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Comparison of Anti-inflammatory activity of *Ampelocissus latifolia* (Roxb.) root extract: Oral administration Vs. Topical application

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ABSTRACT

Ampelocissus latifolia (fam. Vitaceae) is climber with annual stems and fasciculated tuberous roots found in India. Traditionally people uses root in skin disease, fracture, as a tonic, for wound healing, diuretic, in eye disease, gonorrhoea, syphilis, menstrual troubles, rheumatic affection. *A. latifolia* contains flavonoids, saponins and reducing sugar. In present study freshly collected and dried root powder of *Ampelocissus latifolia* (Roxb.) was subjected to hydro alcoholic extraction. The extracts were tested for anti-inflammatory activity in carrageenan induced paw edema in rat by oral and topical application. The result found marked inhibition of inflammation in orally given and topically applied extracts. The results also suggest that hydro alcoholic extract administered orally is more effective than topically applied extract.

Key words: *Ampelocissus latifolia*, Roots, Anti-inflammatory, Topical, Hydro alcoholic.

INTRODUCTION

Ampelocissus latifolia (fam. Vitaceae), is climber with annual stems found mainly in sub-Himalaya tract from sutlej eastwards to Kumaon up to 4000 ft., Aasam, Konkan, W. ghats from bombay to Nilgiris and Anamallis Deccan, and throughout in india. Roots are arising adventitiously from root stock. Roots found fasciculated with many tuberous roots in cluster having irregular shape, 7 to 15 cm in length and 1.5 to 4 cm in diameter. Roots are tapering at both the end with bulging in middle. Roots are reddish brown in colour and having no any characteristics taste. Dried roots are having scaly skin. Transverse section of *A. latifolia* root found circular in outline and contains Epiblema, Cortex, Pericyclic fibres, xylem, phloem and 6 to 10 seriate medullary rays. Acicular and Spharophide calcium oxalate crystals and starch is also present. *A. latifolia* in ayurveda reported to be used as Kustha, Kamala, Sotha, and Vrana^[1]. Traditionally plant is used for Wound healing^[2]. The stem bark is used in stomach Pain^[3]. Stem is used in bone fracture^[4]. Root finds use in skin disease^{[3], [4], [5], [6]}. Roots are used in fracture and as a tonic^{[2], [7]}. Root is used in menstrual troubles^[8]. Root is used for wound healing^[9]. Root is used as diuretic and in eye disease^[10]. Root is used in gonorrhoea, syphilis^[11]. Root used in rheumatic affection^[12].

MATERIALS AND METHODS

Plant material

Fresh & fully grown plants of *Ampelocissus latifolia* collected in month of August, 2011 from the near places of Modasa city, Sabarkantha, Gujarat, India. It was authenticated by Dr. H. B. Singh Scientist and Head of Raw Materials Herbarium & Museum Dept of National Institute of Science and Communication and Information Resources, New Delhi (NISCAIR). The herbarium of this plant is deposited (voucher specimen no. BMCPER/HNGU/11-12), in Dept. of Pharmacognosy, Shri B. M. Shah College of Pharmaceutical Education and Research, Modasa

Preparation of extract

Locally collected whole plants (3.0 kg) were shade-dried and its roots and aerial parts separated from each other and then roots were powdered. Powdered roots were extracted with Hydro alcohol (1:1). The extracts were dried under reduced pressure yielding reddish-brown solid mass. These hydro alcoholic extracts were dissolved in respective solvents and used for Anti-inflammatory activity.

Animals

Male Albino rats of either sex, weighing 180-250 g were used. They were housed in standard environmental conditions of temperature, humidity, and light and provided with standard rodent food and water *ad libitum*.

Anti-Inflammatory Activity^{[13], [14], [15]}

The anti-inflammatory activity of Hydro alcoholic extract of *A. latifolia* root was evaluated by the carrageenan-induced rat hind paw edema method. The experimental protocol (No: IAEOBMCPER/11/2011-12) was designed and approval of Institutional Animal Ethics Committee (IAEC) (Reg. No. /date: 194/CPCSEA/1st June 2001) was obtained. Healthy male albino rats weighing between 180-250 g were obtained from the disease-free animal house of ZRC, Ahmedabad. The animals were housed in institutional animal house under standard conditions with free access to food and water. Anti-inflammatory activity of Hydro alcoholic extract of *A. latifolia* root was compared with Standard Indomethacin (20mg/kg) for extract given orally. Hydro alcoholic extract of *A. latifolia* root applied topically was compared with the marketed gel of diclofenac (Diagesic gel).

Twenty eight albino rats were divided into seven groups of four animals each as follows:

Group 1 (Negative Control): Water

Group 2 (Positive Control group): 0.1ml of 1 % Carrageenan

Group 3 (Standard (Oral)): Indomethacin (20 mg/kg)

Group 4 (Test 1(Oral)): Hydro alcoholic extract of *A. latifolia* root (500mg/kg).

Group 5 (Test 2(Oral)): Hydro alcoholic extract of *A. latifolia* root (750mg/kg).

Group 6 (Standard (Topical)): 1.16 % Diclofenac Gel (0.2 gm).

Group 7 (Test (Topical)): Paste of hydro alcoholic extract of *A. latifolia* root (0.2 gm)

After one hour of the above respective (oral or topical) administration, carrageenan (1%, 0.1ml) was injected subcutaneously in the sub plantar tissue of the right hind paw of each rat. The inflammation was measured using plethysmometer immediately after injection of carrageenan and then 1,2,3 and 4h. The average foot swelling in drug treated animal as well as standard was compared with that of control and the percent inhibition (anti-inflammatory activity) of edema was determined using the formula.

Percentage inhibition = [(C-T)/C] * 100

Where C = control paw edema, T = test paw edema.

Statistical analysis

All the results are expressed as mean \pm standard error of mean. The data was analyzed statistically using ANOVA followed by Dunnett's Multiple Comparison Test.

RESULTS AND DISCUSSION

- The anti-inflammatory activity of hydro alcoholic extract of *Ampelocissus latifolia* revealed significant inhibition of inflammation as compared to control group in orally administered and topically applied extract.

- Result focus that in oral administration inhibition is increases with increase in dose.
- Initially oral administration is giving faster effect than topical application because of slow permeability of topical applied extract. But after 3 hour orally administered and topically applied groups are showing significant inhibition of inflammation.(Tab 1 and Fig 1 to 6)

Table 1: Anti-inflammatory activity of *Ampelocissus latifolia* (Roxb.) Root (Oral Administration Vs. Topical Application)

	Group A	Group B	Group C	Group D	Group E	Group F	Group G
	Control (-ve)	Control (+ve)	Standard (Oral) Indomethacin 20 mg/kg	Test 1 (Oral) 500 mg/kg	Test 2 (Oral) 750 mg/kg	Std. (Topical) Diclofenac gel	Test (Topical)
Paw Volume	Mean ± SEM ml	Mean ± SEM ml	Mean ± SEM ml	Mean ± SEM ml	Mean ± SEM ml	Mean ± SEM ml	Mean ± SEM ml
Time (Hour)							
0	1.625 ± 0.02500	1.625 ± 0.02500	1.625 ± 0.04787	1.650 ± 0.02887	1.650 ± 0.02887	1.575 ± 0.04787	1.600 ± 0.04082
1	1.625 ± 0.02500	2.45 ± 0.08660	2.025 ± 0.04787**	2.15 ± 0.09574	2.100 ± 0.09129*	2.025 ± 0.07500**	2.325 ± 0.08539
2	1.625 ± 0.02500	3.35 ± 0.1041	2.075 ± 0.06292**	2.65 ± 0.1555**	2.4 ± 0.1080**	2.100 ± 0.04082**	2.9 ± 0.1080*
3	1.625 ± 0.02500	4.525 ± 0.2016	2.150 ± 0.06455**	2.925 ± 0.04787**	2.525 ± 0.1652**	2.175 ± 0.04787**	3.325 ± 0.1250**
4	1.625 ± 0.02500	3.175 ± 0.1181	1.925 ± 0.06292**	2.325 ± 0.09574**	2.225 ± 0.1493**	1.975 ± 0.04787**	2.45 ± 0.06455**

Statistical analysis by ANOVA and Dunnet’s Multiple comparison Test. Results are expressed as mean ± standard error of mean, n = 4 in each group. *Less significant difference compared to control group at p < 0.05. ** Significant difference compared to control group at p<0.01

Figure 1

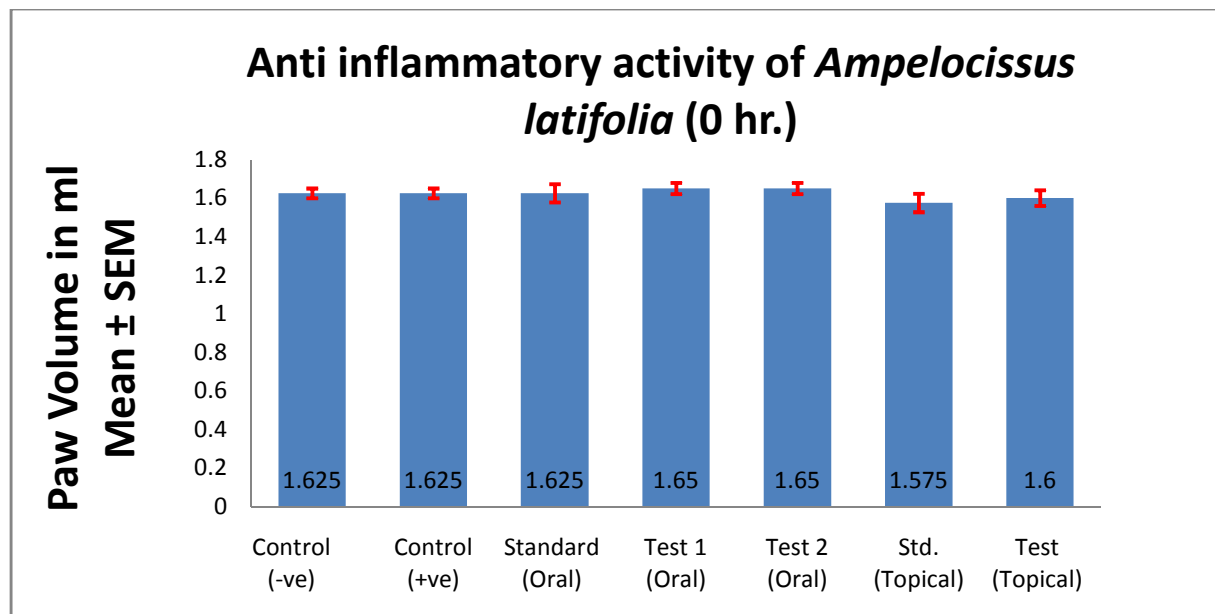


Figure: 2

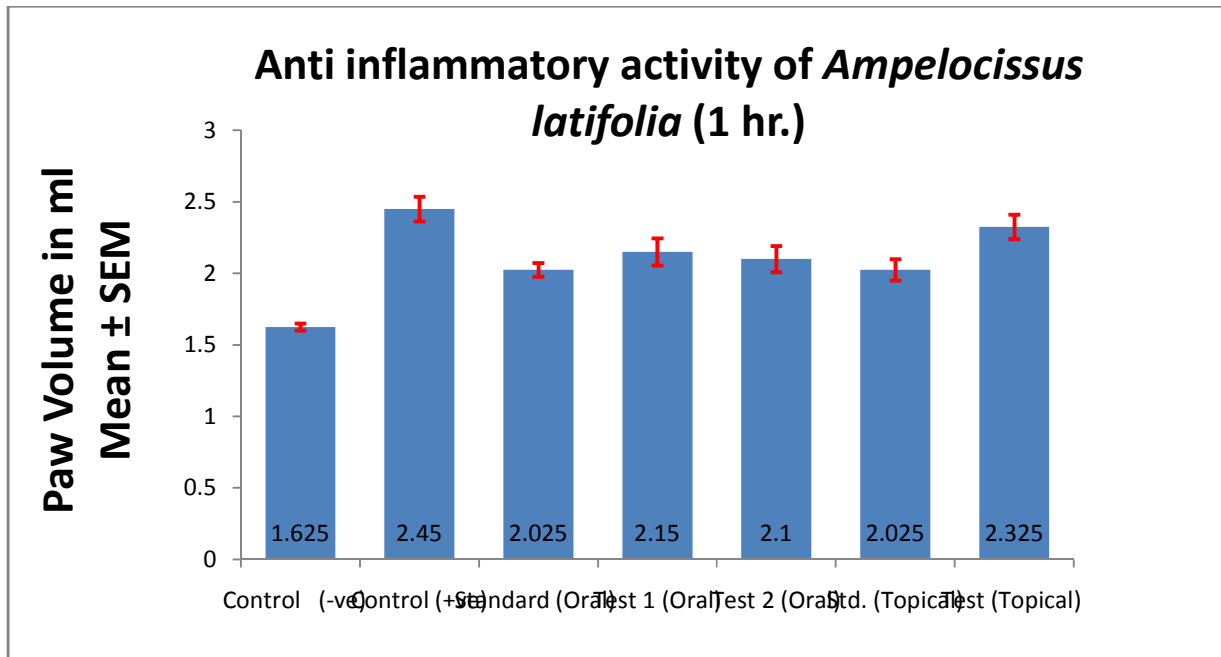


Figure: 3

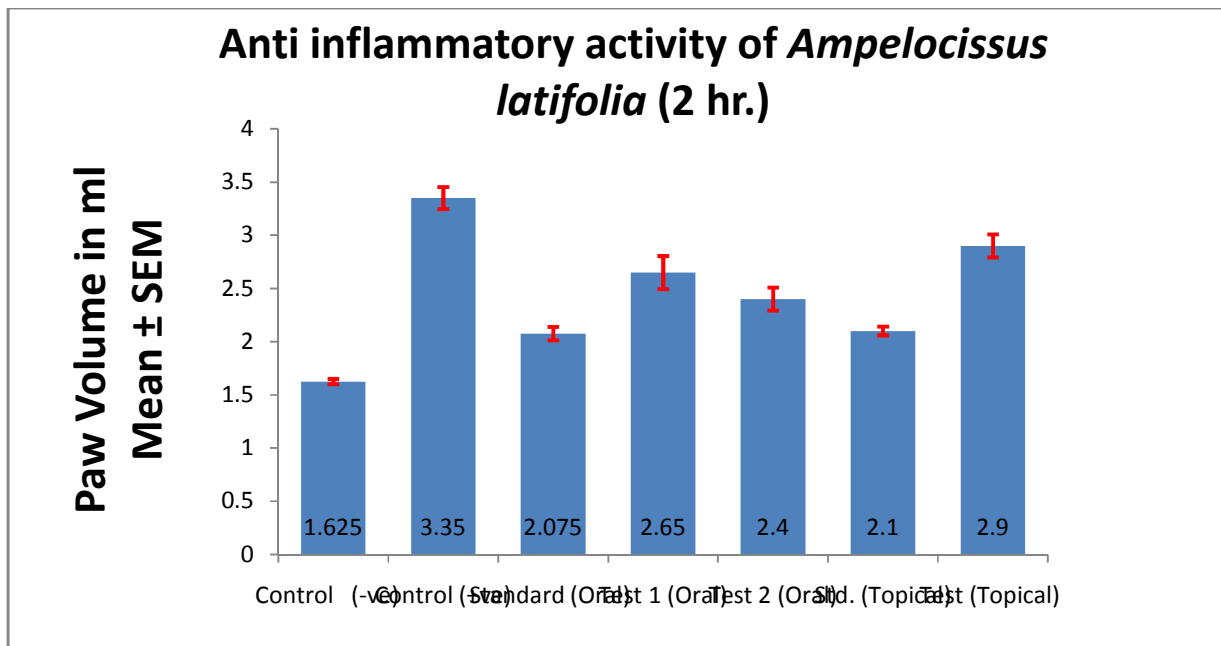


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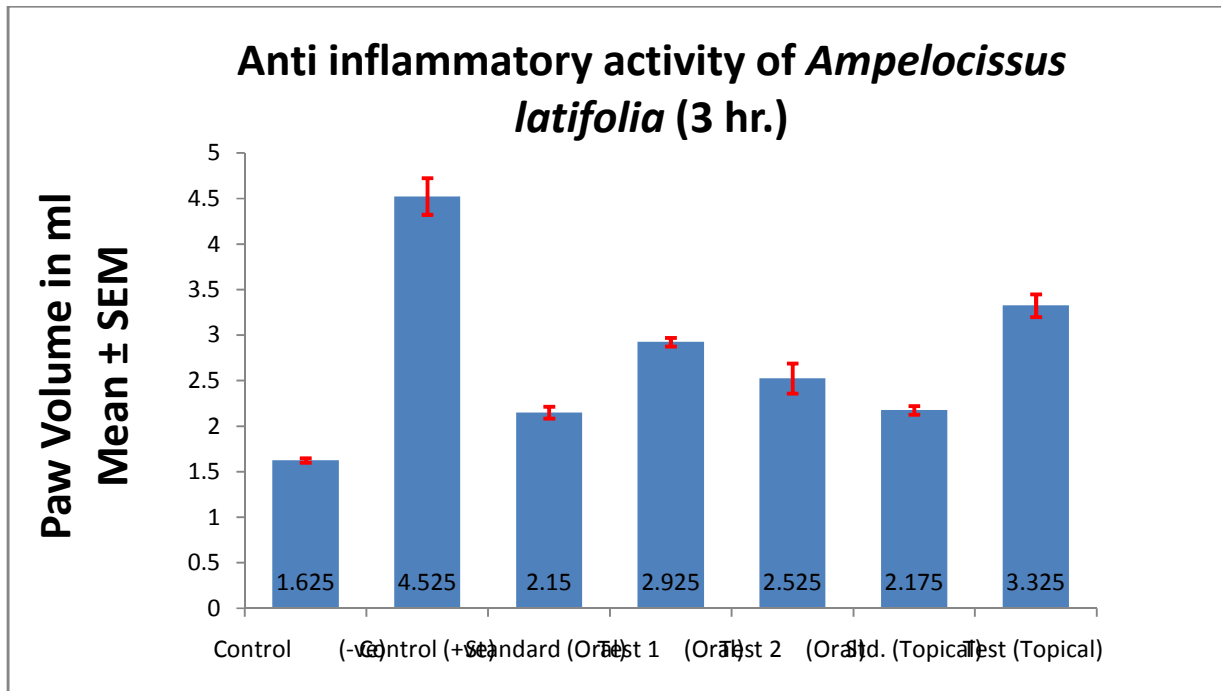


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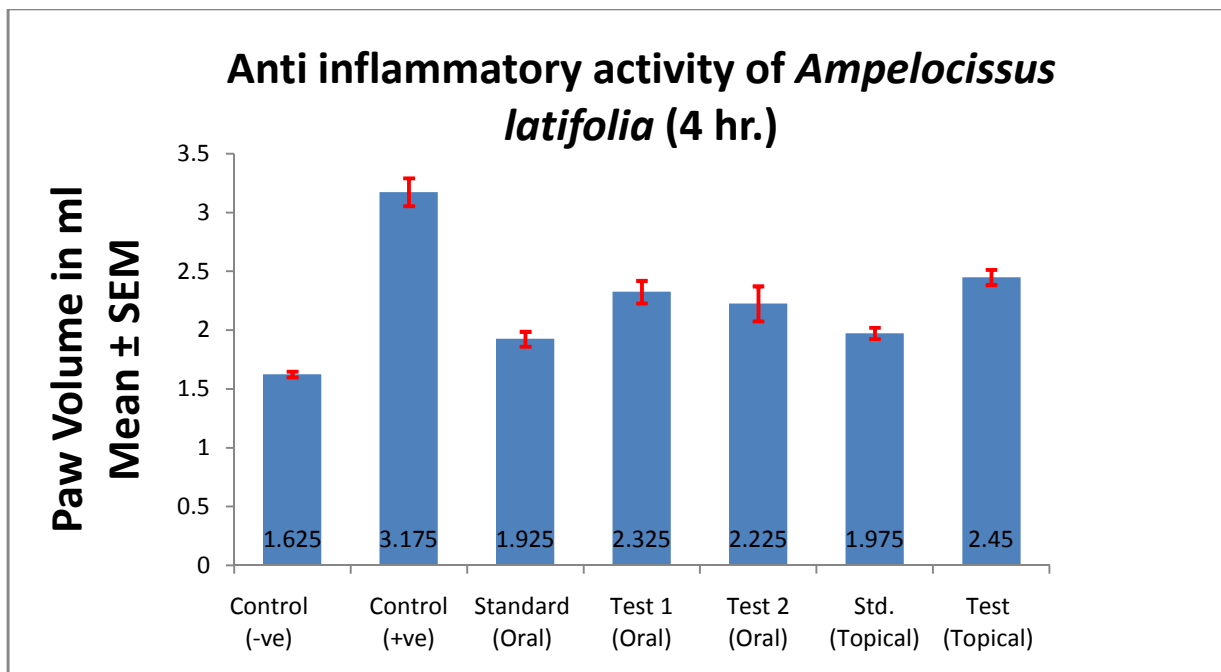
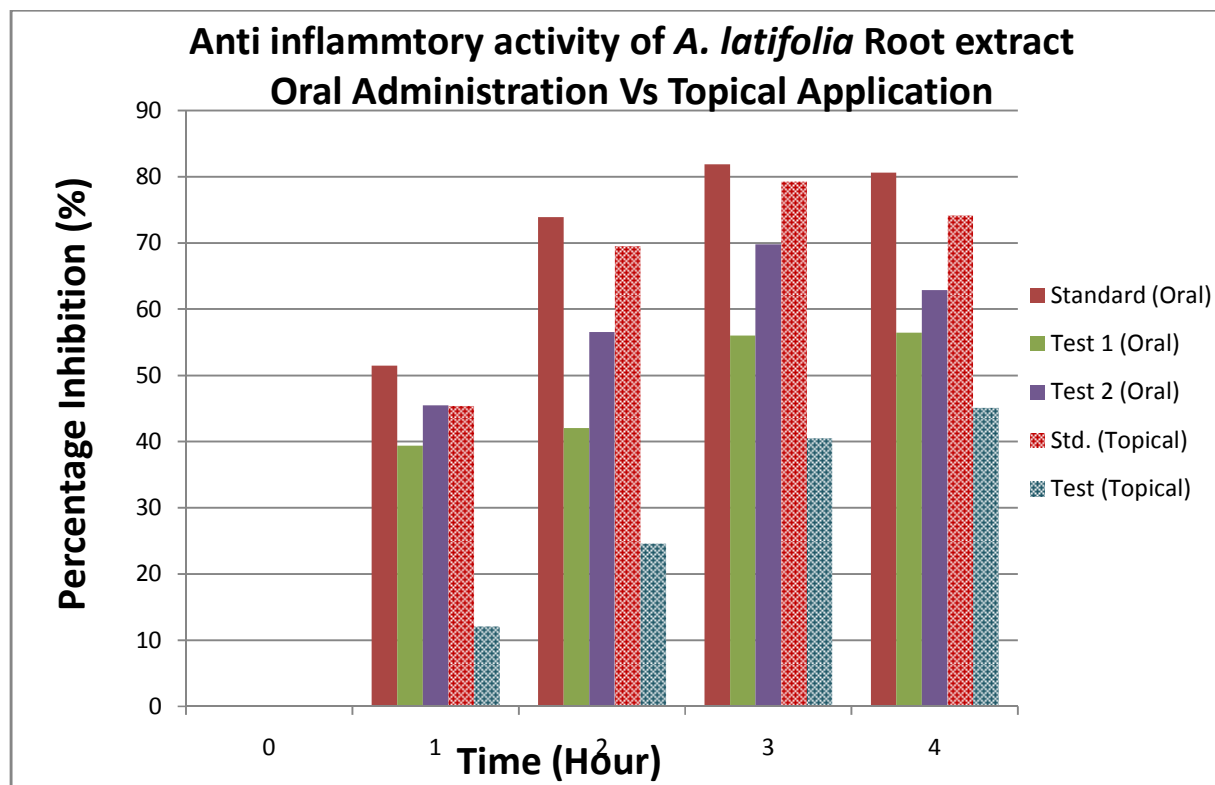


Figure: 6



CONCLUSION

Hydro alcoholic extract of *Ampelocissus latifolia* (Roxb.) root extract was found effective in inhibition of inflammation. Furthermore this study was carried out for comparison of oral and topical application of hydro alcoholic extract. Result suggests that oral administration is faster effective than topical administration. But if any topical formulation of extract is prepared than it may be more convenient and safe than oral administration with same effectiveness.

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