376 SNIP 1.337
Web of Science (2017): Impact factor 2.752
Web of Science (2017): Indexed yes
BFI (2016): BFI-level 1
Scopus rating (2016): CiteScore 2.25 SJR 1.274 SNIP 1.264
Web of Science (2016): Impact factor 2.799
Web of Science (2016): Indexed yes
BFI (2015): BFI-level 1
Scopus rating (2015): CiteScore 2.27 SJR 1.239 SNIP 1.24
Web of Science (2015): Impact factor 2.4
Web of Science (2015): Indexed yes
BFI (2014): BFI-level 1
Scopus rating (2014): CiteScore 2.4 SJR 1.246 SNIP 1.312
Web of Science (2014): Impact factor 2.625
BFI (2013): BFI-level 1
Scopus rating (2013): CiteScore 2.55 SJR 1.297 SNIP 1.362
Web of Science (2013): Impact factor 2.873
ISI indexed (2013): ISI indexed yes
BFI (2012): BFI-level 1