The Influence of Dexamethasone on NK Cytotoxicity and Neutrophil Phagocytosis in Weanling Piglets

1,2,4Dan-Yuan LO, 2,3Wei-Ming LEE, 1Maw-Sheng CHIEN, 1Cheng-Chung LIN, 4Wei-Cheng LEE

1Graduate Institute of Veterinary Pathology, College of Veterinary Medicine, National Chung-Hsing University, 250 Kuo Kuang Rd, 402 Taichung, Taiwan, R.O.C.
2Department of Veterinary Medicine, College of Veterinary Medicine, National Chung-Hsing University, 250 Kuo Kuang Rd, 402 Taichung, Taiwan, R.O.C.)
3Veterinary Teaching Hospital, College of Veterinary Medicine, National Chung-Hsing University, 250-1 Kuo Kuang Rd, 402 Taichung, Taiwan, R.O.C.
4Department of Veterinary Medicine, National Chia-Yi University, 300 University Rd, 600 Chiayi, Taiwan, R.O.C.

ABSTRACT The aim of this study was to evaluate the effect of dexamethasone (DEX) on the immune system. Weanling piglets were administered intramuscularly with DEX (1 mg/kg) every 12 hours for 2 consecutive days or daily for 2 weeks, as short-term and long-term experiments, respectively. Piglets in the control group were treated with saline. The changes of leukocyte number, neutrophil phagocytosis, and NK cytotoxicity were evaluated. In short-term experiments, the number of leukocytes, neutrophils, and lymphocytes were not significantly different between DEX- and saline-treated groups. Enhanced phagocytosis of neutrophils was observed in both DEX- and saline-treated groups. Notably, the NK cytotoxicity was greatly increased at 24 HPI (hours post injection) in DEX-treated piglets as compared to saline-treated group. Furthermore, in long-term experiments, a reduction in the number of lymphocytes was detected on 7 and 14 DPI (days post injection) as compared to 0 DPI, which is in great contrast to saline-treated group as it exhibited an increase in the number of lymphocyte after saline treatment. The neutrophil phagocytosis and NK cytotoxicity were reduced in both groups after treatment. In summary, our data indicated that the short-term, but not long-term DEX-treatment, temporarily enhanced NK cytotoxicity, and the number of lymphocytes and leukocyte functions were greatly reduced after long-term DEX or artificial treatment. We conclude that prolonged exposure to stress factor might impair the innate immunity against infections ascribed to the reduction of lymphocytes. [Lo DY, Lee WM, Chien MS, Lin CC, Lee WC. The Influence of dexamethasone on NK cytotoxicity and neutrophil phagocytosis in weanling piglets, Taiwan Vet J 31 (3) :138-147, 2005. Corresponding author TEL: 04-2284 0894, FAX:04-2286 2073, E-mail: wclee@dragon.nchu.edu.tw]

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INTRODUCTION

Many stress factors such as heat, cold, crowding, transportation, mixing, infectious agents, and treatment accumulated in the intensive pig raising environment impair the immune competence of host [5]. After initial perception of a stress factor, the animal mount an emergency 'alarm' reaction through hypothalamic-pituitary-adrenal pathway, a cascade reaction of corti-