Peritoneal dialysis (PD) has become a widely used alternative to hemodialysis in patients with end-stage renal diseases. The renal clearance of drugs is significantly retarded in these patients. It is essential to design optimal administration regimen of drugs mainly eliminated via the kidneys for patients undergoing PD. Lithium is not metabolized, does not bind to plasma or tissue proteins. In this study, we clarified the effects of PD on pharmacokinetics of lithium in acute renal failure (ARF) rats using a PD model. ARF rats were prepared by an intramuscular injection of 50% glycerol (10 mL/kg) to male Wistar rats weighing 250-330g. Serum creatinine (Cr) and blood urea nitrogen (BUN) were monitored as indicators of the extent of renal failure. A silicone catheter was inserted into the abdominal cavity of the rats. Dialysis fluid (10 mL/kg; Dianeal PD-2 1.5, Baxter) was infused intraperitoneally via the implanted catheter. Lithium concentrations in the plasma and the dialysis fluid were measured at various time intervals up to 8h after administration (LiCl: 0.5 mmol/kg, i.v.) by atomic absorption spectrophotometry. Cr and BUN levels in ARF rats were about 4-times and 8-times higher than those in normal rats, respectively. Rapid transfer of lithium to the dialysis fluid was observed, and the lithium concentrations in dialysis fluid became to the same level to those in plasma in both the normal and the ARF rats. Although the distribution volumes of lithium increased under the single PD in both the normal and the ARF rats, the t1/2 and the CLtot values were not changed in PD.