TOXOPATHOLOGICAL EFFECTS OF HENNA (LAWSONIAINERMIS) ON RATS ORGANS

1Zainab, W. Khudair, 2Saleh, K. Majeed and 3Mohammed, A. A. Hasan

1,2,3Department of Pathology, School of Veterinary Medicine, Basrah University, Basrah, Iraq
3Department of Pathology and Microbiology, School of Veterinary Medicine, UPM University, 43400 UPM Serdang, Selangor, Malaysia

ABSTRACT

The henna leaf solution is important plant in veterinary medicine for treating of some cases in farm animals like wound healing, constipation and other internal or external conditions, especially when they are resistant to treatment methods. This study included 12 rats where divided into two groups, each group included 6 rats. The first group was considered as a control group, without any treatment. While the second group had been given 500mg/Kg body weight of henna solution which was administered orally by stomach tube for 60 days. The result of the toxicity of henna on the treated rats was represented by dilation of renal tubes, erosion in mucosa of stomach, atrophy of lymphatic tissue in spleen, suppression of spermatogenesis, enlargement of adrenal gland with absence of inflammatory cells and other organs mentioned in the research.

INTRODUCTION

Henna is cultivated commercially in many parts of the world specially the Arab, sub-Saharan Africa and Asia particularly India, Bangladesh and Pakistan (Agabna, Nuha et al., 2014; Muhammad and Muhamad, 2005 and Bharali et al., 2012). Henna (Lawsoniainermis) is belonged to family (Lythraceae) it is transmission tree, veteran tree. It is heavy branching (2-hydroxy-1,4 naphthaquinone) is the chief constituent and it is responsible for the dying properties of plant (Rostogi and Mehrota, 1993). Bioactive compounds derived from medical plants can be useful but might have serious dose-related side effects (Taylor et al., 2001 and Uddin et al., 2013). Therefore, Lawsoniainermis had been used for ancient times as colorant for medical purpose like skin, hair nail, clothes and leather in many middle eastern counties (Fransworth, 1993 and Rabe and Staden, 1997). The exhibit antimicrobial (Abdallah et al., 2011; Kelmanison et al., 2002; Arun et al., 2010 and Abdul Moneim, 2007), anti-sickling (Clarke et al., 1986 and Chang and Suzuki, 1982), promisiny activity against Trypanosoma parasite was reported by (Okpekon et al., 2004 and Atawodi et al., 2002) also investigated the traditional use of henna to treat sleeping sickness especially among the cattle herders anti-inflammatory, antipyretic, anticomplementary, antioxidant, cytotoxic (Taylor et al., 2004) and immunomodulatory property (Ali et al., 1995 and Chun et al., 1998). Henna has been used traditionally to cure burn wounds (Muhammad and Muhamad, 2005; Dikshit et al., 2000 and Mikhaili et al., 2004). Henna had benefits in treating eczema as paste applied on the affected area 3-5 times and it had also been used to treat psoriasis (Khan et al., 2009). In addition, Lawsoniainermis cream gave complete recovery of cervicitis after using for cervical erosion (Hashmi et al., 2011).

There are investigations found that crude ethanolic extracts of Lawsoniainermis use to treatment diabetes mellitus due to Linememis have antihyperglycaemic effect, protection against most chemical materials which are dangerous that can damage the tissues of the body (Al-Jubory, 2013). Henna is choice factor to fracture healing, tumors, pimples, treatment of uterus diseases, joint diseases (AlferahMosaid, 2012; Ghosh, ? and Endrini et al., 2002), anticarcinogenic potential of henna leaf extract (Abdel-Wahab et al., 2009). But other scientific studies were presented on henna toxic caused allergic, kidney failure and possibly death sometimes with broken red blood cells (Zumrutdal et al., 2008; Burnett and Goldenthal, 1988 and Munday et al., 1991). The present of histopathological examination indicated there are necrosis association with
inflammatory cells infiltration in interstitial, hemorrhage in the lungs, necrosis of some hepatocytes, hydropic degeneration and edema (Selvanayaki and Ananthi, 2012). Degenerative & necrotic changes, cellular hypertrophy & increased intercellular vaccinations which appeared in the stroma of the treatment groups compared to the control result in cell death which is of two types namely apoptotic & necrotic cell death from extrinsic insults to the such as somatic, thermal, toxic & traumatic effects (Bancroft et al., 1996).

MATERIALS AND METHODS

Animals

We took 12 healthy Albino Wister rates (150-200g) from DhiQar university and placed in the animals house in Basra university, collage of veterinary medicine at adaptation period with giving them diet and water and noted the activity of the rats daily and then began the experiment.

Plants

We collected leaf of henna from Basra region, dried and crushed into fine powder with help of grinder. The extraction was done by take 5gm of henna powder dissolved in 10ml of distilled water for obtaining the extract.

Extract Administration

12 Albino Wister male rates were selected to be used for the experiment and divided into two groups, each group included 6 rats. The first group had been given 1ml of distilled water while the second group had been 500mg/kg of henna solution orally by stomach tube daily for 60 days.

Histopathology study

After giving the leaf extract of henna and then death animals with scarified killing & necropsy of the animals, take the organs, fixed by 10% formalin, passed upgrading of concentration alcohol, zylene, embedded in paraffin, cut by microtome 5µm & then staining with hematoxyline & (H&E) eosin and examined by light microscope (H&E).

RESULTS

The rats of the treated animals in the present study showed clinical signs at final time of experment represented by loss of weight, general weakness, emaciation, nervous signs and convulsions.

Histopathological Changes

Stomach

Control Group

The body of the stomach includes mucosa which is made of three components: The epithelium a supporting lamina properia and a thin smooth muscle layers, the muscularis mucosa. There is submucosa which is loose collagenous tissue supports the mucosa contains the large blood vessels, lymphatic and nerves. There are muscularis properia consists of smooth muscles which is usually arranged as an inner circular larger and an outer longitudinal layer (Fig. 1).

![Figure 1. Rat stomach show normal Tissue (H&E, 10X)](image)

Treated Group

There are histologic changes in the stomach section of the rats like erosion of the mucosal layer of stomach (Fig. 2). Increase cellularity in lamina properia (Fig. 3). Increase hyperkeratosis of non-glandular layer of the stomach (Fig. 4).

![Figure 2. Rat stomach show erosion of mucosal layer (H&E, 10X)](image)

![Figure 3. Rat stomach show increase cellularity in lamina properia, H&E, 40X)](image)
Liver

Control Group

The histological examination of the liver tissue of the Albino Wister rats showed normal portal triad area with no abnormality (Fig. 5).

Treated Group

After examination of the liver section, there were congested central vein and sinusoids, accumulation fibrosis and mononuclear cells around central vein of the liver of the treated group (Fig. 6).

Kidney

Control Group

The histopathological examination of the kidney in Albino Wister rats of the control group showed the glomeruli with normal size and normal renal tubules (Fig. 7).

Treated Group

The histological examination of the kidney of the treated group showed hemorrhage in the interstitial tissues with dilated renal tubules (Fig. 8) and vaculation of the cells of the renal tubules (Fig. 9). The glomerulus with high cellularity of prominent Jakesa glomerulus (Fig. 10).
Testes

Control Group

Seminiferous tubules had been cut in transverse section. The processes of spermatogenesis and spermigogenesis are synchronized, undifferentiated germ cells were found in the basal compartment of the seminiferous tubules are called spermatogonia type A, spermatogonia type B, produce primary spermatocytes, spermatozoa (Fig. 11).

Treated Group

The histopathological changes of testicular tissue showed suppression of spermatogenesis, giant spermatogonia and no stages or absence of primary, secondary spermatogonia (Fig. 12) as well as formation of multinucleated spermatedgiant cells (Fig. 13).

Adrenal Gland

Control Group

The adrenal gland had two parts; outer cortex and medulla. The cortex consisted of three histological zones which are named according to the arrangement of the secretory cells: Zona glomerulosa, zona fasciculata and zona reticularis. The medulla was a pale stained inner layer which is a dense fibrous tissue capsule (Fig. 14).

Treated Group

The histopathological changes of the adrenal gland were represented by presence of enlargement of tissue especially in zona glomerulosa, zona fasciculate & zona reticularis (Fig. 15).

Cardiac Muscle

Control Group

The longitudinal section of the cardiac muscle cells showed containing of one or two nuclei and extensive cytoplasm
which branches to give the appearance of a continuous
dimensional network and presence a specialized intercellular
muscle cells which are intercalated discs between the ends of
the adjacent cardiac muscle cells (Fig. 16).

**Treated Group**

There were a swelling of cardiac muscle cells due to
vacuolated appearance in the cytoplasm (Fig. 17).

**DISCUSSION**

In this study observed clinical signs after repeated
administration of henna (*lawsonia inermis*) at dose 500 mg/kg
for 60 days which observed into lating period of treated agree
with (Agabna *et al.*, 2014; Khanet *et al.*, 2009 and
Selvanayakiand Ananthi, 2012) and in the histological features
of rat tissue due to their wide spread use of medicinal plants in
alternative medicine toxicological assessment becomes
imperative in order to arrive at potencies that can be considered as safe formulations for clinically efficient remedies (Chang and Suzuka, 1982 and Taylor et al., 2004). The result of all scientific studies of henna as plant or flowers have effects on human or animals with notable exceptions (Dikshit et al., 2000), histopathological effect of 500 mg/kg of henna in stomach for 60 days due to saponinosis, tannins and flavonoids are known ulcer productive agents or materialsof henna especially phenolic content (Chun et al., 1998 and AlFerahMosaid, 2012) some researchers were signal there are somatic, thermal, toxic and traumatic effect of administration of henna in stomach layer (AwekaAdjene, 2013). As well as 2- hydroxyl 1-4-naphthoquinone was not only haemolytic agent but anephtoxin caused enlargement elevated plasma levels of urea and necrosis of renal tubules.

The relationship between the in vivo toxic effects of these naphthoquinones and previously reported data on their in vitro cytotoxic action (Munday et al., 1991) the greater chemical reactivity of nanomaterials can result in increased production of reactive oxygen species (ROS) including free radicals, which is one of the primary mechanism of nanoparticle toxicity. It may result in oxidative stress, inflammation and consequent damage to proteins, cell membranes and DNA as well as have steroids and haemolytic effect that is mean causeddegree of toxicity which effect on circulation lead to degenerationinmuse and sciatic nerve with characteristic features of sever angioneurotic edema (Sauriasori et al., 2007). Liver and kidney were important organs of metabolic, detoxification, storage and excretion of xenobiotics and their metabolites and especially vulnarebleto damage.

REFERENCES


Chang, H. and Suzuka, S.E. 1982. Lawsonone (2-OH,1,4-naphthoquinone) derived from the henna plant increase the oxygen affinity of sickle cell blood. Bio-chemical and Biophysical Research Communications, 107(2),602-608.


*******