

Author	Age	Mechanism	Symptoms	Intervention	Outcome
Alcaraz A	12/F	Medication error 2 mg	Asymptomatic for 48 hours, then ascending paralysis, hiccups, cranial neuropathy, coma	35 mL CSF drained at 30 minutes then additional drainage of 15 mL CSF replaced with lactated ringers. Ventriculo-lumbar perfusion at 3 hours using lactated ringers with 15 mL FFP/L for total drainage of 615 mL CSF over 10 hours. 0.785 mg recovered	Fatal day 83
al Fawaz IM	1.25/M	0.7 mg	Febrile and irritable at 10 hours; lower extremity pain, nuchal rigidity, opisthotonos, ileus, hypotonia at day 2; ascending paralysis, encephalopathy by day 5, respiratory arrest day 7	Intrathecal corticosteroids at 3 hours	Fatal day 75 (withdrawal of life support)
Al Ferayan A (Iqbal Y)	7/F	0.5mg	Ascending weakness, pain, paraplegia	Upright position. Immediate drainage 75 mL CSF within 15 minutes and replacement with lactated ringers. Ventriculo-lumbar perfusion started within 2 hours using 150 mL /hour lactated ringers for 10 hours then FFP 15 mL in 1L lactated ringers as irrigant at 55 mL/hr for 24 hours. Other adjuncts.	Paraplegia Neurogenic bladder Survival
Bleck TP	23/M	2 mg	Headache day 1, leg weakness day 2-3 followed by ascending myeloencephalopathy with coma at day 10, seizures	Drainage of 110 mL CSF at 10 minutes, "large volume lumbar punctures" day 2 and 3, adjunctive intravenous therapy	Prolonged coma Fatal at 11 months
Dettmeyer R	5/F		Ascending paralysis, opisthotonos, coma	Not described	Fatal day 7
Dettmeyer R	57/M		Ascending paralysis	"Flushing the subarachnoid space" not otherwise described	Fatal at 4 weeks
Dyke RW	Adult	Medication error	Ascending paralysis	Immediate drainage CSF of unreported quantity and replacement with lactated ringers. Ventriculo-lumbar perfusion 150 mL /hour for >24 hours then 25 mL FFP in 1L isotonic solution at 75 mL/hour for undefined time. 95% recovery of vincristine	Lower extremity neuropathy
Fernandez CV	4/F	Medication error 1.5 mg	Nystagmus, encephalopathy, ascending paralysis, transient improvement	Immediate drainage 18 mL CSF in 3 mL aliquots. Replacement NS. An additional 30-40 mL drained over 30 minutes, starting at 10 minutes. Ventriculo-lumbar perfusion using Plasmalyte to replace 200 mL CSF over at unknown rate. Then 6 mL FFP in 250 mL Plasmalyte at 50 mL /hour for 4 hours.	Fatal day 13
Gaidys WG	23mo/F	0.68 mg in 6.8 mL	Coma by day 3	Ventriculo-lumbar perfusion at begun at 4.5 hours with initial drainage 500 mL CSF and replacement with normal saline over 90 minutes. Subsequent drainage and replacement of 145 mL	Fatal day 6

CSF- Cerebrospinal fluid; LR - lactated ringers solution; FFP – fresh frozen plasma; see appendix D for bibliography and acknowledgements

Author	Age	Mechanism	Symptoms	Intervention	Outcome
Kwack EK	3/M	Medication error	Leg pain day 1, headache, nuchal rigidity day 2, bladder dysfunction, fever and lower extremity paralysis, opisthotonos day 3, coma	Not described	Fatal day 6
Lau G	27/F	Medication error into Ommaya reservoir	Ascending paralysis	Detail limited- CNS “washout” FFP and “lactate solution” in undefined quantities. Timing not described.	Fatal day 10
Manelis J	5/F	0.9mg	Headache at 10 hours, opisthotonos, nystagmus, flaccidity		Fatal day 18
Meggs WJ	59/F	Medication error into Ommaya reservoir 2mg	Nausea, vomiting day 1, altered mental status, tremor, chills, hiccups, nystagmus, coma over 1 week	50 mL CSF drainage at 10 minutes followed by 75 mL CSF drainage at 30 minutes. Ventriculo-lumbar perfusion with lactated ringers and FFP over 24 hours.	Fatal day 40
Michelagnoli MP	10/F	Medication error	Asymptomatic for 6 days Then ascending paraparesis with incontinence	Immediate drainage of CSF for 15 minutes Placement of epidural catheter above the lumbar drainage site with lumbo-lumbar irrigation using 500 mL lactated ringers with 12.5 mL FFP. 96 mL drained Placement of ventriculostomy and ventriculo-lumbar perfusion within 90 minutes for 24 hours Adjunctive therapy with	Survived with normal cognitive function Sensory-motor deficits of the extremities, urinary incontinence
Schochet SS	2.5/F	3mg	Opisthotonos day 2	200 mL CSF drainage in 10 mL aliquots. Replacement with NS.	Fatal day 3

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Appendix C
INADVERTENT INTRATHECAL VINCRIStINE EXPOSURES
Rama B. Rao, MD

Author	Age	Event	Symptoms/Signs	Intervention	Outcome
Shepherd DA	5.5/?	1.2 mg	Headache, vomiting and backache at 3 hours; nystagmus, extremity weakness at 72 hours, autonomic instability, hiccoughs, encephalopathy	Drainage of 20 mL CSF at 30 minutes repeated on day 2. Intrathecal corticosteroids 23% recovery of vincristine	Fatal day 12
Slyter H	29/F	2 mg	Headache, ascending paraplegia, cranial neuropathy, coma	Intrathecal infusion 5 mL normal saline with drainage of 10 mL CSF. Positioned upright; additional 60 mL CSF drained at 3 hours	Fatal day 14 (pulmonary embolus on autopsy)
Williams ME	16/M	Mislabeled	Ascending paralysis at 2 hours, fever, coma	None	Fatal
Zaragoza MR	6/M		Peripheral neuropathy, chorea, urinary retention day 2; ascending paralysis, Quadriplegia week 2	Immediate drainage 50 mL CSF Irrigation with “three passes” of lactated ringers Ventriculo-lumbar perfusion with LR containing 15 mL FFP/L for 18 hours	Alive at 24 months with upper extremity weakness and paralysis lower extremities

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TIMING OF CSF DRAINAGE and OUTCOME

Neurocognitive Survival	4				
Cognitive Impairment		1			
Death	2	1	3	2	6
	Immediate Drainage	10 minutes	≥30 minutes	None	Not described