硬膜外カテーテル留置イヌにおけるブロック効果の変化と機序

笹内杏子

Time dependent changes in anesthetic effect and its mechanism in epidural catheterization in a canine model

Kyoko SASAUCHI

日本歯科大学大学院生命歯学研究科歯科臨床系専攻
指導：砂田勝久教授
（日本歯科大学生命歯学部歯科麻酔学講座）
研究指導：中村達雄准教授
（京都大学再生医科学研究所臓器再建応用分野）

The Nippon Dental University, Graduate School of Life Dentistry at Tokyo
Director: Prof. Katsuhisa SUNADA
The Nippon Dental University, School of Life Dentistry at Tokyo,
Department of Dental Anesthesiology
Conducted by Associate prof. Tatsuo NAKAMURA
Kyoto University, Institute for Frontier Medical Sciences,
Department of Bioartificial Organs

(2014年1月)
BACKGROUND:
Continuous epidural analgesia with catheterization is a useful technique, because it has a wide adaptation range and provides prolonged analgesia. Problems that may arise from long-term epidural analgesia are changes in the analgesic area, duration of analgesia and catheter-related problems. Few articles have evaluated gradual changes of long-term epidural analgesia. In the animal models used in those studies, the catheter was inserted by an invasive surgical procedure. In the present study, we evaluated changes in a canine model in which the catheter was inserted by a minimally invasive procedure.

OBJECTIVES:
To evaluate long-term changes in the efficacy of epidural analgesia in an improved canine model in which the epidural catheter was inserted and fixed for 5 weeks using a minimally invasive procedure.

MATERIALS AND METHODS:
Six beagles underwent epidural catheterization under general anaesthesia. The catheter tip was located in the sixth lumbar region; the catheter peripheral end was passed subcutaneously through the neck. Physiological saline was continuously infused (1.0 mL/h) via the catheter throughout the study. The efficacy of epidural analgesia was assessed weekly with 2% lidocaine once a week in 5 weeks. Peripheral blood analysis including interleukin-6 (IL-6) level in the cerebrospinal fluid (CSF), histological evaluations and epidurography were performed to evaluate the mechanisms underlying the changes.

RESULTS:
No dog died and the catheters were kept in place. The efficacy of analgesia was well maintained until 4 weeks; at 5th week, the efficacy decreased by half. The spread of injected medium was not observed in the cranial direction at 5th week and the tip of catheter was capped with granulation tissue. Throughout the study period, white blood cell counts and C-reactive protein levels were slightly high for catheterization and the IL-6 level in CSF was below detectable limits.

CONCLUSIONS:
This was the longest study period with continuous epidural analgesia administered in canines. The effective period of epidural anesthesia was 4 weeks in this study. We speculate that time-dependent decrease in the anaesthetic efficacy was attributed to formation of granulation tissue surrounding the catheter tip.