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Therapeutic application of *Withania somnifera* (Ashwagandha) for idiopathic paresis in goat kids

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Abstract

A total of 34 goat kids of 1-4 month old were presented to small ruminant medicine referral clinic with a history of incoordinated movement with good appetite. On clinical observation, all kids showed incoordinated gait in hindlimbs, tremor in tail, head tilt, lateral deviation of head, which is progressed to paralysis of hindlimb and forelimb, sternal and lateral recumbency. On palpation of vertebral column, most of the kids evinced pain on lumbo-sacral region and thigh muscle and few showed pain on thorax. All kids were tested for caprine arthritis and encephalitis, border disease and metabolic disorder and found to be negative. The kids were treated with antibiotics, anti-inflammatory drugs for 5 days and ashwagandha churanam for 15 days and 41% were recovered. Ashwagandha could be a best nerve tonic for management of paralysis in goat.

Keywords: Ashwagandha, *Withania somnifera*, goat, paralysis

Introduction

Paresis (Partial paralysis) is a condition of muscle weakness caused by nerve damage and consequent disruption of signaling between the nervous system and muscles [1]. The most common causes of paresis/paralysis are stroke (poor blood flow to brain leading to cell death), head injury, spinal cord injury (SCI), fibrocartilaginous embolism [2], and infectious causes in animals include botulism, listeriosis, caprine arthritis and encephalitis, neurofilariasis and cerebrospinal nematodiasis [3, 4]. Paralysis can be of localized or generalized. In localized form, the specific portion of the body is paralyzed such as face, vocal cord and hands. Generalized paralysis includes monoplegia (paralysis of one limb), hemiplegia (paralysis of an arm and leg on one side of the body), paraplegia (paralysis of both lower limbs, Quadriplegia (paralysis of both arms and legs) [5, 6]. Paralysis when left untreated for a long period could lead to the 'death' of the affected part i.e. wasting of muscles and tissues [1]. Currently, increasing trend of paralysis in animals, especially dogs and goats were reported. Several drugs are used for treatment of neurodegenerative diseases are symptomatic only; the proven drugs for fundamental cure of neurodegenerative diseases are not available [7]. In India many plants and plant products are available in the markets that claim for ability to treat paralysis, some of which are Punarnava powder (containing Hogweed or *Boerhavia diffusa*), Ashwagandha powder (containing *Withania somnifera*) [8, 9]. Ashwagandha is an Indian Ginseng" and commonly available as a churna, a fine sieved powder that can be mixed with water, ghee (clarified butter) or honey. It enhances the function of the brain and nervous system and improves the memory. It also possesses potent anti-stress and antioxidant properties that helps to protect against oxidative cell damage by free radicals [9], and widely used to treat Alzheimer's, Parkinson's, Huntington's and other neurodegenerative diseases in human. There is no report on therapeutic use of Ashwagandha for paralysis in animals. The present article describes the therapeutic efficacy of ashwagandha in paralytic goat kids.

Materials and Methods

A total of 34 goat kids between 1-4 month old were presented to small ruminant medicine referral clinic, Veterinary Clinical Complex, Orathanadu with a history of initial incoordination in hindlimb progressed to recumbency with good appetite. On clinical observation, all kids showed incoordinated gait in hindlimbs, tremors in tail, jerking gait, flaccidity and swaying movement of hindquarters, knuckling of fetlock, frog like posture, head tilt, lateral deviation of head and bruxism. Most of the kids showed initial incoordination in hindlimbs which progressed to paresis and paralysis of both hindlimb and forelimbs, later the condition progressed to sternal and lateral recumbency. On physical examination and palpation, most of the kids evinced pain on palpation of lumbo-sacral and thigh region,

only few kids evinced pain in the vertebral column of thorax. X-ray examination of vertebral column was done to identify the trauma or any lesions in the spinal column. The whole blood, serum, faecal sample and blood smear were collected from the all kids for laboratory diagnosis. Haematology was performed as per the method described by Benjamin ^[10]. The faecal samples were processed by centrifugal sedimentation technique and screened for the helminthic infection. Blood smears were stained with giemsa stain for 30 min after methanol fixation for a minute and screened for blood parasites and microfilaria. The serum calcium, phosphorus, magnesium, potassium and copper were measured in Semi-autoanalyzer using commercially available kits. The blood and serum samples were sent to High security animal diseases laboratory (HSADL) for identification of border disease virus and caprine arthritis and encephalitis virus.

Result and discussion

The blood picture revealed mild leukocytosis and serum calcium, phosphorus, magnesium, potassium and copper were within the normal range. In faecal sample *Monezia* sp was detected in few kids and none of the kids showed haemoparasitemia and microfilaria. The result from HSADL Bhopal declared the kids were free from border disease and Caprine arthritis and encephalitis. There is no radio dense lesion on the X-ray. The original causes of paralysis in goat kids were unknown, and then diagnosis was arrived as idiopathic paresis.

The kids were initially treated with neurtropic vitamins and antihelminthics, there is no response to treatment. Later the kids were treated with Inj. Oxyteracycline @ 20mg/kg IV, Prednisolone @ 0.5 mg/kg IM and Ashwagandha churanam (Krambu 0.40%, Sirunagapoo 0.79%, Elam 1.57%, Milagu 3.13%, Thippali 6.25%, Sukku 12.5%, Amukkara 25% and Sarkkarai 50%) 3.0g bid PO for 15 days along with physical exercise for 5 minutes. The improvement was observed on fifth day of treatment and able to stand and walk on itself without assistance and complete recovery was observed after 20 days of therapy. After treatment 41.1% of kids were fully recovered and 20% were died those presented in lateral recumbency condition and remaining 42% was non-traceable, no response to telephonic call from farmers. Ashwagandha, and the metabolites of its constituents promote the growth of nerves after taking it for 7 days ^[9]. The polyherbal combination of ashwagandha was effective than individual ashwagandha due to additive anti-oxidant properties. The flower buds of *Mesua ferrea longa* (Sirunagapoo) have high antioxidant properties and commonly used in Siddha medicine as carminative, astringent and anti-vatha ^[11]. The *Syzygium aromaticum*, (*Krambu*), *Elettaria cardamom* (*Elam*), *Piper nigrum* (*Milagu*), *Piper longum* (*Thippali*) *Zingiber officinale* (*Sukku*) possess anti-inflammatory and antioxidant and laxative properties ^[12]. Singh *et al.* (2011) reported that long term treatment of patient with Aswagandha able to cure the paralysis due to brain stroke. Withanolide A, withanoside IV, and withanoside VI were identified as active constituents in ashwagandha by methanol extract and induce axonal growth ^[13, 14]. Chronic oral administration of withanoside IV is metabolized to sominone and induced marked recovery in neurites and synapses loss and also enhanced axonal and dendritic outgrowth and synaptogenesis ^[15]. Aswagandha root extract acts on cortical and basal forebrain cholinergic signal transduction cascade and increase muscarinic acetylcholine receptor and enhance cognition and memory in animals and human ^[16]. It reduces the convulsions

in animal through GABA mimetic activity and decrease the severity of motor seizure when administered at 100mg/Kg ^[17, 18]. The aquous root extract of *Withania somnifera* was potent agonist of GABAP receptor and 27% more sensitive than GABAA receptor. Which is used for treatment of neurological disorder associated with GABAergic signalling disruption such as general anxiety disorder, sleeping disturbances and muscle spasm ^[19].

Conclusion

This study proven the polyherbal combination of Ashwagandha was effective for cure of paresis in animals. It could be useful for exploring the other beneficial effect of ashwagandha on animal health in the future.

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