

## 말기 신부전 환자와 신이식 환자의 부갑상선 종양에서 FGFR1과 Klotho의 발현 차이 비교

가톨릭대학교 의과대학 내과학교실 신장내과<sup>1</sup>, 서울성모병원 장기이식 연구소<sup>2</sup>

홍유아<sup>1</sup>, 임선우<sup>2</sup>, 이명현<sup>1</sup>, 김정관<sup>1</sup>, 조윤희<sup>1</sup>, 황현철<sup>1</sup>, 안건희<sup>1</sup>  
정병하<sup>1</sup>, 최범순<sup>1</sup>, 박철휘<sup>1</sup>, 김용수<sup>1</sup>, 장윤경<sup>1</sup>, 양철우<sup>2</sup>

### Parathyroid FGFR1 and Klotho Expression is Suppressed in Renal Transplant Recipients with Persistent Hyperparathyroidism

Yu Ah Hong<sup>1</sup>, Sun Woo Lim<sup>2</sup>, Myung Hyun Lee<sup>1</sup>, Jeong Gwan Kim<sup>1</sup>, Yul Hee Cho<sup>1</sup>  
Hyun Chul Whang<sup>1</sup>, Gun Hee An<sup>1</sup>, Byung Ha Chung<sup>1</sup>, Bum Soon Choi<sup>1</sup>  
Cheol Whee Park<sup>1</sup>, Yong Soo Kim<sup>1</sup>, Yoon-Kyung Chang<sup>1</sup>, Chul Woo Yang<sup>2</sup>

Division of Nephrology, Department of Internal Medicine<sup>1</sup>  
College of Medicine, The Catholic University of Korea  
Transplantation Research Center<sup>2</sup>, Seoul St. Mary's Hospital  
College of Medicine, The Catholic University of Korea

**Background:** Successful kidney transplantation usually corrects the hyperparathyroidism, but some patients show persistent hyperparathyroidism. The present study was designed whether klotho or fibroblast growth factor receptor 1 (FGFR1), key regulator of parathyroid hormone, are involved in persistent hyperparathyroidism in kidney transplant recipients (KTR).

**Methods:** Nineteen hyperplastic parathyroid glands were obtained from end stage renal disease (ESRD) patients and KTR, and six normal parathyroid glands were used as normal control (NC). We compared with the expression of Klotho or FGFR1 between KT recipients and ESRD patients. The expression of FGFR1 or Klotho was evaluated by immunohistochemistry, and quantitated as the number of FGFR1 or Klotho positive cells per unit area.

**Results:** The number of FGFR1 positive cells in KTR or ESRD patients was significantly lower than NC but there was no difference between KTR and ESRD patients. The number of Klotho positive cells in KTR higher than that of ESRD patients ( $3.46 \pm 3.90$  vs.  $0.70 \pm 1.05$  positive cell/ $0.5 \text{ mm}^2$ ,  $p=0.037$ ), but was lower than that of NC. There was significant positive correlation between Klotho and FGFR1-positive cells ( $r=0.573$ ,  $p=0.003$ ). The number of FGFR1 or Klotho positive cells decreased according to the severity of histopathologic findings.

**Conclusions:** Incomplete recovery of parathyroid FGFR1 and Klotho expression after transplantation may be responsible for persistent hyperparathyroidism.

**Key Words:** 부갑상선 종양, 신장이식, Klotho  
Parathyroid hyperplasia, Kidney transplantation, Klotho