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Amylase Activity in Albino Rats Treated With Painkil Tablets (Analgesic)

[1]Agbafor K. N. and [2]Ossai Emmanuel C.
[1]*Department of Biochemistry, Ebonyi State University, Abakaliki, Nigeria.*
[2]*Department of Biochemistry, University of Nigeria, Nsukka, Nigeria.*

Abstract: *The use of painkil tablet (analgesic) has been reported to show some toxic effect. This research was set up to determine the possible toxicity of painkil tablet (analgesic) to the pancreas of albino rats. Twenty albino rats were grouped into five groups of four rats each. Groups A, B, C and D were treated orally with doses of 4.0, 8.0, 14.0 and 21.0mg/kg respectively of the drug solution for seven days while animals in group E were kept as control. Treatment of the animals with the drug solution/sample resulted to a decrease in physical activities, body weight, feed and water intake during the days of treatment while the control increased in body weight. Measurement of total protein concentration showed significant decrease between the test and control groups (P< 0.05). The amylase activity in the serum of the albino rats in the test groups was found to be significantly higher (P<0.05) from that of the control, the effect was found to vary among the doses. The findings in this research suggest that painkil tablet maybe toxic to the pancreas especially at high doses.*
Keywords: *Painkil, total protein, analgesic and pancreas.*

I. Introduction

Pain is an unpleasant feeling often caused by intense or damaging stimuli, such as stubbing a toe, burning a finger, putting alcohol on a cut etc, the international association for the study of pain widely used definition which states that pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage. However, pains can be explained as a mental or emotional suffering or torment, various daily activities and actions which may cause pains and aches like, headache, muscle cramp or a pinch from someone or engaging in strenuous exercise that can be lead to muscle aches (Backonja *et al*., 2011).

The word analgesic is derived from Greek work "du" meaning without and "algia" meaning pain. An analgesic is also known as painkiller and is any member of the group of the drugs used to achieve relief from pain (Harper, 2012).

Analgesic drugs act in various ways on the peripheral and central nervous systems, they are distinct from anesthetics which reversibly eliminate sensation and include paracetamol (known in the US as acetaminophen). The non-steriodal anti-inflammatory drugs (NSAIDS) such as the salicylates and opioid drugs such as morphine and opium. In choosing analgesics, the severity and response to other medication determines the choice of agent, the World Health Organization (WHO) pain ladder specifies mild analgesics as its first step. Analgesic choice is also determined by the type of pain: for neuropathic pain traditional analgesics are less effective and there is often benefit from classes of drugs that are not normally considered analgesics such as tricyclic antidepressants and anticonvulsants (Dworkin *et al*., 2003).

Painkil tablet is an analgesic used to achieve relief from pains and is made up of Diclofenac and paracetamol. It contains 500mg of paracetamol and 50mg of diclofonac. The exact mechanism of action of painkil tablet is uncertain but appears to act centrally in the brain rather than peripherally in nerve ending.

Amylase is an enzyme that catalyzes the hydrolysis (splitting of a compound by addition of water molecule) of starch into smaller carbohydrate molecules such as maltose (a molecule composed of two glucose molecule) (Schelger, 2003). Amylase has an optimum pH and temperature range in which it is most active, and in which the substrate binds most easily. At high substrate level, the enzymatic rate increase if the temperature is increased, then the enzymatic rate will decrease (Robert, 2012). Serum amylase levels are elevated in acute pancreatitis obstruction of pancreatic ducts, occasionally elevated in the presence of renal insufficiency diabetic acidosis and with inflammation of the pancreas from a perforating peptic ulcer.

The factors that effect amylase activities are

Acute pancreatitis, cancer of the pancreas, ovaries or lungs, intestinal blockage, kidney disease, toxemia of pregnancy and acute pancreas

The normal reference value of amylase is 16-35 months, 19-98µ/l, 3-4 years, 26-106µ/l, 5-12 years, 30-119µ/l, 13 years and older 30-110µ/l.

II. Aim and Objectives

The adverse effects of analgesic drugs have been investigated. Painkil tablets (Analgesic) have been shown to affect various body systems. This research evaluated the effect of painkil tablet on the pancreas of albino rat using amylase activity as an indicator after treating the rats with the drug.

III. Materials And Methods

Collection of Albino Rats

Twenty adult male rats were collected from the Animal House of the University of Nigeria, Nsukka (UNN), using steel cages and transferred to Ebonyi State University Animal House in Presco Campus, Abakaliki.

Collection of Drug

The painkil tablets of 500mg of paracetamol and 50mg diclofenac were bought from a Pharmacy Shop at Ariaria in Aba, Abia State.

Preparation of Painkil Solution

Thirty (30) tablets of painkil were dissolved in 400ml of distilled water and the concentration of 5mg/mol was gotten.

Animal Handling and Treatment

The albino rats were grouped into five groups of four rats each.

Measurement of Weight of Animals

The weight of the rats were measure daily, using weighing balance and used to determine the actual volume of prepared solution of painkil to be administered.

Administration of Samples to the Animals

Doses 4, 8, 14 and 21mg/kg weight of drugs were administered orally to rats in A, B, C, D and E respectively for seven days using 2ml syringe. Group E served as control and distilled water was given to them. The animals were allowed free access to food and water throughout the experiment.

Collection of Specimen

After seven days of drug administration to the albino rats, the albino rats were starved overnight under a mild anesthesia (diethylether) and the blood samples were collected.

Determination of total protein concentration.

Total Protein was determined using (Lowry, 1951) methods.

Determination of serum amylase

Amylase activity was determined using (Caraway, 1959) methods.

Statistical Analysis

The results expressed as mean ±standard deviation. The data were subjected to statistical analysis.

IV. Results

Physical Observation

The treated rats showed reduction in physical activities, feed consumption and water intake unlike the control.

Table 1: Mean weight of animals (G) during seven days of drug administration

DOA	A	B	C	D	E
1	95.50±9.95	95.61±9.93	114.95±9.55	99.50±9.43	120.52±8.85
2	94.16±9.01	94.80±9.65	112.72±7.40	95.61±7.40	123.50±9.01
3	93.63±8.60	93.98±8.80	110.55±6.65	93.63±6.80	125.01±9.03
4	90.45±8.05	91.12±7.95	105.45±5.85	92.45±5.42	127.03±9.05
5	85.75±6.66	90.98±5.55	104.40±5.02	90.75±4.95	129.01±9.07
6	80.80±6.55	85.65±4.95	100.37±5.04	85.50±4.05	131.02±9.08
7	75.53±5.95	80.32±4.01	99.38±4.04	82.52±3.90	134.02±9.30

N/B: Values are mean weight±standard this table shows the average body weight of animals in groups A, B, C and D during the seven (7) days of drug of administration.

Table 2: Changes in average enzyme activity, protein concentration, and specific enzyme activity after seven days of drug administration.

No of animals/ group	Enzyme Activity (µ/l)	Total protein (mg/l)	Specific enzyme activity (µ/l / mg/l)
A	150.96±7.50	0.55±0.03	277.01±12.09
B	167.55±9.14	0.51±0.01	336.18±53.76
C	191.63±4.85	0.41±0.02	479.40±47.76
D	218.85±12.16	0.31±0.01	711.03±69.66
E	116.86±10.50	0.79±0.02	146.93±8.14

All values are mean ± standard deviation

Changes in Average Enzyme Activity, Protein Concentration and Specific Enzyme Activity after Seven Days of Drug Administration

The result in table 2 shows that the total protein concentration of the test groups reduced insignificantly ($P<0.05$) from that of the control. There was a significant difference ($P<0.05$) between the enzyme activity and specific enzyme activity. The enzyme activity and the specific enzyme activity of the test groups increased relative to the control group.

V. Discussion

The actual biochemical mechanism involved in the reported decrease in physical activities, feed and water intake is not known, however, it may be due to the some chemical constituents of the administered drug (painkil tablet). The work by Dworkin *et al.,* (2003) observed that some of the analgesic drugs have some side effects like gastro intestinal upset, digestion, itching and dizziness which maybe as a result of the stimulation/inhibition of cell metabolic enzymes. Similarly, observation has been reported by Meister *et al.,* (2002) after treating albino rats with paracetamol.

The mechanism supporting the weight lost in the albino rats can be suggested for further studies. The observed loss of appetite may account for the weight loss and apart from this direct effect of constituents of the painkil tablet (analgesic) in the animals which may cause metabolic changes upon their ingestion and may certainly have contributed to the observed changes (Backonja, 2011). A similar observation was made by Raurt *et al.,* (2005) on albino rats treated with diclofenac.

The protein analysis carried out on the serum revealed a significant decrease ($P < 0.05$) in protein concentration. This suggests that the chemical constituent of the drug at the doses administered may influence the rate of protein synthesis and degradation. This report has also been presented by Dworkin *et al.,* (2003) when the albino rats were treated with panadol (an analgesic).

The significant increase ($P>0.05$) in amylase activity showed in the animals administered with the drug may suggest that the drug possess amylase activity potentials, the exact biochemical reason for the increase in amylase activity is not clear. It may be as a result of administration of the drug solution which may have exhibited toxic effects on the organ causing the enzyme to leak from the liver into the bloodstream, thereby reducing the serum level of amylase according to Levit (2003). The analgesic potential shown by the drug may be responsible for the application of the drug (painkil tablet) in the management, treatment or disorders such as chest pain, muscle pain and arthritis Solomon *et al.,* (2005). The dose dependent nature of the increase in amylase activity indicates that the doses used might have significant effect on the liver which could be as a result of physiological association with the ingestion of the drug.

VI. Conclusion

The observation made in this research (Amylase activity of rats administered with painkil tablet) indicates that this drug may possess adverse effect on the pancreas. It can be concluded that the drug may be toxic on over dose, since the actual mechanism of painkil as analgesic is not yet understood, further research is recommended for proper investigation.

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