MISC-01

ANTIVENOM THERAPY OF CROTALINE SNAKEBITES: DID THE POISON CONTROL CENTER PROVIDE AN EFFECTIVE GUIDELINE?

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BACKGROUND/AIMS: Crotaline snakebite (*Protobothrops mucrosquamatus* and *Trimeresurus stejnegeri stejnegeri*) is a common medical emergency in Taiwan. The specific antivenom to such snakebites is equine-derived bivalent $F(ab')_2$. We investigated the differences in clinical outcomes between patients who received antivenom dose recommended by the poison control center (medical group) and patients who received different therapeutic regimen of antivenom (surgical group) in a medical center.

METHODS: We conducted a retrospective cohort study by reviewing medical records of patients with crotaline snakebite between 1991 and 2005. We used a structured questionnaire to abstract information on demographic variables, treatment, adverse effects of antivenom, and local/ systemic complications. T-test, chi-squared test, and multiple logistic regression were employed in data analyses.

RESULTS: One hundred and seventy-nine patients (89 surgical, 90 medical) were eligible for the study. There was no inter-group difference in patients' demographic data. The average dose of antivenom and the probability of antibiotic use were both significantly higher in the surgical group as compared to the medical group (5.9±4.2 vials versus 2.7±1.6 vials; 93% versus 60%). Multiple logistic regression that was adjusted for age, gender, calendar year of envenoming, severity of envenoming and antibiotic use revealed no significant difference in the occurrence of adverse reactions to antivenom, local and systemic complications, and digit amputation between the two groups.

CONCLUSIONS: Lower dose of antivenom recommended by the poison control center is as effective and safe as the higher dose used in the surgical group for the treatment of crotaline snakebites. The study findings, however, do not exclude the possibility that high dose of antivenom may be beneficial to certain severely envenomed patients.

Key words: Snake bite, Crotalid venom, Antivenom

Table 1. Distribution of baseline demographic and clinical characteristics of 179 patients with crotaline snakebite

Characteristics	Surgical group n= 89 (%)	Medical group n= 90 (%)	*p* value
Age, mean ± SD years*	45.9 ± 20.5	44.4 ± 17.5	0.6
Male	64 (72)	59 (66)	0.4
Major comorbidities	2 (2)	1 (1)	0.6
Transferal from other hospitals	52 (58)	63 (70)	0.1
Pre-hospital management	12 (14)	17 (19)	0.4
Calendar year of envenoming			0.005
1991-1995	24 (27)	14 (16)	--
1996-2000	37 (42)	26 (29)	--
2001-2005	28 (32)	50 (56)	--
Snake species			1.0
Protobothrops mucrosquamatus	68 (76)	68 (76)	--
Trimeresurus stejnegeri stejnegeri	21 (24)	22 (24)	--
Sites of snakebite			0.9
Upper limb	41 (46)	43 (48)	--
Lower limb	48 (54)	47 (52)	--
Acute symptoms/ signs			
Local pain	89 (100)	90 (100)	1.0
Inflammation	89 (100)	90 (100)	1.0
Local bleeding	20 (23)	19 (21)	0.9
Bruising	65 (73)	61 (68)	0.5
Blistering	15 (17)	12 (13)	0.5
Severity of envenoming			0.5
Mild to moderate	49 (55)	48 (53)	
Severe to very severe	40 (45)	42 (47)	
Start of antivenom ≤ 8 hours	79 (89)	82 (91)	0.9
Antivenom dose, mean ± SD vials	5.9 ± 4.2	2.7 ± 1.6	< 0.001
Route of antivenom			1.0
Intravenous	84 (94)	84 (93)	--
Local injection plus intravenous	5 (6)	6 (7)	--
Use of antibiotics	83 (93)	54 (60)	< 0.001

SD: standard deviation

Table 2. Distribution of various outcomes and their association with the treatment groups among 179 patients with crotaline snakebite

Outcomes	Surgical group n= 89 (%)	Medical group* n= 90 (%)	Odds ratio and 95% confidence interval	
			Crude	Adjusted†
Life-threatening complications‡	4 (5)	4 (5)	1.0 (0.2-4.2)	1.4 (0.2-7.7)
Other complications	28 (32)	35 (39)	0.7 (0.4-1.3)	0.5 (0.2-1.0)
Coagulopathy	4 (5)	5 (6)	0.8 (0.2-3.1)	0.8 (0.2-4.2)
Rhabdomyolysis	3 (3)	10 (11)	0.3 (0.1-1.1)	0.3 (0.1-1.2)
Acute renal impairment	1 (1)	4 (4)	0.2 (0-2.2)	0.1 (0-1.2)
Cellulitis/ necrosis	17 (19)	21 (23)	0.8 (0.4-1.6)	0.5 (0.2-1.1)
Compartment syndrome	4 (5)	6 (7)	0.7 (0.2-2.4)	0.5 (0.1-1.9)
Dermatomy/ fasciotomy	4 (5)	3 (3)	1.4 (0.3-6.3)	0.7 (0.1-4.2)
Skin graft	8 (9)	5 (6)	1.7 (0.5-5.3)	0.9 (0.2-3.2)
Digit amputation	1 (1)	1 (1)	1.0 (0.1-16.4)	0.4 (0-6.7)
Adverse effects of antivenom	3 (3)	3 (3)	1.0 (0.2-5.2)	1.3 (0.2-8.1)

* Reference group

† Adjusted for age, gender, calendar year of envenoming, severity of envenoming, and use of antibiotics

‡ Including severe rhabdomyolysis (creatine phosphokinase ≥ 10,000 U/L) and acute renal failure (creatinine ≥ 3 mg/dL)