ARTIGO ORIGINAL

EXPERIMENTAL MODEL TO MYOSITIS INDUCTION IN MICE: MICROSCOPIC EVALUATION[1]

MODELO EXPERIMENTAL PARA INDUÇÃO DA MIOSITE EM CAMUNDONGOS: AVALIAÇÃO MICROSCÓPICA

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SUMMARY

Objective: To evaluate the effect of acetic acid as an experimental model for the induction of myositis in hind limb of mice. **Method**: A total of 15 mice (Mus musculus), female, adult, weighing between 45 and 60g. Distributed into 3 groups according to the concentration of acetic acid used, 1%, 5% and 10%. After anesthesia, it was injected acetic acid and 14 days was carried out euthanasia. After euthanasia, the gastrocnemius muscle of each animal was dissected and sent for histopathological analysis to assess inflammation presented. **Results**: In all groups there was the occurrence of muscle inflammation, confirmed by histopathological analysis. **Conclusion**: The injection of acetic acid 0.1 ml in mice gastrocnemius muscle was efficient to produce inflammatory process, so it can be used as an inflammatory model.

KEYWORDS: acetic acid; myositis; mice.

INTRODUCTION

Inflammation is defined as a response of vascularized living tissue to an injury site, can be triggered by a bacterial infection, physical agents, chemicals, necrotic tissue and immune responses.[1]

Aside from that, it is a complex reaction to various noxious agents, such as microorganisms and damaged cells, usually necrotic, which consists of vascular responses, migration and activation of leukocytes and reactions sistêmicas.[1]

Inflammation is fundamentally a defense mechanism whose ultimate goal is to eliminate the initial cause of cell damage and the consequences of such damage. However, inflammation and repair may be potentially prejudiciais.[1]

Local factors to muscle inflammation, oxidative stress, apoptosis, and injury are, among others, certain drugs myotoxicity. These factors interact in different ways in each muscle group, giving rise to different specific capacities of contraction. [2]

Acetic acid is used in the induction of pain for the analysis of anti-inflammatory substances. [3] In addition, it is also used to induce colitis in experimental models of rats to investigate the protective effect of substances in tissue integrity, degree of oxidation and infiltration of neutrophils to the inflamed organ. [4]

The literature reports the use of acetic acid to induce inflammation in rats hind limb, including the testing of various substances such as medicinal plants. [5, 6]

Thus this study is necessary to verify if acetic acid injection can be used like an experimental model for induction of myositis in mice.

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METHODS

Ethics

The use of laboratory animals followed the Council for International Organization of Medical Sciences ethical code for animal experimentation and the principles of the Brazilian College on Animal Experimentation. The research was approved by the Ethics Committee of State University of Pará (UEPA), process number 01/2009.

Sample

Fifteen BALB/c female mice (Mus musculus) weighing 45-60g were used in this reserch. They were stored in cages in a temperature-controlled room (22ºC) with 12-h light and dark cycles, with offered water and food ad libitum. The mice were randomly distributed into three following groups:

Acetic acid group 1% (GA1) – 5 animals. Each animal of this group underwent injection of acetic acid at a concentration of 1%.

Acetic acid group 5% (GA5) – 5 animals. Each animal of this group underwent injection of acetic acid at a concentration of 5%.

Acetic acid group 10% (GA10) – 5 animals Each animal of this group underwent injection of acetic acid at a concentration of 10%.

Substances

For the induction of myositis, we used 0.1 ml of acetic acid at concentrations of 1%, 5% and 10%, according to each group.

Procedures of the experiment

On day zero, the animals were anesthetized with ether inhalation performed through the vaporizer éter[7] craft. Asepsis was performed with polyvinylpyrrolidone (PVP) in the region epilators right posterior limb of the animal and injected 0.1 ml of acetic acid 1%, 5% and 10% according to the group of the animal by means of hypodermic needle and syringe of insulin in the right gastrocnemius muscle.

The euthanasia was performed by inhalation of ethyl ether in a saturated environment at 14 days. After euthanasia, the gastrocnemius muscle of the right hind limb of each animal was dissected and placed in a container with 10% formalin and sent for histopathological study, carrying out a qualitative analysis, using the technique of staining with hematoxylin-eosin (HE). As observed the following parameters: necrosis, granulation tissue, fibrosis, edema and inflammatory infiltrate, being classified as mononuclear, polymorphonuclear or mixed.

RESULTS

Table I – Microscopic findings presence or absence in mice´s muscle with different concentrations of acetic acid.

Groups	1%		%5		10%			
	A	P	A	P	A	P	TOTAL	%
Inflammatory infiltrate	0	5	0	5	0	5	15	100
Edema	0	5	0	5	0	5	15	100

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Necrosis	0	5	0	5	0	5	15	100
Tissue of Granulation	0	5	0	5	0	5	15	100

P: Presence; A: Absence

DISCUSSION

To evaluate the efficacy of some substances with anti-inflammatory properties, there are several studies using experimental models of inflammation. [8, 9.10] The acetic acid induced inflammatory response and its action was yet described to rats. [5, 11]

Substances such as carrageenan, histamine and serotonin, are traditionally used like inflammation model.[12,13] However, the authors opted for the use of acetic acid, since the same substance is an easy and inexpensive.

The animals in this study had difficulties in walking, especially in the early days that followed induction with acetic acid. There were no animals deaths during the study.

In this research was observed inflammatory response in mice at all concentrations of acetic acid. Therefore, this substance can be used at a concentration of 1%, being the lowest concentration of the tested, capable of causing an inflammatory process in the animals muscle.

CONCLUSION

The injection of acetic acid 0.1 ml in mice gastrocnemius muscle was efficient to produce inflammatory process, so it can be used as an inflammatory model.

RESUMO

Objetivo: avaliar o efeito do ácido acético como modelo experimental para a indução de miosite no membro posterior de camundongos. **Método:** Foram utilizados 15 camundongos (Mus musculus), fêmeas, adultas, pesando entre 45 e 60g. Distribuídos em 3 grupos de acordo com a concentração de ácido acético utilizada, 1%, 5% e 10%. Após anestesia foi injetado ácido acético e no dia 14 foi realizada a eutanásia. Após a eutanásia, o músculo gastrocnêmico de cada animal foi dissecado e encaminhado para análise histopatológica para avaliar a inflamação apresentada. **Resultados:** em todos os grupos observou-se a ocorrência de processo inflamatório muscular, comprovado pela análise histopatológica. **Conclusão:** A injeção de ácido acético já na concentração de 1% mostrou-se capaz de induzir miosite em camundongos, podendo então ser utilizado como modelo de inflamação muscular também nestes animais.

DESCRITORES: ácido acético; miosite; camundongos.

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