

Table 14. Safety and dose adjustment for cardiovascular system drugs in patients with cirrhosis.

		CHILD-PUGH A	CHILD-PUGH B	CHILD-PUGH C
ACEI				
Benazepril Captopril Enalapril Fosinopril Lisinopril Perindopril Ramipril Quinapril	Safety	No risks known	Risks known	Unsafe
	Dose	Start at the lowest possible dose and increase gradually depending on effect and tolerance		Do not use
ARA-II				
Candesartan	Safety	No risks known	Risks known	Unsafe
	Dose	Start at 4 mg per day and then increase gradually		Do not use
Eprosartan Irbesartan	Safety	No risks known	Risks known	Unsafe
	Dose	Start at the lowest possible dose and increase gradually		Do not use
Losartan	Safety	No risks known	Risks known	Unsafe
	Dose	Start at 12.5 mg per day and then increase gradually		Do not use
Olmesartan	Safety	No risks known	Risks known	Unsafe
	Dose	Start at 10 mg per day and then increase gradually	Start at 10 mg per day and then increase gradually. Maximum dose 20 mg per day	Do not use
Telmisartan	Safety	No risks known	Risks known	Unsafe
	Dose	Start at 20 mg per day and then increase gradually. Maximum dose 40 mg per day		Do not use
Valsartan	Safety	No risks known	Risks known	Unsafe
	Dose	Start at half the dose and increase gradually. Maximum dose 80 mg per day		Do not use
CALCIUM CHANNEL BLOCKERS				
Amlodipine ✓	Safety	No risks known		
	Dose	Standard	Start at 2.5 mg per day	Start at 2.5 mg every other day
Barnidipine	Safety	Unsafe		
	Dose	Do not use		
Diltiazem ✓	Safety	No risks known		
	Dose	Start at half the dose and increase gradually depending on effect and ADR		
Felodipine	Safety	No risks known		Unsafe
	Dose	Start at 2.5 mg per day		Do not use
Lacidipine	Safety	Unknown		
	Dose	Start at 2 mg once per day		
Lercanidipine	Safety	Unknown		Unsafe
	Dose	No dosing recommendations		Do not use
Nicardipine (oral)	Safety	Unsafe		
	Dose	Do not use		
Nifedipine ✓	Safety	No risks known		
	Dose	Start at half the standard dose		Start at half the standard dose and double the dosing interval
Nimodipine (oral)	Safety	No risks known		
	Dose	Start at 30 mg three times per day		
Nitrendipine	Safety	Unsafe		
	Dose	Do not use		
Verapamil (oral)	Safety	No risks known		Unsafe
	Dose	Start at 40 mg twice per day and then increase depending on effect and ADR. Maximum interval every 12 hours		Do not use
NON-CARDIOSELECTIVE BETA-BLOCKERS				
Carvedilol ✓ (m)	Safety	Safe		
	Dose	Standard	Start at half the standard dose	Start at 25% of the standard dose
Labetalol (oral) (h)	Safety	No risks known		
	Dose	Start at half the standard dose		
Propranolol ✓ (l)	Safety	Safe		
	Dose	Maximum starting dose: 20 mg 3 times per day		
Sotalol (h)	Safety	No risks known		
	Dose	Standard		
CARDIOSELECTIVE BETA-BLOCKERS				
Atenolol ✓ (h)	Safety	Safe		
	Dose	Standard		
Bisoprolol (m)	Safety	No risks known		
	Dose	Start at 2.5 mg per day ²¹		Start at 2.5 mg per day ²¹ Maximum dose 10 mg/day
Celiprolol (m)	Safety	Unknown		
	Dose	No dosing recommendations		
Esmolol (h)	Safety	No risks known		
	Dose	Standard		
Metoprolol (l)	Safety	No risks known		Unsafe
	Dose	Standard	Start at 1/3 the standard dose	Do not use
Nebivolol (m)	Safety	Unsafe		
	Dose	Do not use		
LOOP DIURETICS				
Bumetanide	Safety	No risks known		
	Dose	Standard		
Furosemide	Safety	Safe		
	Dose	Standard		
POTASSIUM-SPARING DIURETICS				
Amiloride Eplerenone	Safety	No risks known		
	Dose	Standard		
Spironolactone ✓	Safety	Safe		
	Dose	Standard		
Triamterene	Safety	Unsafe		
	Dose	Do not use		
THIAZIDE DIURETICS				
Chlortalidone Indapamide	Safety	Unknown		
	Dose	No dosing recommendations		
Hydrochlorothiazide	Safety	No risks known		
	Dose	Standard		

(h) Water-soluble. (m) Moderately liposoluble. (l) Liposoluble. The pharmacokinetics of liposoluble beta-blockers is markedly affected in liver cirrhosis as they present an extensive first-pass effect and their plasma concentrations may increase.

(✓) Of choice.