Changes in the pharmacokinetics of teicoplanin in patients with hyperglycaemic hypoalbuminaemia: Impact of albumin glycosylation on the binding of teicoplanin to albumin

There is large interindividual variability in serum teicoplanin (TEIC) concentrations after administration of a loading dose, and the factors that influence the pharmacokinetics of TEIC are disputed. The aim of this study was to clarify changes in the pharmacokinetics of TEIC that occur in patients with hyperglycaemia as well as the impact of albumin glycosylation on the pharmacokinetics of TEIC. This study consisted of retrospective and prospective investigations. The pharmacokinetic parameters of TEIC were retrospectively compared between patients receiving TEIC treatment. Ninety-four patients were divided into four groups according to their serum albumin and blood glucose concentrations [(i) hyperglycaemic hypoalbuminaemia (albumin<3.0g/dL) (n=16); (ii) non-hyperglycaemic hypoalbuminaemia (n=29); (iii) hyperglycaemic normoalbuminaemia (albumin≥3.0g/dL) (n=9); and (iv) non-hyperglycaemic normoalbuminaemia (n=40)]. In addition, the concentration of glycosylated albumin was prospectively determined in 28 patients. At 12h after administration of a loading dose, patients with hyperglycaemic hypoalbuminaemia displayed significantly lower serum TEIC concentrations (P<0.05) and higher TEIC volume of distribution (Vd) (P<0.05) than the other three groups, whereas TEIC clearance did not differ significantly among the groups. In addition, the percentage of glycosylated albumin was
significantly correlated with the association constant (Ka) of TEIC for albumin (r=0.53, P=0.004) and the Vd (r=0.41, P=0.031). These results suggest that hyperglycaemic hypoalbuminaemia lowers the serum TEIC concentration, which is attributable to the decreased Ka and increased Vd of TEIC by albumin glycosylation.

以上、本論文は低アルブミン血症と高血糖を合併する人では、血清テイコブラニン濃度が低下することを示し、原因として高血糖によるアルブミングリコンシル化の関与を報告した論文であり、学術上極めて有益であり、学位論文として価値があるものと認めた。

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