

## 일반인구집단에서의 혈중 인 수치와 사망률과의 관계

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### Association of Serum Phosphorus Level with Mortality in General Population

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**Background:** High serum phosphorus levels were significantly associated with mortality in ESRD patient. And chronic kidney disease patients might be associated with cardiovascular event and high serum phosphorus level. However, serum phosphorus levels affect risk for death was not elucidated in general population without chronic kidney disease.

**Method:** Clinical and biochemical data had been collected in 136,235 routine health checkups between 1995 and 2009. Patients who undergone a colonoscopy in same-examination date was excluded. Patients with estimated GFR under 60 ml/min/1.73m<sup>2</sup> and over 1+ urine protein by urine dipstick examination were also excluded. In this study, mortality data were extracted from Statistics Korea at 31, December, 2011.

**Results:** A total of 93,230 individuals was included, the mean age was 53.3 years and male patients were 51,310 (55.0%). Among of them, 8.1% of participants had diabetes, and 27.7% had hypertension. About 10% patients showed urine protein trace (N=11765). Patient's educational level were also included in this study but, only 10% patient answered. Serum phosphorus levels were classified into 5 groups by quantile. The mean phosphorus level by quintile was 2.88±0.21 mg/dL, 3.30±0.08 mg/dL, 3.55±0.05 mg/dL, 3.83±0.11 mg/dL and 4.56±0.67 mg/dL, respectively. There were no significant difference in BMI, albumin, hsCRP, cholesterol, TG and muscle mass index between the groups. The mortality rate was 1.9% (N=1773), and ESRD has occurred in 0.45% (N=42) during 16 years of follow up. Survival analysis was performed by Kaplan-meier curve, and interestingly, the mortality rate conversely decreased as the serum phosphorus levels increase. In cox regression analysis, serum phosphorus level was failed to be an independent association with all-cause mortality after adjustment for by age, diabetes, hypertension, estimated GFR, body mass index, muscle mass index, lipid profile, C-reactive protein, and serum albumin. Only old men group (over 60 years old) seemed to be slightly increased mortality in statistically significant.

**Conclusion:** In this study, there might be no independent association of serum phosphorus with mortality in general population. Follow up serum level of phosphorus and other mineral metabolite such as FGF23, 25(OH)vitD are needed serially, and additional survival analysis are also need by age, gender difference.

**Key Words:** 혈중 인, 사망률

Serum Phosphorus level, Mortality