

Title: SUCCINYLCHOLINE AND INTRACRANIAL PRESSURE IN CATS

Authors: J. E. Cottrell, M.D., J. P. Giffin, M.D., J. Hartung, Ph.D., and B. Shwiry, CRNA

Affiliation: Department of Anesthesiology, SUNY/Downstate Medical Center and Kings County Hospital Center, Brooklyn, New York 11203

Introduction. There is reason to suspect that succinylcholine (SCh) is contraindicated in patients with intracranial hypertension.^{1,2} Recent studies show a lack of SCh effect on the intracranial pressure (ICP) of dogs with raised ICP,³ and a lack of clinically significant SCh-induced ICP increase in humans.⁴ We investigated the effect of SCh on the ICP of cats with normal and increased ICP.

Methods. Cats were paralyzed with pancuronium, intubated, and mechanically ventilated with N₂O in O₂ to maintain PaO₂ 90-100 torr and PaCO₂ 30-40 torr. Mean arterial pressure (MAP), heart rate (HR), and pulmonary arterial pressure (PAP) were continuously transduced and recorded. Pulmonary wedge pressure (PWP) and cardiac output (CO) were obtained using a Swan-Ganz catheter, and temperature was controlled with a heating pad at 37 ± 0.5°C. A double 19-gauge needle was inserted into the cisterna magna and secured with cyanoacrylate tissue adhesive (Crazy Glue). Intracranial pressure was continuously monitored from one needle and Ringer's lactate was infused through the other, as necessary, to increase and maintain ICP at 27 ± 2 torr. After control values were stabilized for each experimental condition (normal and increased ICP, in random order), SCh was injected intravenously (1.5 mg/kg).

Results/Conclusion. A rapid, marked, short-duration increase (≈ 100%) in ICP followed injection of SCh under both ICP conditions (see figure). As indicated in the table, a significant transitory drop in MAP was followed by a significant subsequent increase. Although the observed increase in ICP was short-lived (10-15 seconds), its intensity and magnitude suggest further investigation is warranted in humans with intracranial masses.

Table: ICP, MAP, HR, CO, PAP, and PWP following SCh in cats with normal (1) and raised (2) ICP.

	Before SCh	After SCh	Mean Change	p = <
ICP (torr)	1. 8.2 (n=9)	16.3	+8.1	.01
	2. 27 (n=8)	47	+20	.01
MAP (torr)	1. 131 (n=9)	107	+24	.01
	2. 113 (n=7)	93 131	+18	.05
HR*	1. 154 (n=9)	170	+16	.05
	2. 167 (n=8)	174	+7	.06
CO (l/min)	1. .79 (n=6)	.97	+ .17	N.S.
	2. .77 (n=7)	.86	+ .09	N.S.
PAP (torr)	1. 10 (n=8)	14	+3	.05
	2. 22 (n=6)	26	+4	.05
PWP (torr)	1. 10 (n=1)	16	+6	N.S.
	2. 18 (n=3)	20	+2	N.S.

N.S. = no significance
* = beats/min

References:

1. Halldin M, Wahlin A. Effects of succinylcholine in the intraspinal fluid pressure. *Acta Anaesth Scand* 3:155-161, 1959.
2. Hunter AP. Pharmacology II: Non-volatile agents. In: *Neurosurgical Anaesthesia*. Great Britain: Alden Press, 1975. pp. 77-109.
3. Paul WL, Bishko JR, Woodham B. Succinylcholine, d-tubocurarine, dimethyltubocurarine, and intracranial pressure in dogs (Abstract). *Anes Analg* 60:29, 1981.
4. Marsh ML, Dunlop BJ, Shapiro HM, Gagnon RL, Rockoff MA. Succinylcholine-intracranial pressure effects in neurosurgical patients (Abstract). *Anes Analg* 59:550, 1980.

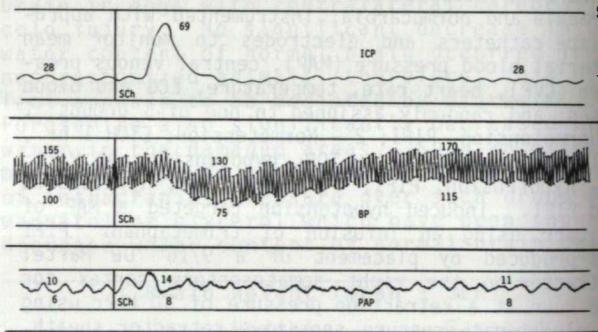


Figure: Tracing of ICP, BP, and PAP for ≈100 seconds. Vertical line = injection of SCh (1.5 mg/kg) from cat #10 - initial ICP increased).