

EFFECT OF *CISSUS QUADRANGULARIS* IN ACCELERATING HEALING PROCESS OF EXPERIMENTALLY FRACTURED RADIUS-ULNA OF DOG: A PRELIMINARY STUDY

D.K. DEKA, L.C. LAHON, J. SAIKIA** A. MUKIT***

Departments of Pharmacology_and Toxicology,
Surgery and Radiology and Veterinary Pathology,
College of Veterinary Science,
Assam Agricultural University,
Khanapara,
Guwahati • 781 022.

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Summary

A study was undertaken to evaluate the effect of methanolic extract of *Cissus quadrangularis* Linn (CQ) on the healing process of experimentally fractured radius-ulna of dog. CQ treated animals revealed faster initiation of healing process than the control animals on radiological and histopathological examinations. The treated group also revealed a decrease in serum calcium level to a greater extent than the control group. Healing was almost complete on 21 st day of fracture in the treated animals and remained incomplete in the control animals. No significant alteration of serum calcium level was observed on 21 st day of fracture in both the groups.

Key words

Cissus quadrangularis fracture healing radius-ulna

Cissus quadrangularis Linn (Syn: *Vitis quadrangularis* Wall: Family: Vitaceae) is an indigenous medicinal plant of India. The plant is known as "Harsankar" in Hindi and "Asthisanghara" in Sanskrit. The use of this plant by the common folk for promoting fracture healing process is an old practice. The plant contains a high amount of Vitamin C, carotene A, anabolic steroidal substance and calcium.' A few reports are also available on the effect of the plant on fracture healing in laboratory animals.²⁻⁵ In the present investigation an attempt was made to study the effect of CQ on experimentally fractured radius-ulna of dog by radiological, histological and biochemical parameters pertaining to serum calcium level.

MATERIALS AND METHODS

Preparation of extract: Dried methanolic extract of CQ was obtained from 500g of dried finely powdered stems using soxhlet apparatus. The extract was reconstituted with distilled water (100 mg/ml), filtered and used in the present study.

Grouping of animals: Eight healthy mongrel dogs of either sex weighing 3-5 kg were randomly selected into two groups - A and B, each consisting 4 animals. Animals were acclimatized in the laboratory and kept on standard condition in separate cages. Under general anaesthesia using intraval sodium (30

mg/kg, i.v.), a closed fracture of the right forelimb of each animal was produced by bending either end of the bone in hands. Plaster of paris bandage was applied over the fractured parts after reduction.

Group B received CQ (50 mg/kg, s.c.) every alternate day and group A received normal saline (0.5 ml/kg, S.C. to maintain uniformity in volume) served as control. Health status of the animals was monitored during treatment period. At 11 th day of fracture, radiological examination of the fractured parts of the animals in group A and B was carried out to evaluate the rate of healing. For estimation of serum calcium level (by O.C.P.C. method kit from Span Diagnostic Ltd.) blood was collected from the saphenus vein. Two animals from each group were sacrificed for histopathological examination. Fractured parts were dissected out leaving 4 mm normal bone on each side and preserved in 10% formalin. Bones were decalcified in formic acid, sectioned at 5 μ and stained with haematoxylin and eosin.

At 21st day of fracture, rest of the animals in group A and B were subjected to similar studies.

RESULTS

At 11th day of fracture: Treated animals revealed bony dissolution and periosteal reaction at the fractured sites as evidenced by radiograph whereas, in

Table 1. Effect of CQ on serum calcium level at 11 th day of fracture.

Group	Drug	Dose (by S.C. route)	Serum calcium level (mg/100 ml) Mean ± SE	% decrease
Normal	-		11.72 ^a ± 0.39	0.00
A	Saline	0.5 ml/kg	10.03 ^b ± 0.09	14.45*
B	CQ	50 mg/kg	7.67 ^b ± 0.15	34.60*

^aValue indicated is average of eight animals

^bValue indicated is average of four animals

*P < 0.01 (between groups).

the control group, bony dissolution was comparatively less and periosteal reaction was absent. The level of serum calcium is depicted in Table 1. The treated group revealed a decrease in serum calcium level to a greater extent. Histopathologically, treated group exhibited initiation of osteogenesis which was absent in the control group.

At 21st day of fracture: Radiograph of the treated group revealed almost complete bridging of the fractured ends with extensive bony deposition and periosteal reaction compared to that of control group. Serum calcium level remained unchanged in both the groups. Histopathologically, the treated group revealed replacement of cartilaginous cells by osteoblastic cells and union of the fractured gap at several places with the formation of new bony

trabeculae, whereas bony trabeculae were absent in the control group.

DISCUSSION

In the present investigation, the radiographic evidence of early periosteal reaction and bony dissolution in the treated group indicates a faster healing process.⁶ The level of serum calcium was declined in both the groups at 11 th day of fracture. However, the decline was still higher in the treated group. A low level of serum calcium in the early stages of fracture healing was already reported.⁷ Further, the calcium of callus was stated to be derived from the serum calcium.⁸ The decrease in the level of serum calcium to a greater extent in the treated group may be due to faster healing process with more mobilisation of calcium in the formation of callus. Histopathological examination exhibited faster initiation of healing with increased osteoblastic activity at 11 th day of fracture and presence of bony trabeculae at 21st day of fracture in the treated group. An increase in the osteoblastic activity in CQ treated animal during fracture repair was also reported by Udupa and Prasad.² They also mentioned about the probable pathway of action of CQ to be through the anterior pituitary followed by adrenal, testes and liver.⁹ However, the possible involvement of the thyroid gland also cannot be ruled out which probably caused parafollicular or "C" cells to release more calcitonin and thereby a decrease in serum calcium level as observed in the present study since calcitonin increases the osteoblastic activity.¹⁰

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