International Journal of Sciences & Applied Research

www.ijsar.in

STUDIES ON EFFECT OF CONTROL DRUGS (OPIUM) ON THE SERUM PROTEIN OF ALBINO RAT

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ABSTRACT

Poppyplant Papaver somniferum is the source of the narcotic drug opium which contains powerful medical alkaloid such as morphine and has been used since ancient time as analgesic and narcotic medicinal recreational drug. It relieves in pain and supresses of cough but cause addiction and respiratory depression. This study attempts to evaluate the health status of the albino rat on the basis of serum protein change under opium addiction. Rats were orally feed with opium on constant dose i.e.1.38g/kg body weight for 5, 10 and 15 days. Significant change decline serum protein observed.

Key words: Opium, Albino rat, Serum protein.

INTRODUCTION

The natural source of opium is a poppy with a white flower plant, Papaver somniferum. This poppy has its origins in Asia Minor (Sumer) ancient Iraq. But is now grow in countries with similar climates throughout world. The plant manufactures the drug several active ingredients in opium are present. The two main, ones are morphine, which accounts for 10% of the weight of opium and codeine, which makes up only 0.5%.Morphine was first isolates from opium by the German chemist Friedrich Serturner. He called it morphium after Morpheus the Greek God of sleep and published his findings in 1804.

Opium is plant alkaloid obtained from a plant known as Papaver somniferum. when the plant flowers petals have fallen slightly incising (cut) the unripe poppy seed pod and latex (waterly juice) obtained. Its dried form is called raw opium. The dried latex is malleable gum which is light to dark brown in colour. In 1804 morphine isolated from opium and 1898 heroin synthesized from morphine. Heroin is white or brown powder or black tar. It is used as drug generic name morphine sulphate. Morphine is used as an analgesic which has tranquilising actions. It can induces a relaxed sleep and reduced fearfulness associated with pain. It can be given orally or parentally and is of most value in relieving dull prolonged pain. It relieves pain suppresses cough but cause addiction and respiratory depression.

The work will be helpful in exploring the biochemical changes in the blood serum of opium addicted rats. Very scantly information is available as regards to effects of opium to albino rat like Alarcon (1969), Atweh & Kumar (1983), Naik & Kar (1983), Ball & Snarr (1969), Hill et al

(1993), Arti & Akela (1993), Akela & Arti (1994), Arti & Akela (1996), Revati et al (2003), Shipra et al (2005) Aruna et al 2007.

MATERIALS & METHOD

The healthy adult rats of equal weight and age were selected for experiments after proper acclimatization to laboratory condition. The albino rats were divided into two groups.

GROUP – 1 the rats' kept as control were fed with normal pellet diet. GROUP -2 the second group rats were orally feed with opium of constant dose i.e. 1.38g/kg body weight for 5, 10 & 15 days. At the end of exposure period i.e. 5, 10 & 15 days. Blood was collected directly from the heart on dissecting the anaesthetised albino rat, Heparin was used as anticoagulant, serum protein was estimated by the "Biuret method" of Varley et al (1980),

Stock Biuret reagent

22.5 g Sodium potassium tartrate, was dissolved in 200 ml of 0.2 N NaoH into which 7.5 g of $Cuso_4$ was dissolved. 2.5 g sodium iodide was added to this solution and the volume of the solution was made 500ml with 0.2 N NaoH.

Working Solution

50ml of stock reagent was made 250 ml with 0.2 N NaoH containing 5 g potassium iodide per litre. This served as working solution.

STANDARD

Bovine serum albumin was used as standard which was prepared by dissolving 500 mg /1000ml.

PROCEDURE

0.2 ml Serum was transferred to 3 ml of 0.9% Nacl. Three test tubes marked. T, S, and B were taken. 2 ml of the above diluted Serum was taken in the T and 2 ml of the standard solution was transferred to test tube S whereas to B tube was poured 2 ml of water. The T, S and B tubes served as test. Standard and blank respectively. None to each of these tubes 5 ml working biuret reagent was added. The three tubes were now placed in a water. Both at 37°C for exactly 10 minutes and then optical density was measured at 540 nm using a spectrophotometer (spectronic 20)

CALCULATION

$$\frac{Grams\ of\ total\ protein}{100\ ml\ of\ the\ Serum} = \frac{Reading\ of\ T-B}{Reading\ of\ S-B} \times \text{Grams of protein in 100ml of Standard Solution.}$$

All the data were analysed for statistical significance between the mean ($\bar{X}$) of the experimental and control group by using students't' test and 'p' values calculated to determine the level of significance.

RESULTS AND DESCUSSION

The serum protein of opium addicted rats showed a significant decline. It showed statistically highly significant ($P < 0.001$) in both male and female rats. The serum protein in control group of rat is 7.32 ± 0.08 is male while in female the value is 6.32 ± 0.07. In male rat with opium addicted under 5, 10, and 15 days the value are 7.22 ± 0.06, 6.93 ± 0.04 and 6.67 ± 0.07 respectively. While in female the value are decrease i.e. 6.22 ± 0.03, 5.91 ± 0.04 and 5.80 ± 0.4 respectively.

The present loss in serum protein may also be explained in this light. The liver cell might have reduced or stopped the synthesis of serum protein due to the direct effects of the opium and the serum would have been utilized under opium addicted stress leading to their depletion.

TABLE

2 gm. /kg body weight			Opium addiction in days		
PARAMETER	SEX	CONTROL	5	10	15
Serum protein gm./ 100ml	male	7.32 ± 0.08	7.22 ± 0.06	6.93 ± 0.04	6.67 ± 0.07
	female	6.32 ± 0.07	6.22 ± 0.03	5.91 ± 0.04	5.80 ± 0.4

GRAPH

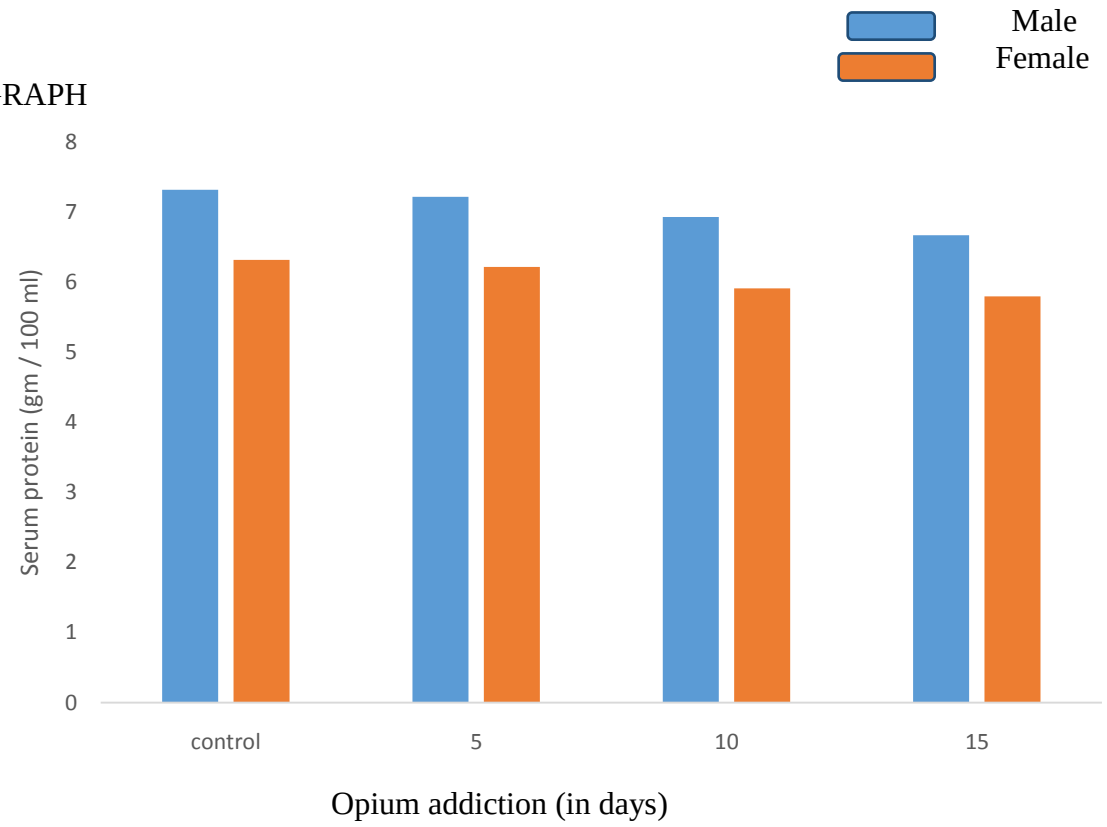

Fig :- Showing the effect of opium addiction on serum protein in male & female albino rat.

During present study plasma protein to be depleted are the enzymes of the gastro intestinal secretions (gastric pancreatic intestinal secretions), the hepatic engorges concerned in processing the absorbed nutrients to plasma proteins, lipoproteins as well as the glycolytic enzymes proteins (Albanese 1959, cooper et al 1960).

The rate of cell division protein syntheses and enzymatic development can be well influenced by the state of nutrition since free amino acids are the building blocks from dietary protein and protein reserves of the body (Wanne Macher & Yatrin 1965).

The majority of the changes in structure proteins which have been reported can be directly related to the oxidation of amino acid for energy. Glycogen and /or lipids are generally utilized first, however, depending upon the season, reproductive status of the organisms protein can become an important energy source (Heath & Barnes 1970). During toxicant induced

stress protein catabolism was increased in oysters exposed to Naphthalene and in fresh water crabs exposed to submission increased proteolysis to meet the energy demands of stress were assumed to cause the decline in structure proteins.

Depletion of proteins as a result of toxicity stress was already reported by a number of workers (Rath & Mishra 1980) have reported such reduction in proteins content in fish Tilapia mossambica was exposed to dichlorovos. Shastry and Siddiqui(1983) reported significantly decreased plasma protein level in Channa punctatus in toxicited with endosalfan. Rajain(1993) observed the biochemical changes of total protein due to halothane in sheep. Smith(1992) studied the gabaergic involvement in the acquisition of voluntary ethanol intake in laboratory rats.

Similar finding is in conformity with finding of Jha (1992), Jha and Jha (1995), Singh (1999), Singh (2002), Ray (2003), Choudhary (2004), in fish. While Naik (1993), Majumdar (2005), Aruna et al (2007), in rats. Very recently Shipra et al (2005). Clearly explained that a protein level has been observed at all dose of the dye blend. This depletion in the serum protein might be due to liver damage following orange red administration. The disturbance in liver function would naturally result in decreased synthesis of protein and thus results in hypoproteinemia in rats.

The examples cited above reflects as to none loss of total proteins in the present case might be associated with intensive proteolysis and inhibition of protein synthesis and utilization of their degradation product for mobilization under the influence of opium stress. They might have incorporated into TCA cycle through aminoacid transferase system.

In muscle the glutamic oxaloacetic acid traminase (GOT), the distinguishing substrate being oxaloacetic acid & pyruvic acid respectively might have affected the transfer of amine group from glutamic acid to keto acid receptor such as oxaloacetic acid.

It has been reported Gupta & Agrawal (1982), that reduced tyrosine amino transfer enquire has direct effect on weight and the concentration of hepatic protein nucleic acids and freeα - amine nitrogen (α) suggesting that better profiles synthesis occurs as a result of improvement in protein quality.

Lack of single amino acid does not occur naturally, but can be produced experimentally hepatic necrosis anaemia, haemorrhagic necrosis kidney, hypo protein acid fatty liver, hepatic cirrhosis, hypospermia in testes are some of the conditions caused by depriving some of essential amino acids from animal diet.

There is also an atrophy of the acinar portion of pancreas resulting indigestion, diarrhoea, steatorrhea. Which all further aggravate the protein deficiency kidneys are also damaged resulting in increased excretion of amino acid in urine (Alban et al 1959, Cooper 1960).

CONCLUSION

The present loss in serum protein may also be explained in this light. The liver cell might have reduced or stopped the synthesis of serum protein due to the direct effects of the opium and the serum would have been utilized under opium addicted stress leading to their depletion.

Opium get rid from mental anxieties, relieves in pain and supresses of cough but its addiction is harmful of body. Present study findings of significant change

decline serum protein 5, 10 and 15 days opium addiction. So think before intake opium.

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