The THAI Journal of SURGERY 2015;36:108-111.
Official Publication of the Royal College of Surgeons of Thailand

Original Article

Steroid Prophylaxis and Local Effects of Green Pit Viper Bite

Jatuporn Sirikun, MD
Anjana Klungkaew
Chanphim Chiamphongphan
Chumporn Pongnumkul, MD
Anunt Tonmukayakul, MD
Division of Trauma, Department of Surgery, Siriraj Hospital, Bangkok, Thailand

Abstract

Background and Objective: **The recommendation of using prophylactic steroids to decrease local effects of venomous snake bite is controversial. There is no scientific data to support the benefit of this recommendation. We conducted a randomized controlled trial to determine the benefits of steroid prophylaxis on the local effects of venomous snake bites.**

Material and Method: **A double blind randomized controlled trial was performed during March 2004 and October 2004. Patients were randomized into 2 groups: the prednisolone (0.5mg/kg single dose) group (n=17) and the placebo group (n=17). The inclusion criteria included: patients bitten by the green pit viper and could identify the snake; bite time within 6 hours; no previous wound manipulation; and age over 12 years. The exclusion criteria included: evidence of abnormal bleeding (systemic bleeding, or minor bleeding such as petechial hemorrhage, or ecchymosis) with abnormal venous clotting times (> 30 minutes). The outcomes compared included swelling scores, pain scores, presence of skin blebs, skin necrosis, itching and numbness. All outcomes were compared on initial presentation, and 24 hours, 48 hours, 72 hours, and 7 days after presentation. Statistical analysis was performed using the SPSS® software version 10.0. *P*-values less than 0.05 were considered statistically significant.**

Results: **34 patients (18 male and 16 female) were bitten by the green pit viper between March 2004 and October 2004. There were no significant (*P*> 0.05) differences in the swelling scores, pain scores, presence of skin blebs, skin necrosis, itching, and numbness between both groups.**

Conclusion: **No benefit of prophylactic steroids for decreasing local effects of green pit viper bite could be demonstrated in the present study.**

Keywords: **Snake bite, green pit viper, steroid, local effects**

Introduction

Venomous snake bite is a common problem in Thailand. In Bangkok, 74% of venomous snake bite patients are bitten by the green pit viper[1]. The most serious complication of green pit viper bite is systemic bleeding due to its haematotoxic venom[2,3]. The systemic bleeding is mainly mucosal (mostly as gum and gastrointestinal hemorrhage)[2]. The treatment of choice for systemic bleeding is antivenin. The side effects of antivenin include hypersensitivity (20%) and severe allergic reaction (2%)[2].

Swelling, skin blebs, skin necrosis, lymphangitis,

Correspondence address: *Pawit Sutharat, MD, Department of Surgery, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand; Email: pw3807@gmail.com*

and pain due to the cytotoxic effects of the venom are also seen[2,3]. The incidence of local effects of the venom in prior studies vary by the type of local effect (swelling in 96%, skin blebs in 25%, lymphangitis in 8%, and skin necrosis in 6% of patients)[2,3].

The use of steroids for the treatment of, or as prophylaxis against, the local effects of snake venom are recommended in many previous studies[4-9]. This recommendation is controversial[4-9]. There are no scientific data to support these recommendations. The present study was designed to determine the benefit of prophylactic steroids in decreasing local effects of the green pit viper bite.

Material and Methods

The present study is a double blind randomized controlled trial. The subjects of the study included patients who presented at the Trauma Unit, Siriraj Hospital, between March 2004 and October 2004, with green pit viper bites. Other inclusion criteria included: bite time within 6 hours, no evidence of wound manipulation[11], age over 12 years, and the reliable identification of the offending snake (such as the capture of the snake, or a reliable history of being bitten by a green snake with red tails[10], with a typical green pit viper bite wound). Patients who received antivenin treatment due to systemic bleeding (such as mucosal hemorrhage, gastrointestinal hemorrhage, gross haematuria, or epistaxis) or minor bleeding (petechial hemorrhage or ecchymosis) with venous clotting times (VCT) of more than 30 minutes were excluded from this study.

Overall, 40 patients were included in the present study. All gave informed consent. Patients were randomized into 2 groups, and both the patient and the evaluator were blind to the study treatment. The first group received oral prednisolone, 0.5 mg/kg single dose, and the second group received the placebo. Both groups were provided with Clindamycin (150 mg) 1 tablet orally every 6 hours for 5 days. Other investigations and treatments included complete blood counts and venous clotting time, if indicated, standard wound dressing, and analgesic drugs. Patients were observed in the hospital at least 6 hours, and when no systemic bleeding or decreased platelet count was evident, they were discharged from the hospital and advised to observe for signs systemic bleeding at home. Local effects of the snake bite were measured using the highest level of swelling score[2] (score 0=no edema, 1=local swelling, 2=up to one joint, 3=across one joint , 4=up to two joints, 5=across two joints, 6=up to three joints or to the rest of the body), the pain score, and the presence of itching, bleb formation, numbness, and skin necrosis were recorded in the Case Report Form (CRF) at the initial visit. Patients were followed within 24 hours (the 1st follow up visit), 48 hours (2nd follow up visit), 72 hours (3rd follow up visit) and 7 days (4th follow up) after the initial visit, and all data were recorded in the CRF. After the 7th day, patients were not required to return for follow-up if no complications occurred.

The data were analyzed using the SPSS® software, version 10.0, to determine whether the differences in the outcomes between the two groups (such as the swelling score, pain score, the presence of itching, bleb, numbness, skin necrosis, as well as the patients' characteristics) were statistically significant. A clinically significant decrease in swelling was defined to be a difference in the mean swelling scores of 2 or more, as well as any significant difference between the 2 groups in the proportions of patients whose swelling improved. *P*-values less than 0.05 were considered statistically significant.

Results

Of the 40 patients with green pit viper bite who were included in the present study, 6 were lost follow up, so only 34 patients had complete data for analysis. These 34 patients were equally divided into 2 groups. The patients' characteristics such as age, sex, initial swelling score, pain score, the use of analgesic drugs (Acetaminophen), and the site of bite wounds were not significantly different between the 2 groups (Table 1 and Figure 1).

Changes in the swelling scores during the follow-up are shown in Figure 2, where patients in both the steroid and placebo groups are shown divided into 3 sub-groups: those with improved swelling, those not improved, and those worsening. There were no significant differences ($P > 0.05$) in the proportions of patients with swelling improvement at all occasions of follow-up between both groups (Table 2). There were no clinically significant differences in the swelling scores between the 2 groups. All average swelling score

Table 1 Characteristics of both groups of patients

Patient characteristic	Placebo group (n = 17)	Steroid group (n = 17)	*p*-value
Age, years: mean ± SD	44.88 ± 14.7	38.47 ± 16.9	0.247
Sex (male)	9 (53%)	9 (53%)	0.999
Initial swelling score: mean ± SD	1.59 ± 0.9	1.53 ± 0.9	0.845
Initial pain scores (VAS): mean ± SD	4.53 ± 2.6	4.47 ± 3.2	0.059
Use analgesic drugs (Acetaminophen)	16 (94%)	15 (88%)	0.999

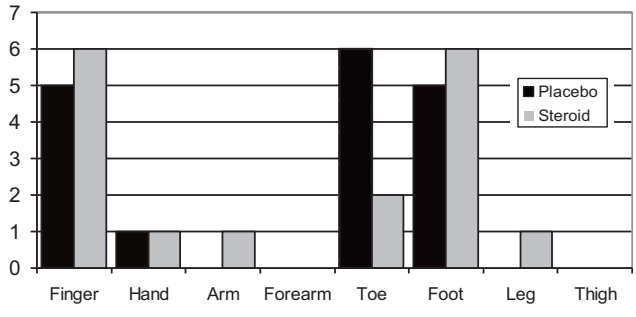

Figure 1 Sites of bite wounds.

differences were less than 2 (Table 3).

The incidence of other local effects of the snake bite, including itching, presence of blebs, numbness and skin necrosis was not significantly different between the two groups (Table 4).

Discussion

The use of steroids for the treatment of, or as prophylaxis against, the effects of venomous snake bites is a world-wide recommendation. Previous articles[4-9] discussed the benefits of steroids in this context, but there was no scientific data to back up any claim.

This study might be one answer to the controversy surrounding the benefits of using steroids for snake bites. All comparisons between the group given prednisolone and the group given placebo at various times of follow up, did not find any significant benefit

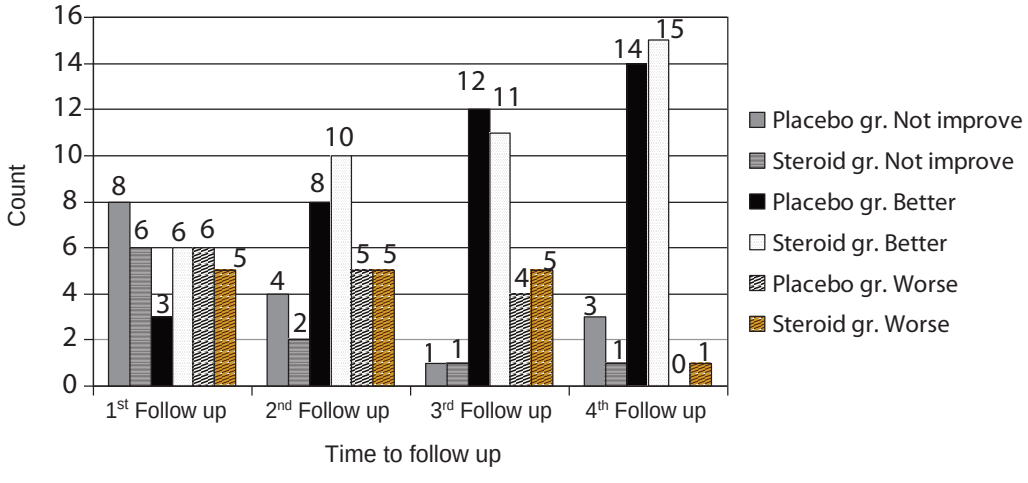

Figure 2 Changes in the swelling scores during the follow-up

Table 2 Comparing number of patients with improved swelling score at each follow-up occasion (Chi-square test)

Occasion of follow-up	Number of patients with improved swelling score		*P*-value
	Placebo group (n=17)	Steroid group (n=17)	
1st follow-up	3	6	0.502
2nd follow-up	8	10	0.641
3rd follow-up	12	11	0.926
4th follow-up	14	15	0.362

Table 3 Comparing the mean swelling score improvement at each follow-up occasion

Occasion of follow up	Mean swelling score improvement		Difference
	Placebo group (n=17)	Steroid group (n=17)	
1st follow-up	-0.2941	0.0588	0.3529
2nd follow-up	0.2353	0.4706	0.2353
3rd follow-up	0.7059	0.7647	0.0588
4th follow-up	1.3529	1.3529	0

Table 4 Comparing other local effects of snake bite

Effect of snake bite	Placebo group (n=17)	Steroid group (n=17)	*p*-value
Itching	2 (12%)	2 (12%)	0.999
Bleb	1 (6%)	0	0.999
Numbness	8 (47%)	6 (35%)	0.486
Skin necrosis	2 (12%)	0	0.466

of the steroid, in terms of wound bite swelling, at least in the case of the green pit viper bite. All other local effects examined in the present study, such as itching, pain, bleb formation, numbness and skin necrosis were also not beneficially affected. Therefore, the recommendation for initial management of the green pit viper bite may not include steroid treatment or prophylaxis.

The limitations of the present study included the small sample size and the administration of the steroids. However, in the present study, the sample size was estimated with the swelling score as the main outcome. The negative results of others local effects such as itching, pain, bleb formation, numbness and skin necrosis might be due to random errors. Future studies should include more patients. Because no previous study exists as to the optimum use of steroids in snake bites, we used the 0.5 mg/kg single dose of prednisolone (highest usual daily dose), which might not be enough for a prophylactic effect. The future trials, extending the use the prednisolone to more than one dose might demonstrate a clearer beneficial effect.

Conclusion

There was no benefit of using a single dose of prednisolone as a prophylaxis against the local effects of the green pit viper bite.

REFERENCES

1. Dumavibhat, B. A study of epidemiology, risk factors and preventive measures against snake bites. J Med Assoc Thai 1997;80:547-56.
2. Rojnuckarin P, et al., Prognostic factors of green pit viper bites. Am J Trop Med Hygiene 1998;58:22-5.
3. Visudhiphan S, et al. Dark green pit viper (Trimeresurus popeorum) bite: clinical and serial coagulation profiles in 51 cases. Am J Trop Med Hygiene 1989;41:570-5.
4. Ben Abraham R, et al. Snakebite poisoning in children–a call for unified clinical guidelines. Eur J Emerg Med 2001;8:189-92.
5. Blanco Bruned, JL, et al. Poisoning by viper bites in children. Ann Esp Pediatr 1993;38:119-22.
6. Gerber JD, Adendorff HP. Boomslang (Dispholidus typus) bite: case report. S Afr Med J 1980;57:710-1.
7. Grace TG, Omer GE. The management of upper extremity pit viper wounds. J Hand Surg [Am] 1980;5:168-77.
8. Kleber JJ, Zilker T. Adder bites in humans. Tierarztl Prax Ausg K Klientiere Heimtiere 1998;26:95-100.
9. Kurecki BA, Brownlee HJ. Venomous snakebites in the United States. J Fam Pract 1987;25:386-92.
10. Mahasandana S, Jintakune P. The species of green pit viper in Bangkok. Southeast Asian J Trop Med Public Health 1990; 21:225-30.
11. Gunnels D, Gunnels MD. Snakebite poisoning: treatment myths and facts. J Emerg Nurs 2003;29:80-2.