

Plasma Lecithin/Cholesterol Acyltransferase (LCAT) Activity in Multiple-Organ Donors: A Predictor of Allograft Viability in Clinical Liver Transplantation

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THE purpose of this study was to evaluate the efficacy of plasma lecithin/cholesterol acyltransferase (LCAT) activity of multi-organ donors as a predictor of hepatic allograft viability prior to liver transplantation.

MATERIALS AND METHODS

Thirty-nine brain-dead donors were studied during a 5-month period between April and August 1988. The age of the donors ranged from 12 to 42 years (mean 24.1 years); 26 were male (66.7%). The causes of brain death among the donors consisted of closed head injury in 21 (53.8%), gun-shot in 9 (23.1%), subarachnoid hemorrhage in 5 (12.8%), and others in 4 donors (10.3%). The allografts were stored cold (4°C) in University of Wisconsin solution.

Early post-transplant allograft function in the recipients was classified into three groups: good, fair, and poor function, according to the highest SGOT, SGPT and prothrombin time (PT) within 5 days following liver transplantation (good: SGOT \leq 1500 U/L, SGPT \leq 1000 U/L, PT \leq 20.0 seconds; fair: SGOT \leq 3500, SGPT \leq 2500, PT \leq 20.0 seconds; poor: SGOT $>$ 3500, SGPT $>$ 2500, PT $>$ 20.0 seconds). Grafts were put into the lowest (poorest) category into which any of the assessment value fell. Blood samples from the donors were drawn immediately prior to the aortic crossclamp.

Plasma LCAT activity was determined using a LCAT test kit-S (Nippon Shoji Co., Osaka Japan) at 37°C with a modification of the method described by Nagasaki and Akanuma.¹ A unit of LCAT activity was expressed as an ability to esterify the free cholesterol at 37°C ($\mu\text{g}/\text{mL}/\text{h}$) in the assay mixture. LCAT activities of the plasma from 5 healthy male volunteers were 31.0 ± 5.7 U.

RESULTS

Figure 1 demonstrates the correlation between the donor plasma LCAT activity and early post-transplant allograft function. The LCAT activity was significantly higher in the donors with good allograft function than in ones with fair or poor function ($P < 0.05$).

Among the donor variables evaluated (age, duration of hospital stay, SGOT, SGPT, total bilirubin, PT, and graft ischemic time), the age of the donors with fair function was significantly higher and the duration of hospital stay was significantly longer than those of ones with good function ($P < 0.05$). Other variables exhibited no correlation with early allograft function.

Among the clinical variables of the recipients (age, SGOT, SGPT, total bilirubin, prothrombin time and intra-operative blood loss), the intra-operative blood loss of the recipients who received graft with poor function was smaller than that of the ones with good function.

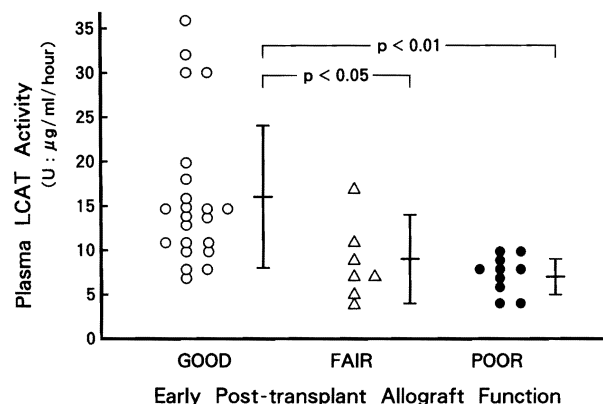


Fig 1. Correlation between the plasma LCAT activity in multi-organ donors and early post-transplant allograft function (LCAT = lecithin/cholesterol acyltransferase; U = $\mu\text{g}/\text{mL}/\text{h}$).

DISCUSSION

In 1987 Makowka et al² reported that none of the currently available donor variables could predict the transplant outcome. In our study, plasma LCAT activity correlated with healthy hepatic allograft function.

In the field of clinical liver transplantation, only a few studies have been reported on the assessment of the viability of hepatic allografts prior to liver transplantation. In 1988 Lanir et al³ and Kamiike et al⁴ reported that the adenine nucleotides level in hepatic allografts predicted the outcome of liver transplantation. For the measurement of adenine nucleotides, however, the allograft needs to be biopsied after donor laparotomy in the operating room, and special equipment is required. In 1989 Oellerich et al⁵ reported that serum levels of monoethylglycineylidene after intravenous injection of 1 mg/Kg of lidocaine correlated well with the viability of the hepatic allograft. Their technique requires the use of a special equipment for the determination of lidocaine metabolite. The plasma LCAT activity, on the other hand, can be measured easily with the use of a commercially available kit without special skills or equipment.

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In summary, the determination of LCAT activity in multiple-organ donors seems to be a discriminating and practical predictor of hepatic allograft viability prior to liver transplantation.

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