

29-verapamil hydrochloride (CAS# 152-11-4)																
Table 1a. Sub-lethal acute poisoning (single dose): Clinical observations (time related)																
Ref No.	Reference (linked to full source)	Case No.	Case age/sex	Case category	Dose: g	Notes (case, dose, time)	Time (exposure to sampling): h	Notes (blood sample)	Blood conc.: mg/l	Blood conc.: µM	Metabolite Blood conc.: mg/l	Metabolite Blood conc.: µM	Symptoms and signs	Treatment	Time (exposure to recovery): h	
1	BGPC 87 12312	1	66	NR	NR	ET	6		7.20	15.84	(a)		C,H,LP	ST	NR	
2	Perkins 1978	2	19F	A	3.2		5	pl	4.00	8.80			I:H,LP 5h:HA	0h:ST,AA	NR	
3	Woie 1981	3	33M	S, Z	3	(b), ED	4.5	pl	1.21	2.65	1.26	2.86	0h:LP,H	0h:ST		
4	Crump 1982	4	39F	NR	≥1.2	ET	11	pl	0.51	1.12	0.84	1.91			NR	
		4				ET	19	pl, p	3.70	8.14			0h:DC,LP,H,KF	0h:ST		
		4				ET	23	pl	1.35	2.97			I:MA			
		4				ET	42	pl	1.30	2.86				8h:AR 24h		
		4				ET	76	pl	0.07	0.15			I:G,P,SS(c)		NR	
5	Jäger 1984 req	5	31F	NR	1.4	ET	9		1.67	3.68			NR	ST		
		5				ET	13		0.85	1.86					NR	
6	Zoghbi 1984	6	42M	S	2.4	(d)	4	sr	0.93	2.04	0.47	1.07	ba:LP,H 0h:MS,LP	ba:ST		
		6					16	sr	0.46	1.01	0.37	0.84				
		6					21	sr	0.35	0.77	0.34	0.77			48	
7	Kozlowski 1988	7	23M	S	8.2	ED	9	sr	2.81	6.19			0h:LP,H	0h:ST I:PM	NR	
8	Gris 1989	8	62F	S, A	NR		4		7.27	15.99			0h:C,H,LP	0h:ST,PM,K		
		8					15		0.12	0.26					17	
9	Hagège 1990	9	18F	NR	16.8		6		2.76	6.07			0h:C,LP,H	0h:ST,PM		
		9					8	p	4.49	9.87						
		9					18		3.53	7.76					120	
10	Spurlock 1991	10	38F	NR	4.8		1		1.20	2.64	0.91	2.06	0h:MS I:V I:H,LP,SZ,R	0h:ST I:AR	48	
11	Köppel 1995	11	17F	S, A	NR	(e)	2	pl	1.25	2.75			H	ST	240	
12	Buckley 1995	12	59M	S, A	2.4	(f), ET	6	sr	0.19	0.42			CA	ST, CR, AR	264	
		12					7.5	sr	1.07	2.35						
		12					17	sr	0.63	1.39						
		12					30.5	sr	0.27	0.59						
13	Kivistö 1997	13	45F	S, A	4		1.5	pl	2.70	5.94			H, LP	PM	NR	
		14	22M	S, A	3.2	(g)	2	pl	2.20	4.84			H, LP	PM, RC	NR	
14	Holzer 1999	15	41M	S, A	4.8-6.4	(h)	4	sr	0.63	1.39			CA, LP, H	ST, AR	432	
15	Szekely 1999	16	27M	S, A	24		18	pl	2.68	5.90			LP, MS	ST, PM, R	144	
16	Kuhlmann 1999	17	Ad	S, A	9.6		4	pl	4.36	9.59			H, LP	HD	NR	
		17					9	pl	2.82	6.20						
		17					17	pl	1.41	3.10						
17	Ori 2000	18	59F	S, A	7.2		16	sr	2.97	6.53			LP,H,KF,G,R (j)	PM, RC	NR	
		18														
18	Place 2000	19	49M	S, A	19.2		NR	sr	4.62	10.16			IP	(k)	5 or more	
		19														
19	Vadlamudi 2002	20	61F	A, Z	7.2	(i)	NR	pl	0.80	1.76			MS	ST	84 or more	

Footnotes [General Glossary (via link) lists definitions of common abbreviations (general terms, symptoms and signs, treatment)]															
MW (free base) 454.6															
(a) norverapamil, MW for a free base 440.5 (the cardioactive metabolite).															
(b) two year history of atrial fibrillation.															
(c) cerebral anoxic damage.															
(d) one year history of alcohol abuse; plus 5 mg lorazepam, and one liter of vodka.															
(e) plus metoprolol.															
(f) plus alcohol; treated for hypertension.															
(g) and some alcohol.															
(h) plus 1 g of diclofenac, 1 g of vitamin B1, 5 mg of vitamin B12, 6.25 mg of timolol, and an unknown amount of vitamin B6.															
(i) hypertension treated with verapamil; plus sertaline, diphenhydramine, and temazepam.															
(j) hyperglycaemia.															
(k) hyperinsulin therapy.															
Table 1b. Sub-lethal acute poisoning (single dose): Clinical observations (without time information)															
Ref No.	Reference (linked to full source)	Case No.	Case age/sex	Case category	Dose: g	Notes (case, dose, time)	Time (exposure to sampling): h	Notes (blood sample)	Blood conc.: mg/l	Blood conc.: µM	Metabolite Blood conc.: mg/l	Metabolite Blood conc.: µM	Symptoms and signs	Treatment	Time (exposure to recovery): h
1	Rasmussen 1986	1	50F	S, Z	3.6				0.97	2.12					
2	Howarth 1994	2	18F	S, Z	3.5S				2.37	5.21					
		3	18F		7.2				2.5	5.5					
3	Lüscher 1994	4	65F	Z	NR			sr, p	2.75	6.05					
Footnotes [General Glossary (via link) lists definitions of common abbreviations (general terms, symptoms and signs, treatment)]															
MW (free base) 454.6															

Table 2a. Lethal acute poisoning (single dose): Clinical observations (time related)															
Ref No.	Reference (linked to full source)	Case No.	Case age/sex	Case category	Dose: g	Notes (case, dose, time)	Time (exposure to sampling): h	Notes (blood sample)	Blood conc.: mg/l	Blood conc.: µM	Metabolite Blood conc.: mg/l	Metabolite Blood conc.: µM	Symptoms and signs	Treatment	Time (exposure to death): h
											(a)				
1	AAPCC 1990:511	1	38	S	NR	(b)	0.75		18.7	41.14			NR	NR	NR
2	Orr 1982	2	17F	NR	NR		13.5	sr	3	6.6	2.5	5.67	0h:DC,HA,LP 3h:CA	0h:ST,AC	
		2												I:AR,CR,PM	E20.5
3	Mayer 1985	3	60F	S, Z	2.4	(c)	8	pl	2.5	5.5			0h:DC,LP,H,E,N	0h:ST,AR	
		3					23	pl, i	2.7	5.94			I:KF	I:PM	E52
4	Børkje 1986	4	21M	S	7.68		2	sr	4.09	9.0			0h:MS,LP,SZ I:HA	0h:ST,AC	
		4											I:MA(6.96/-)	I:AR,CR,PM	2,5
5	Reines 1987	5	58M	S	≥2.4	(d)	3	sr	1.65	3.63			0h:MS I:LP,H 2h:N,R	0h:ST I:PM	
		5					4	sr y	1.2	2.64					
		5					10	sr	0.7	1.54					
		5					31	sr	0.1	0.22			23h:C,N		31
6	Minella 1991	6	33M	S	4.16		0.66		2.06	4.53	0.52	1.18	0h:NS 0.5h:LP	0h:ST 1h:PM	
		6											2.5h:CA	2.5h:CR	3,5
7	MacDonald 1992	7	22M	S	8.4	ED	8		2.42	5.32	1.74	3.95	0h:LP,H,MA(7.31/14.6)	ba:ST 0h:ST I:PM	
		7					24		2.47	5.44	2.11	4.79	E24h:PN,R I:CY,LP	E24h:AR	64
8	Howarth 1994	8	33F	NR	8	(e)	2		6.1	13.42			ba:CA	ST	E2.5
		8	37F	NR	8	(f)	3		19	41.8			ba:CA	NR	<4
9	Brass 1996	9	22F	S, A	4.8		1	pl	2.73	6.01			LP, ARDS	ST	36
10	Kuhlmann 1999	10	Ad	NR	2.4		4	pl	1.27	2.79			LP, H. (i)	PM, CR	38
		10					9	pl	1.15	2.53					
		10					17	pl	0.5	1.1					
11	Herbert 2001	11	58M	NR	NR	(g)	>24		1.74	3.83	0.85	1.93	LP, KF, RA	ST, PM	48
12	SPC	12	48M	Z	NR	(h)	NR	sr, p	0.69	1.52			K	PM, AR	NR
		12					5	sr	0.19	0.43					
13	SPC	13	21M	S, A	7.68		2	p	4.09	9	1.44	3.27	LP, H, HF	PM, ST	1,5
<b>Footnotes [General Glossary (via link) lists definitions of common abbreviations (general terms, symptoms and signs, treatment)]</b>															
MW (free base) 454.6															
(a) norverapamil, MW for a free base 440.5 (the radioactive metabolite).															
(b) blood ethanol level 2.3 g/l.															
(c) hypertension, atrial fibrillation; medication: acetyldigoxin, verapamil, and thyroxin.															
(d) hypertension since 7 years; medication: verapamil 80 mg x 3, bendroflumetazid 2.5 mg x 1, ketogan 5-6 tabl./day, nitrazepam 5 mg/day.															
(e) Wolff-Parkinson-White (WPW) syndrome; plus 2g of naproxen sodium.															
(f) hypertension.															
(g) a history of miocardial infarction and hypertension; medication: frusemide, verapamil, warfarin and amlodipine.															
(h) hypertension treated with verapamil.															
(i) multiorgan failure.															

Table 2b. Lethal acute poisoning (single dose): Clinical observations (without time information)															
Ref No.	Reference (linked to full source)	Case No.	Case age/sex	Case category	Dose: g	Notes (case, dose, time)	Time (exposure to sampling): h	Notes (blood sample)	Blood conc.: mg/l	Blood conc.: µM	Metabolite Blood conc.: mg/ml	Metabolite Blood conc.: µM	Symptoms and signs	Treatment	Time (exposure to death): h
											(a)				
1	AAPCC 1992:544	1	15						4.61	10.14					
2	AAPCC 1992:546	2	30						2	4.4					
3	Horowitz 1989	3	31M					sr	5.34	11.75					
4	AAPCC 1999:610	4	61	S					7.7	16.94	4.0	9.08			
5	AAPCC 2001:715	5	53	S					3.18	7					
6	AAPCC 2002:818	6	42	S				(b)	13.9	30.58					
7	AAPCC 2003:853	7	61	S		(c)			0.91	2					
<b>Footnotes [General Glossary (via link) lists definitions of common abbreviations (general terms, symptoms and signs, treatment)]</b>															
MW (free base) 454.6															
(a) norverapamil, MW for a free base 440.5 (the cardioactive metabolite).															
(b) blood concentration of metoprolol was 3.48 g/l.															
(c) plus benzodiazepine.															

Table 3a. Post-mortem observations (time related)															
Ref No.	Reference (linked to full source)	Case No.	Case age/sex	Case category	Dose: g	Notes (case, dose, time)	Time (exposure to sampling): h	Notes (blood sample)	Blood conc.: mg/l	Blood conc.: µM	Metabolite Blood conc.: mg/l	Metabolite Blood conc.: µM	Symptoms and signs	Treatment	Time (exposure to death): h
1	Gelbke 1977	1	42F	Z	NR	(a)	NR	wb	0.59	1.3					E2
2	Thomson 1981	2	40F	S, Z	NR		NR	wb	8.8	19.36			NR	ST	4
3	Mayer 1985	3	60F	S, Z	2.4	(b)	NR	pl, (c)	4.2	9.24			0h:DC,LP,H,E,N I:KF	0h:ST,AR I:PM	E52
4	Buckley 1993	4	44F	NR	17.5	(d), ED	NR	(e)	2.7	5.94			0h:H,LP	0h:ST I:PM	39
<b>Footnotes [General Glossary (via link) lists definitions of common abbreviations (general terms, symptoms and signs, treatment)]</b>															
MW (free base) 454.6															
(a) diabetes, hypertension, disordered action of the heart.															
(b) hypertension, atrial fibrillation; medication: acetyldigoxin, slow-released verapamil (retard), thyroxin.															
(c) level obtained immediately after death (see also Table: Lethal acute poisoning (single dose): Clinical observations (time related)).															
(d) verapamil retard.															
(e) at 26 and 31 h after ingestion, verapamil levels were >2.0 mg/l.															
Table 3b. Post-mortem observations (without time information)															
Ref No.	Reference (linked to full source)	Case No.	Case age/sex	Case category	Dose: g	Notes (case, dose, time)	Time (exposure to sampling): h	Notes (blood sample)	Blood conc.: mg/l	Blood conc.: µM	Metabolite Blood conc.: mg/l	Metabolite Blood conc.: µM	Symptoms and signs	Treatment	Time (exposure to death): h
1	AAPCC 1986:326	1	51						11	24.2					
2	AAPCC 1987:306	2	49						7.7	16.94					
3	AAPCC 1990:504	3	66						26.2	57.64					
4	AAPCC 1992:609	4	35						1.27	2.79					
5	Weller 1986	5	58F						20	44					
6	Crouch 1986	6	22M						9.3	20.46					
7	Chan 1987	7	66F						8.6	18.92					
		8	16M						6.6	14.52					
		9	42M						1.5	3.3					
		10	43F						4.5	9.9					
		11	48M						4.8	10.56					
		12	52M						85	187					
8	Rankin 1990	13	56M			(a)	14		4.3	9.46					
<b>Footnotes [General Glossary (via link) lists definitions of common abbreviations (general terms, symptoms and signs, treatment)]</b>															
MW (free base) 454.6															
(a) verapamil retard.															