Australian Journal of Basic and Applied Sciences, 5(10): 786-789, 2011
ISSN 1991-8178

Comparative Study of Sedative, Pre-Anesthetic and Anti-Anxiety Effect of *Equisetum arvense* (horse's Tail) Extract with Diazepam on Rats

[1]Ali Rezaie, [2]Changiz Ahmadizadeh, [1]Gafor Mosavi, [3]Mehrdad Nazeri, [2]Behbod Jafari, [2]Reza Ebadi

[1]Department of Clinical Science, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
[2]Faculty of science, Ahar Branch, Islamic Azad University, Ahar, Iran.
[3]Young Researchers Club, Tabriz Branch, Islamic Azad University, Tabriz, Iran.

Abstract: In the present study, sedative and anti-anxiety drugs such as chemical drugs are used for the sedation and anti-anxiety but due to their side effects and economical issues, the significance of research on finding sedative and anti-anxiety drugs with less side effects and their ability to substitute these synthetic drugs and substituting newer sedation and anti-anxiety compounds is obvious. Equisetum arvense is one of the plants that have the effect sedation and anti-anxiety. The aim of this research was to examine the effects of sedative, pre-anesthetic and anti-anxiety of Equisetum arvense with diazepam in rats. To different groups of male wistar rats received herbal extract Equisetum arvense with doses (100,200,400 mg/kg , IP) and Diazepam with dose of(1/2 mg/kg , IP) , and Dimethyl sulfoxide with the equal volume. 30 minutes after assessing the relift/sleep inducing effect (induced sleep duration by ketamine 40 mg/kg, IP) anti-anxiety effects (using Elevated plus maze). The results show meaningful increase in the period of the sleep that had been made with ketamine and also meaningful increase in the spend time at open arms in the patient group with the previous. The results show that the dose of extract Equisetum arvense 200mg/kg relieving effects of sedative, pre-anesthetic and anti-anxiety and before.

Key words: sedation, anesthesia, anxiety, *Equisetum arvense* extract, diazepam, rat.

INTRODUCTION

Nowadays, herbs are making up an important part of traditional medicine in many countries. Use of herbal medicines in developed countries has expanded sharply in the latter half of the twentieth century. Monographs on selected herbs are available from a number of sources, including the European Scientific Cooperative on Phytotherapy (Do Monte, 2004; Graefe, 1999), German Commission E (Do Monte, 2004; Soleimani, 2007) and the World Health Organization (Mamedova, 1996). The WHO monographs, for example, describe the herb itself by a number of criteria (including synonyms and vernacular names) and the herb part commonly used, its geographical distribution, tests used to identify and characterize the herb (including macroscopic and microscopic examination and purity testing), the active principles (when known), dosage forms and dosing, medicinal uses, pharmacology, contra-indications and adverse reactions. Other resources that provide detailed information about herbal products in current use include the Natural Medicines Comprehensive Database (Oh, 2004) and NAPRALERT (Natural Products ALERT) (2001). Information about other available databases has been published (Mamedova, 1996; Oh, 2004). Horsetail consists of the fresh or dried, green, sterile stems of E. arvense L. [Fam. Equisetaceae] and its preparations in effective dosage. The herb contains silicic acid and flavonoids. Constituents include 10% minerals, of which over 66% are silicic acids and silicates, plus potassium, aluminum, and manganese; 0.3% flavonoids, mainly quercetin glycosides (quercetin 3-glucoside and its malonyl esters); phenolic acids, including up to 0.008% di-E-caffeoyl-meso-tartaric acid, plus methyl esters of protocatechuic and caffeic acids; alkaloids (traces of nicotine); polyenic acids and rare dicarboxylic acids; and phytosterols. Minerals (silicic acids and silicates - 5-8%; potassium, aluminium, sulphur, manganese and magnesium), flavonoids (principally quercetin glycosides), phenolic acids, alkaloids (usually absent except for traces of palustrine and palustrinine), saponin (equisetonin), bitter principle, phytosterols (cholesterol, isofucosterol, campesterol and others), tannins. Equisetum is an excellent genito-urinary system astringent (Clute, 1928; Great Plains Flora Association, 1986). It may be applied to such conditions as urethritis or cystitis with haematuria, reducing haemorrhage and healing wounds thanks to the high silica content. Whilst it acts as a mild diuretic, its toning and astringent action make it of value in the treatment of incontinence and bed-wetting in children (Almack, 1985; Gleason, 1991). As a diuretic it is particularly suited to metabolic or hormonal edema during the menopause. The diuretic action is thought to be due partly to the flavonoids and saponins. It is generally accepted that water diuresis takes place without increase in the excretion of electrolytes (Jung, 1999). Sits baths with equisetum extract are indicated for functional pelvic disease in women where there is no inflammation, but primarily muscular tensions and changes in muscle tone in the small pelvis that are autonomous in origin. It is considered a specific remedy in cases of inflammation or benign enlargement of the

Corresponding Author: Ali Rezaie, Department of Clinical Science, Tabriz Branch, Islamic Azad University, Tabriz, Iran.
E-mail: Arezaie1@gmail.com, a_rezai@iaut.ac.ir

prostate gland. Equisetum is restorative to damaged pulmonary tissue after pulmonary tuberculosis and other lung disease, as the silicic acid is said to stabilize the scar tissue.

MATERIALS AND METHODS

In this study, 30 male wistar rats weighted 200-230 g and aged 3 months old were selected. All animals were kept in same situation (temperature 24°C and humanity 70%) and food and water were provided ad libitum. Animals were divided into 6 groups of 5 rats. To assessment of sedative and pre-anesthetic effects of extract in comparison with diazepam, group 1 received extract at the dose of 100 mg/kgBW, group 2 received extract at the dose of 200 mg/kgBW, group 3 received extract at the dose of 400 mg/kgBW, group 4 received diazepam at the dose of 1.2 mg/kgBW, group 5 received Dimethyl sulfoxide at the dose of 1.2 mg/kgBW and group 6 as control group not received any medicines. 30 minute after administration of above procedures, ketamine at the dose of 40 mg/kgBW was administrated to all 6 groups through intra peritoneal immediately. After ketamine, induction time and sleeping times were calculated. To assessment of anti-anxiety effects of Equisetum arvense extract we used from elevated plus maze test (Wilson, 1998). The Statistical Package for Social Sciences (SPSS Inc., Chicago, IL, USA), version 13.0, was used for statistical analysis. All data are presented as mean ± SEM. Before statistical analysis, all variables were checked for normality and homogeneity of variance by using the Kolmogorov-Smirnoff and Levene tests, respectively. The data obtained were tested by ANOVA followed by Tukey's post-hoc multiple comparison test. $P<0.01$ was considered statistically significant.

Results:

After administration of the anesthetic drug, recording of low induction and high sleeping times are consider as one of the good markers in detection of sedative effects of an anesthetic drug. Data shows that injection of different doses of mentioned extract yields to increase in sleeping time resulted from anesthetic drug. Tukey's test result showed that injection of extract at the dose of 200 mg/kgBW has shown significant difference than 1.2 mg/kgBW diazepam ($P<0.01$). Based on data, IP injection of extract at the dose of 200 mg/kgBW has lower induction time and higher sleeping time than diazepam at 1.2 mg/kgBW ($P<0.01$) to wit, horsetail extract has better sedative and pre-anesthetic effects than diazepam. But, extract at the doses of 100 and 400 mg/kgBW has not show significant difference than diazepam. Thus, can be conclude that efficacy of horsetail extract is dose-independent. Based on data it revealed that extract at the dose of 200 mg/kgBW has better anti-anxiety effect than diazepam ($P<0.01$). But, doses of 100 and 400 mg/kgBW have not showed statistical significance ($P<0.01$). (Diagrams 1, 2, 3)

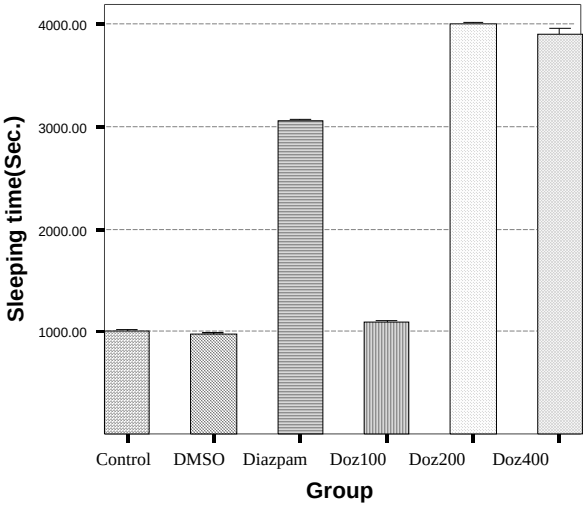

Diagram 1: Data mean of induction time in understudying groups.

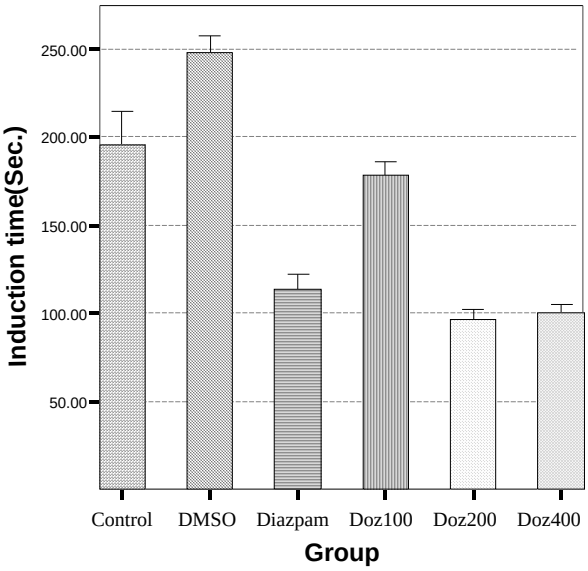

Diagram 2: Data mean of sleeping time in understudying groups.

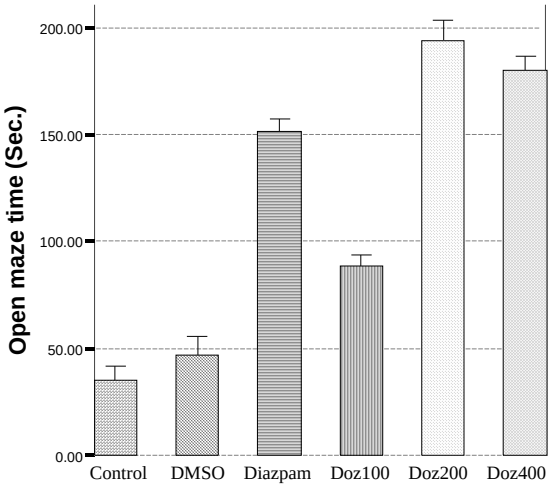

Diagram 3: Data mean of Maze test in understudying groups.

Discussion:

The traditional uses and therapeutic activity of Equisetum arvense has been established through modern testing and evaluation (preclinical and clinical trials) in different disease conditions. These investigations place this indigenous drug as a novel candidate for bioprospection and drug development for the treatment of such diseases as anaemia, inflammation, cancer, convulsions, diabetes. The medicinal applications of this plant and countless possibilities for investigation still remain in relatively newer areas of its function. Hence phytochemical and minerals of this plant will enable to exploit its therapeutic use. In this study revealed that Equisetum arvense extract has sedative, pre-anesthetic and anti-anxiety effects. The research of influence at 5 plant collections on nervous system is carried out. They consist of Equisetum arvense (grass), Galium verum (grass), Plantago major (leaves), Achillea millefolium (grass), Leonurus quinquelobatus and/or cardiaca (grass), Rubus caesius (leaves), Filipendula hexepetala (flowers) and Calendula officinalis (flowers). The collection No1, consisting from a grass of Equisetum arvense, grass of Galium verum, leaves of Plantago major, grass of Achillea millefolium and grass of Leonurus, was the most active. It has the greatest synergism to barbiturates, more than others it increased barriers of emotional response at animals and also has the greatest anticonvulsive effect (Samura, 2002). The hydroalcoholic extract of Equisetum arvense tested at doses of 200 and 400 mg/kg enhanced the number of falls in the rota-rod reducing the time of performance in the bar and increased the

sleeping time (46% and 74%) in the barbiturate-induced sleeping. In the pentylenetetrazole-seizure, it increased the first convulsion latency, diminished the severity of convulsions, and reduced the percentage of animals from death. Thus, HAE presented anticonvulsant and sedative effects (Santos, 2005). The hydroalcoholic (HAE) extract of Equisetum arvense reverses the cognitive impairment in aged rats. Chronic administration of HAE at dose of 50mg/kg, i.p., improved both short- and long-term retention of inhibitory avoidance task and ameliorated the cognitive performance in reference and working memory version of the Morris water Maze (Monte, 2005). In one other study by Behnam Rassouli *et al*., 2009, they worked on Neuroprotective effects of Equisetum telmateia in rat. They worked on two groups, the first subgroups received 3, 6 or 9 injections (15 mg/kg/injection, ip) of horse tail extract and the second subgroups received 3, 6 or 9 injections (6 mg/kg/injection, ip) of sodium meta silicate, respectively. The first injection was made after sciatic nerve injury and the others by 72 hours intervals. After a month, the rats were sacrificed and their spinal cord lumber segment sampled, processed for histological preparation and analyzed stereologicaly (the dissector technique) for estimation of numerical density of alpha motoneurons. The results showed significant decrease in the numerical density of alpha motoneurons in shams ($p< 0.05$) and no significant differences between experimental and control groups. This may suggest the neuroprotective effects of silica on the survival of alpha motoneurons (Behnam Rassouli, 2009; Sandhu, 2010).

REFERENCES

Almack, J., 1985. Grizzly bear habitat use, food habits, and movements in the Selkirk Mountains, northern Idaho. In: Contreras, Glen P.; Evans, Keith E., compilers. Proceedings--grizzly bear habitat symposium, pp: 150-157.

Behnam Rassouli, M., F. Gholizadeh Nasari, M.R. Nikravesh and A. Moghimi, 2009. Neuroprotective effects of Equisetum telmateia in rat. Ferdowsi University International Journal of Biological Sciences, 29-33.

Clute, W.N., 1928. The fern allies of North America north of Mexico. Joliet, IL, Willard N. Clute & Co., pp: 278.

Do Monte, F.H., J.G. Jr dos Santos, M. Russi, V.M. Lanziotti, L.K. Leal, G.M. Cunha, 2004. Antinociceptive and anti-inflammatory properties of the hydroalcoholic extract of stems from Equisetum arvense L. in mice. Pharmacological Research, 49(3): 239-43.

Gleason, H..A and A. Cronquist, 1991. Manual of vascular plants of northeastern United States and adjacent Canada. 2nd ed. New York: New York Botanical Garden, pp: 910.

Graefe, E.U., M. Veit, 1999. Urinary metabolites of flavonoids and hydroxycinnamic acids in humans after application of a crude extract from Equisetum arvense. Phytomedicine, 6(4): 239-46.

Great Plains Flora Association, 1986. Flora of the Great Plains. Lawrence, KS, University Press of Kansas.

Jung, H.C., J.H. Jang, D.J. Ahn, S.J. Kim, H.N. Yun, W.Y. Kong, 1999. Herbal beverage with a diuretic effect. Republic Korea.

Mamedova, K.T. and I.D. Gysejnova, 1996. Effect of Equisetum arvense L. on diuresis, Doklady-Akademiya Nauk Azerbaidzhana, 51: 175.

Mdidea. com- what is horsetail (Equisetum arvense (L)) and its super functionhttp://www.mdidea.com/products/herbextract/horsetail/data.html.

Monte FHMDo, 2005. Santos JGDos jr, Marcela Blanco M, Damasseno MF, Leal LKAM. Cognitive enhancement in aged rats after chronic administration of Equisetum arvense L. with demonstrated antioxidant properties in vitro. Pharmacol Biochem Behav, 81(3): 593-600.

Oh, H., D.H. Kim, J.H. Cho and Y.C. Kim, 2004. Hepatoprotective and free radical scavenging activities of phenolic petrosins and flavonoids isolated from Equisetum arvense, J Ethnophannacol, 95: 421.

Samura, B.A., I.A. Dovzhenok, 2002. Influence of plant collections with horsetail field on nervous system. Fiziologichno Aktivni Rechovini, 2: 104-107.

Sandhu, N., S. Kaur and D. Chopra, 2010. EQUIETUM ARVENSE: PHARMACOLOGY AND PHYTOCHEMISTRY - A REVIEW. Asian Journal of Pharmaceutical and Clinical Research, 3(3): 146-150.

Santos JGDos jr, Monte FHMDo, M. Russi, V.M.N.B. Lanziotti, L.K.A.M. Leal, G.M. Cunha, 2005. Sedative and anticonvulsant effects of hydroalcoholic extract of Equisetum arvense. Fitoterapia, 76(6): 508-513.

Soleimani, S., F.F. Azarbaizani and V. Nejati, 2007. The effect of Equisetum arvense L. (Equisetaceae) in histological changes of pancreatic P-cells in streptozotocin induced diabetes in rats, Pak J Bioi Sci., 10: 4236.

Wilson, J., W.P. Watson and H.J. Little, 1998. CCKB. antagohists proted against anxiety related benaviour produced by ethanol withdrawal, mensured using the elevated plus maze, psychopharmacol., 137: 120-31.